

Kosova- Energy and Environmental Challenges to Security

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**Paper submitted for the NATO Advanced Research Workshop” Energy and
Environmental Challenges to Security” November 21–23, 2007, Budapest**

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Abbreviations

TPP thermo power plants

KEK Kosovo Energetic Cooperation (Korporata Energjetike e Kosovës)

ABSTRACT

The environmental status of Kosovo is dominated by a range of issues including polluted TIR, soil and water and poor infrastructure management generated mostly by the lack of an environmental protection regime in the past.

Based on the researches and measurements carried out up to now and also through sightseeing, information gathered and empiric comparison with the results of the previous activities in the sector, it is obvious that environment pollution in Kosovo is relatively high, caused from different resources such as: energy production facilities (TPP), industrial facilities (metallurgy factories, quarrying sites and cement factories), the transport sector, activities in agriculture, industrial and urban waste, central and individual heating, low quality infrastructure, etc.

Through Environmental Strategy of Kosovo, Kosovo Strategy of Energy of and Kosovo Development Strategy and Action Plans, recognizes the opportunities for improving environmental goals through :

Reducing environmental impacts of energy use and promote environmental awareness in the operation of the energy industry.

Consist in the increase of energy efficiency, increase and improvement of energy savings, use of economic, regulatory and legal instruments for energy efficiency and saving.

Implementing appropriate transportation policies.

Introduction

Kosova is a small territory in the center of Balkans' Peninsula. Kosova is bordered with Macedonia (FYROM), Albania, Serbia and Montenegro. Kosova covers a surface of 10.887 km². The total number of population is not known, however based on previous data and present evaluation, it is estimated that Kosova has approximately 2 million inhabitants, (a post-conflict census has not yet been carried out).

Kosova is characterized by a complex geological construction, which has also conditioned the creation of a wide spectrum of sources and their metal, non-metal energetic resources, inert materials and mineral water appearance.

During last decades the economy of Kosova mainly relied on mineral processing industry, production of Pb, Zn, Ag, Au, etc., energy, textile and agriculture.

Kosova's economic development depended on developed metallurgical industry of the mines, for internal use as well as for export. Besides this in Kosova, especially in KEK (Energetic Sector) and in Trepca, mines and metallurgical industry, were the biggest employers and work suspension in there has caused negative social effects in Kosova.

Today, the economic development of Kosova is at a very low level and restarting the mines and metallurgy activities and building a new industries, is essential for further development of Kosova.

The environmental status of Kosova is dominated by a range of issues including polluted air, soil and water and poor infrastructure management, generated mostly by the lack of an environmental protection regime in the past..

The level of many atmospheric pollutants exceeds the accepted international standards, for example at the TPP near Prishtina and the dust from the industrial activities in Mitrovica region, in which there is a high amount of Pb, Cd, As, Ni etc.

Compared to central European countries, Kosova could be considered a territory with many environmental problems.

2. Energy Activities

After the conflict the interest of the Government was strengthened energy sector due to the financing for repairing and security of energy supply. Government took more responsibility for providing or mobilizing funds, to ensure that energy supply capacity is expanded to meet the future demand. In 2006 with Energy Strategy and Kosova Development Strategy, energy supply had turned into a socio-economic and strategic matter

1.1 Current situation in the electricity sector

Electricity sector in Kosova is dominated by the power generation company, KEK, a vertically integrated system. The integrated electricity system is composed of two lignite mines at Bardh and Mirash, two TPP, Kosova A and B, with an overall effective capacity from 645 to 710 MW (from an installed capacity of 1478 MW), from network transmission and dispatching, distribution network and supply.

The TPP, Kosova A and B, industrial site about 3 km from Prishtina, is place for a number of activities with environmental impact on the surrounding area. The most important from an environmental point of view are mining of lignite, power generation and gasification (the plant stopped production about 10 years ago but the are never been decommissioned).

1.1.1 Lignite reserves

There are two major lignite basins: Kosova lignite basin and Dukagjini lignite basin and also smaller lignite basins like: Drenica, Malishevë, Babush i Muhaxherëve and one potential lignite basin in southern part of Kosovo with lignite exploitable reserves of good quality. The estimated lignite quantity is between 11.55 - 14 billion tons. Lignite reserves have low content of sulphur, relatively good concentration lime (calcium oxide) for partial sulphur absorption during burning. The proportion between the waste land and lignite is very favourable, a fact that makes mines very attractive for exploitation.

Key parameters of lignite basins;

Area: 19.7 km²

Geological reserves: 990 m t

Exploitable reserves: 830 m t

Overburden to Coal Ratio: 0.9 m³: 1 t

Average Coal Seam Thickness: 75 m

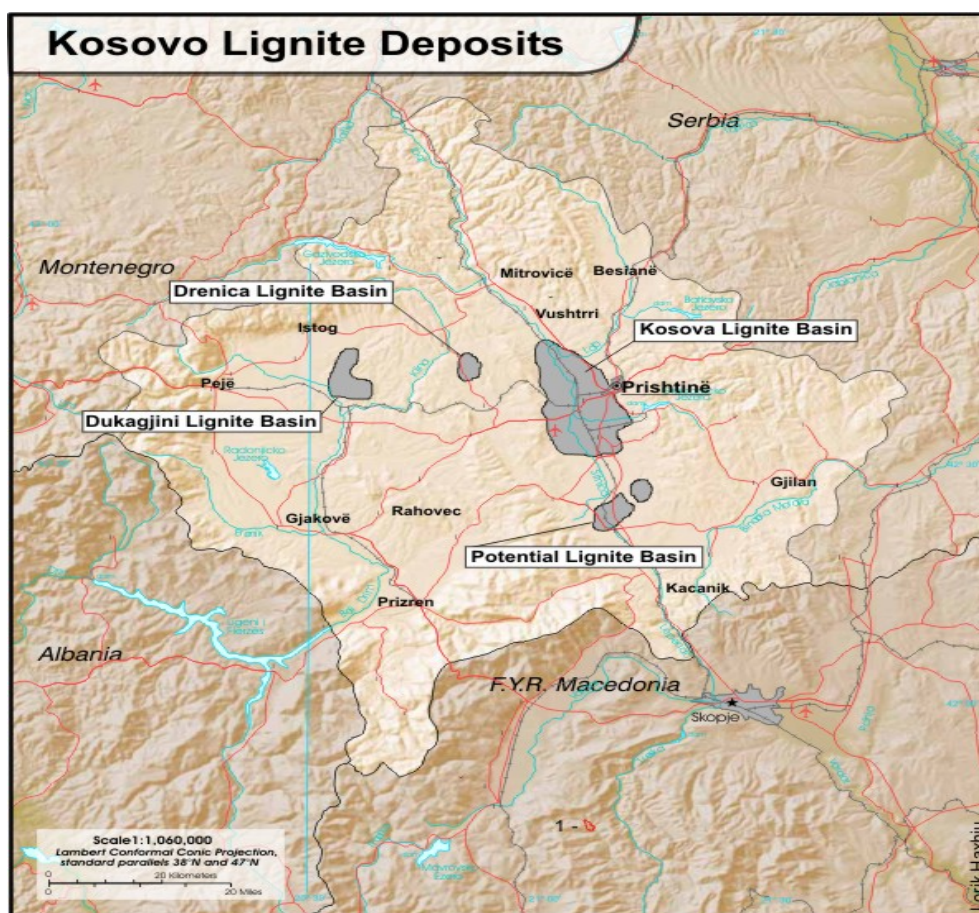


Fig 1. Lignite resources in Kosova

Two open mines of lignite (Bardh and Mirash) operate from 1963/64. Currently these two mines supply two power plants with approximately 7 million tons of lignite per year. According to last estimates existing mines will exhaust completely until 2007/2009, which depends from the intensity of energy generation compared to the lignite reserves in existing mines.

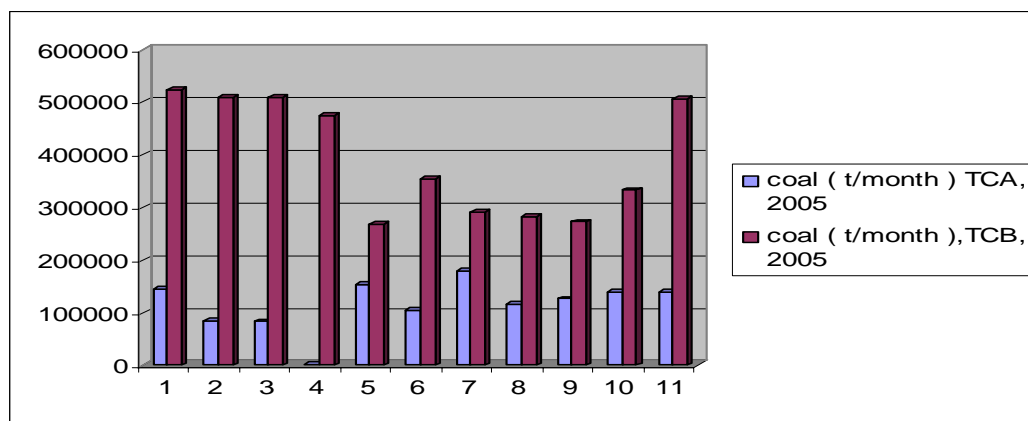


Fig 2. Exploited coal, 2005

1.2 Thermal power plants

Installed technical capacities of two TPP could have been sufficient for fulfilment of current Kosova's demands for electricity. However, due to the lifetime and improper maintenance years before and after the conflict, the security and generation capacity of these TPP and their equipments have been seriously damaged. Hence fore, existing available capacities are reduced significantly specifically at TPP Kosova A, Vast part of the generating units at TPP Kosova A is in very weak operating condition and with small generating possibilities, as a result of failures and unexpected breaks.

| | Installed | Net | Net available | | |
|----------|-----------|-----|---------------|--------------------|------|
| Kosova A | | | | | |
| Unit A1 | 65 | 58 | 30 – 40 | Lignite/Oil | 1962 |
| Unit A2 | 125 | 113 | 0 | Lignite/Oil | 1964 |
| Unit A3 | 200 | 182 | 0 | Lignite/Oil | 1970 |
| Unit A4 | 200 | 182 | 0 | Lignite/Oil | 1971 |
| Unit A5 | 210 | 187 | 95 – 110 | Lignite/Oil | 1975 |
| Kosova B | | | | | |
| Unit B1 | 339 | 309 | 260 – 280 | Lignite /Heavy Oil | 1983 |
| Unit B2 | 339 | 309 | 260 – 280 | Lignite /Heavy Oil | 1984 |

Table1. Existing TPP in Kosovo

Participation of households and services has increased from 26% to 75%, respectively, from 7% to 13%, whereas the industry percentage has decreased from 67% to 12%. The overall number of KEK consumers has been estimated to be around 360,000. The electricity consumption for comprises 64.2% of the supplied electricity, therefore creating a huge load during the winter season. The above mentioned situation, regarding the supply in the electricity sector, has put KEK into a very unstable economical situation, with limited financial capabilities for fulfilment of its own duties.

Other problems that aggravate the situation are:

- Lack of financial means for rehabilitation and revitalization, and current dilemmas on which generating units needs revitalizing and which need to be closed down.
- Restructuring and reorganizing in process including incorporation.
- Long term problems with environmental pollution.
- Unresolved status of the KEK management.
- Political instability for foreign investors.

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KEK has increased its electricity production with 15% over the last 2 years. This is about the same percentage as the increase in coal production. Public consumption of electricity has fallen by 20% in that period, whereas commercial consumption grew by 7%. Electricity imported fell by 13%, whereas export of electricity grew by as much as 30%.

| Year | Coal Production (t) | Electricity (MWh) | | | | |
|------|---------------------|-------------------|---------|---------|-------------------|-----------|
| | | Production | Imports | Exports | Consumption (MWh) | |
| | | | | | Public | Comercial |
| 2004 | 5.658.333 | 3.481.054 | 650.640 | 194.665 | 1.489.978 | 649.239 |
| 2005 | 6.391.139 | 3.999.767 | 490.641 | 225.755 | 1.447.864 | 661.460 |
| 2006 | 6.532.348 | 3.970.511 | 537.816 | 253.297 | 1.458.605 | 696.511 |

Table2. Coal and electricity production

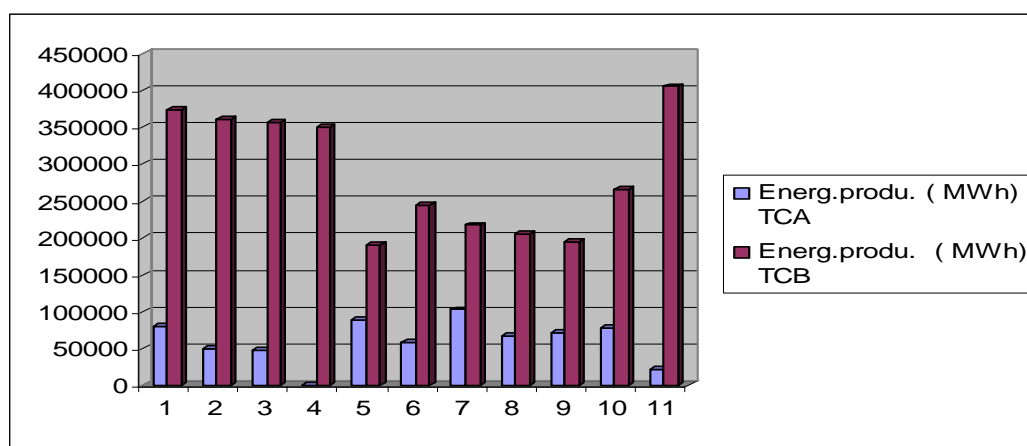


Fig 3. Energy production/month, 2005

The only important plant outside of KEK is hydro plant is Gazivoda/Ujmani ($2 \times 17.5 = 35$ MW), administrated by the water company (Hydrosystem Ibër-Lepenc). Units A2, A3, A4 are out of function

1.3 Transport

The transport sector is characterized by a large number of old vehicles and low-grade fuel quality being used.

The number of vehicles registered in Kosovo is an indication for the amount of emissions. Overall the number of registered vehicles went up by 18% in one year. The majority of these vehicles are private cars, which went up by 5%. The other categories vary quite a bit and probably there has been some confusion with the categorisation.

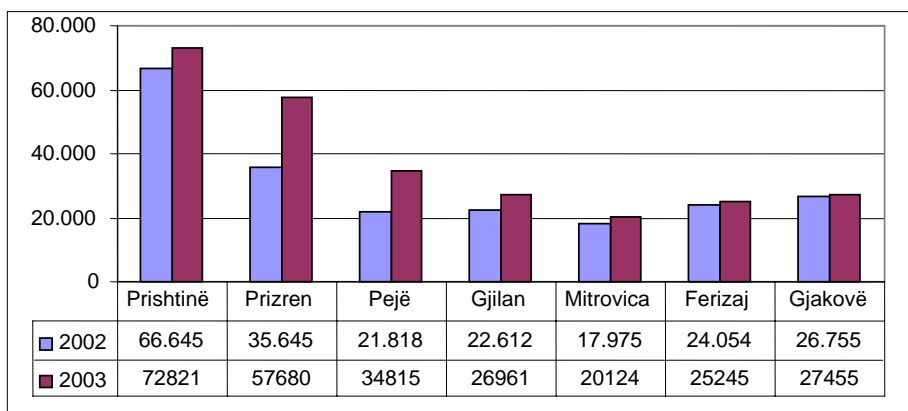


Fig 4. Vehicle distribution per region

Railways are not electrified in Kosovo. This means that trains run on diesel. No data are available as yet on the total mileage of trains.

Rail traffic in Kosovo is not electrified. The diesel engines contribute to local air pollution and noise nuisance.

| | |
|------------------------------------|-----|
| Rail infrastructure (km) | |
| Public transportation (passengers) | 333 |
| Industrial transportation | 97 |
| Total | 430 |

Air traffic contributes to local air pollution and noise nuisance. It also contributes to global problems such as global warming and destruction of the ozone layer. Air traffic in Kosovo is growing at 6% per year (No of flights). This means that Kosovo's contribution to global warming is increasing as well. On a local level this means more noise nuisance from air traffic and more air pollution on ground level from taxiing.

2. Environmental issues of Power Generation and Transport

Based on older on TPP and unmesured emission of gases from TPP consists of high level carbon dioxide, NOx, dust etc. Due to the lack of maintenance of industrial waters, TPP cause water pollution as well. Temporally storage of ash presents specific problems which reach over 40 million tones of ash and occupy around 150 hectare of land, so do craters which are created during the exploitation of coal in the open mines of lignite. Ash TPP Kosova A is transported in open stripes and stored in particular storage where is not protected from spreading the ash into the air from the wind and water pollution from

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leaks. There are serious disproportions between the exploitation dynamics and revitalization of exploited surfaces.

There is no permanent functioning monitoring system of harmful emissions in the environment. Due to the huge electricity demands, the activity is tolerated even when legal norms and conditions for environmental protection are met.

2.1 Emission

The energy sector of Kosova is an enormous polluter, especially in the wide region of Prishtina but also in regional and global level

The coal fires and combustion process leads to the generation of emissions to air, water and soil, of which emissions to the atmosphere are considered to be one of the main environment concerns. The most important emissions to air from TPP are SO₂, NO_x, particulate matter, heavy metals and greenhouse gases.

- Fires due to self combustion of lignite in coal reserves

Main environmental effects of lignite spontaneous combustion are;

- Greenhouse gas emissions(eg.CO₂, CH₄, NO_x etc)
- Emission of toxic gases and their emission in the area such as CO₂, N₂O, SO_x, etc.
- Destabilization of mines slopes

About 3 Mt of lignite are likely to be burnt every year.

- Power Plant Kosova A

The problem with dust emissions is serious and apparently cannot be solved without major redesign of the boilers andelektrofilters. An assessment of possible reduction in dust emission shows that the Kosova A units will not comply with current EU regulations, even after recommended actions are taken. Units in Kosova A are already at the end of their lifespan and further investment in these units may be questionable.

- Power Plant Kosova B

Considering that the remaining lifetime of B units is quite long, harmful effect of fine dust particles on human health, bad operation of existing electrostatic precipitators and relatively low costs of dust control equipment, the rehabilitation of filters is proposed till 2008.

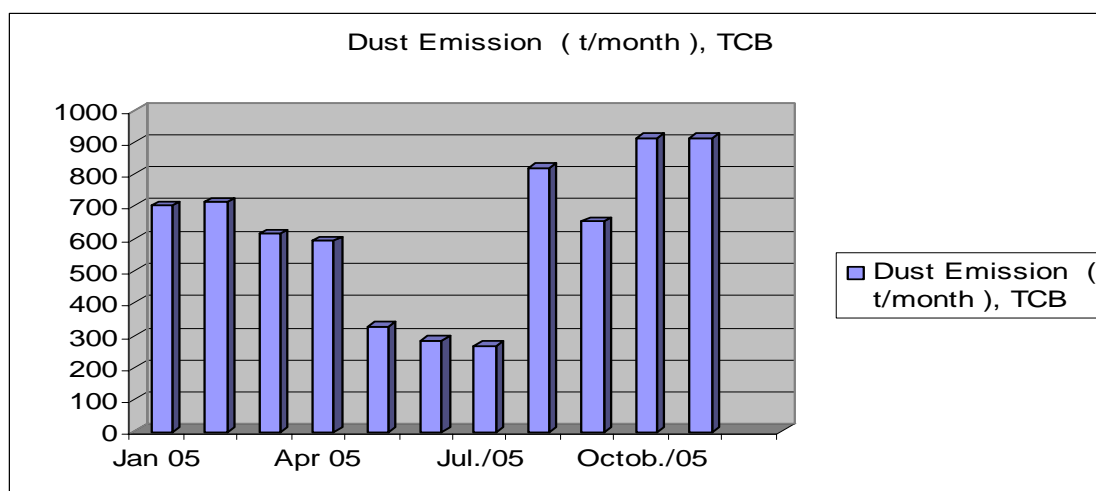


Fig 5. Dust emission from TPP, Kosova B, 2005

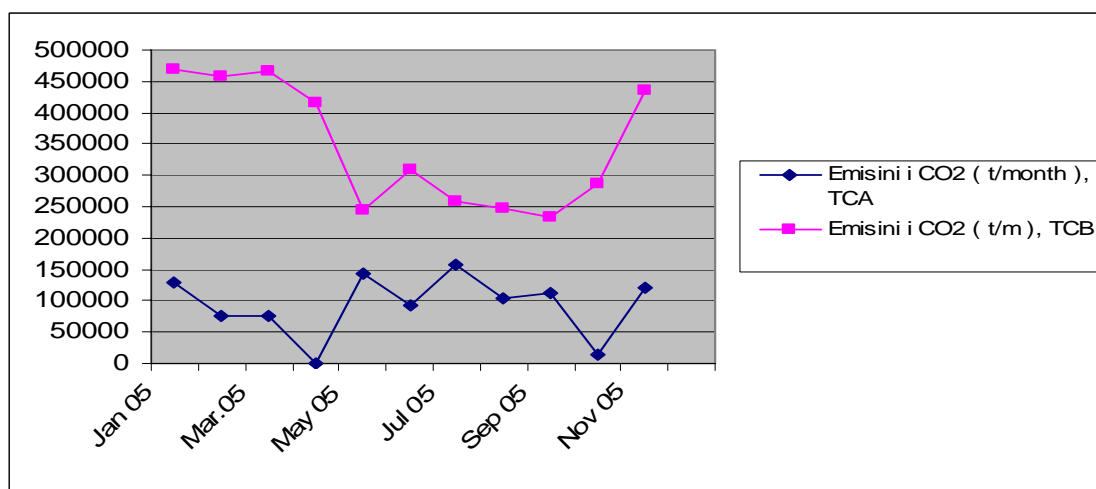


Fig 6. CO₂ emission, 2005

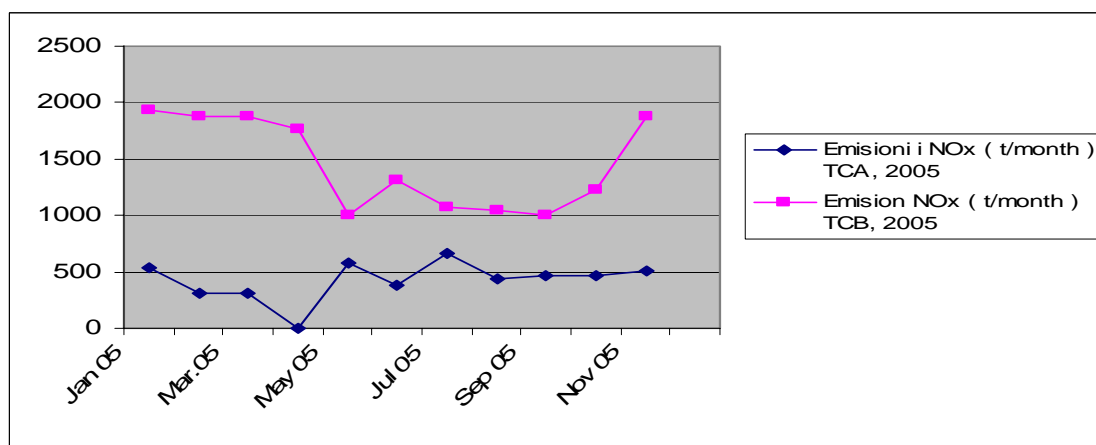


Fig 6. NO_x emission, 2005

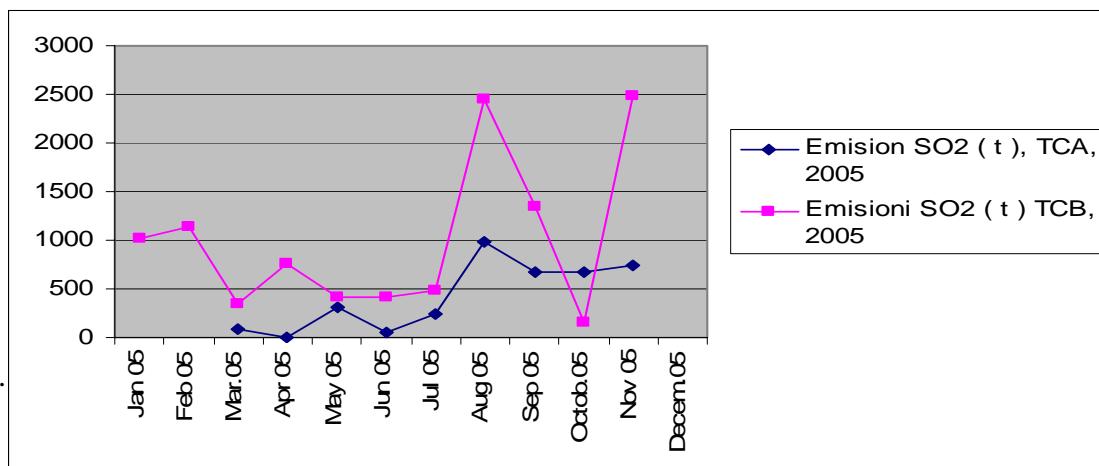


Fig 7. SO₂ emission, 2005

- Ash landfill

The relief of the territory in which stretches KEK and its sterile dumpsites of ashes changed 150ha with around 40 million tons of ashes, became insufferable source of air pollution

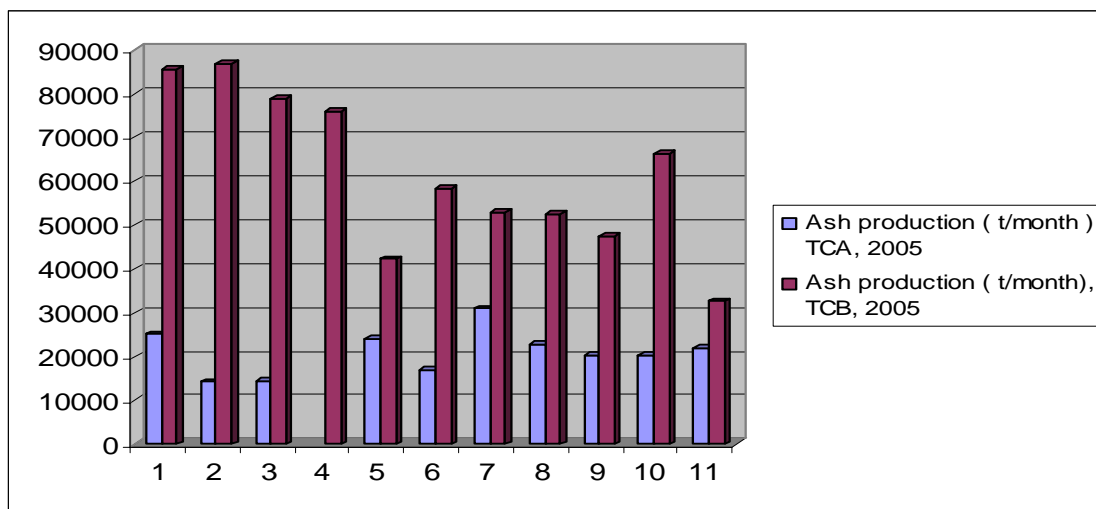


Fig 8. Ash production, 2005

- Transport

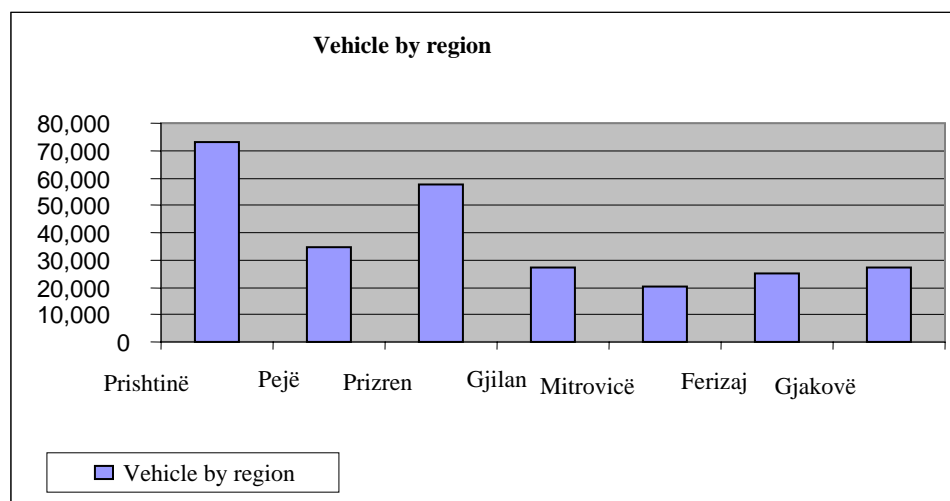


Fig.8. Vehicle in Kosova regions

Though no precise data exists, most of the vehicles in Kosova can be considered to be old. The estimation pollution load from traffic is calculated

| Type | Fuel | Oldness | Nr of vehicles | km/ year | Emissions factors, g/km | | | | | Emissions tone/year | | | | |
|---------------------|----------|----------|----------------|----------|-------------------------|-----------------|-----|-------|--------------|---------------------|-----------------|---------|--------|--------------|
| | | | | | dust | SO ₂ | NOx | CO | hydrocarbons | dust | SO ₂ | NOx | CO | hydrocarbons |
| Vehicle | Gasoline | Up to 90 | 100683 | 16.000 | 0.1 | 0.2 | 2 | 32,88 | 2.1 | 161,092 | 322,18 | 3221,85 | 5296.3 | 338.29 |
| Vehicle | Diesel | Up to 90 | 77000 | 16.000 | 1 | 2 | 1 | 32,82 | - | 1232 | 2464 | 1232 | 40409 | - |
| Truck Bus Van | Diesel | Up to 90 | 37821 | 16.000 | 1.5 | 3 | 3 | - | - | 907 | 1815 | 1815 | - | - |
| total | | | | | | | | | | 2300,92 | 4601,1 | 45705,3 | | |

Table4. Estimation pollution load from road traffic

(the lack on the emissions measures from the vehicles in Kosova, the value was calculated theoretically based on the formula:

no. of vehicles x passed km. x emission factor = emission product)

2.2 Air quality

The information available are subject of uncertainties, due to the lack of air monitoring system in Kosova, including the self-monitoring system at the level of polluters, which makes the real assessment of air pollution to be difficult to be done.

Measurement of air quality taken in two points in area of TPP, concentration includes measurement of air mote, SO₂, soot,

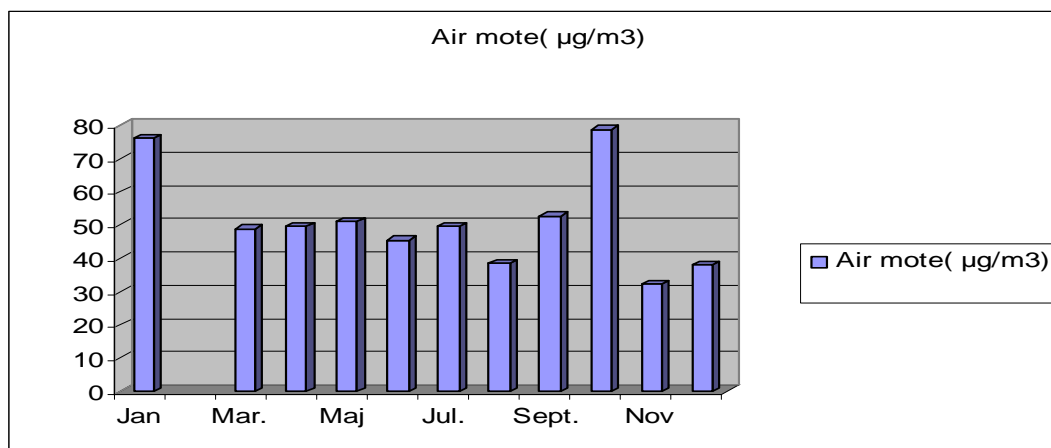


Fig.9. Air mote concentration

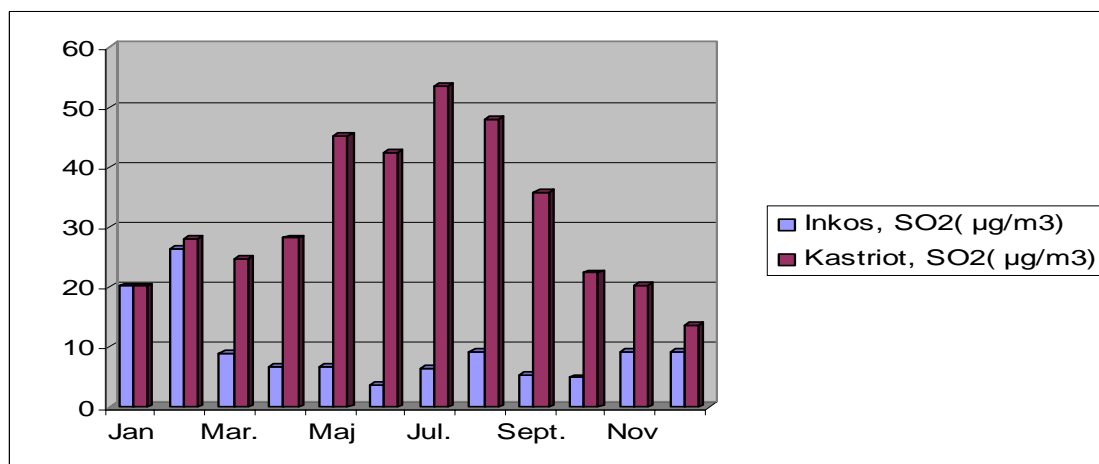


Fig.10. SO₂ concentration

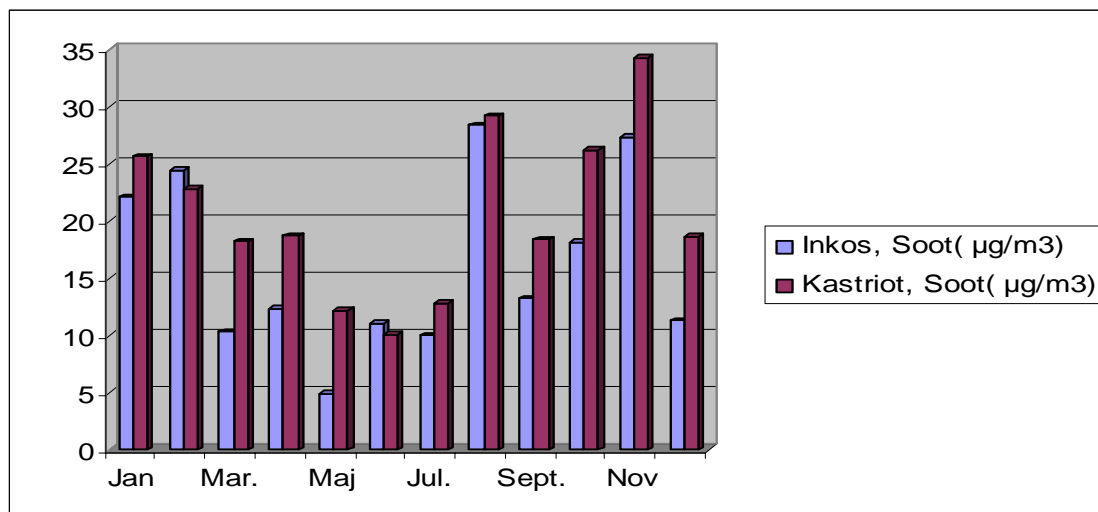


Fig.11. Soot concentration

3. Protecting the environment

Therefore, it is of a great importance from energy sector side, with the political support from the government, to put more efforts in order to establish effective relationships between supplier and consumers, reduction of commercial losses which means the urgent increase in billing and collection. These are main challenges and preconditions to stabilize and immediately function of the electro system in Kosova as well as the establishment of a environmental menagement system.

The legal and administrative framework is not yet fully developed and the avoidance of the overall environmental policy leaded to several difficulties in the establishment of a proper environmental system in Kosova.

Until now are adopted :

- The Law on Environmental Protection 2003/9.
- Administrative instruction on Environmental Impact Assessment
- The Law on Energy
- The Law on the Energy Regulator
- The Law on Electricity
- The Law on Mines and Minerals
- Law on Air Protection
- Administrative Instruction on the rules and standards of the discharges on air by the stationary sources of pollution
- Administrative Instruction on air quality standards (in procedure)
- Administrative Instruction on norms of the discharges on air by the mobile sources of pollution (in procedure)

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- Law on Trade of petroleum and petroleum products
- Administrative Instruction on quality of the liquid petroleum products

Kosova is the first country to ratify the Energy Community Treaty (ECT) in late-2005 (signed on 25 October 2005).

3.1 The main strategic goals for mitigating pollution from the energy sector

Based on the analysis of the current situation, energy demand, strategic objectives for the development of energy for the 2005-2015 period are:

- Improvement of economy sector, through finalization of KEK restructuring
- Increase of efficiency in ensuring needed financial resources and efficient management of investments with emphasizes on creating attractive conditions for international investors who need to participate with up to 60% in financing the overall investments in this sector.
- Up to the end of 2012 regional centres of Kosova will have the district heating system and regional gas system.
- Restoration of consequences in the environment created around TPP up to 2010 and thorough implementation of high norms and standards of environmental protection during construction of new capacities of electricity generation aiming the fulfilment of obligation from KYOTO protocol.
- Establishment of monitoring system and electronic database.
- Increase of awareness on benefits of rational utilization of energy and usage of alternative energy resources.
- Significant increase of domestic capacities for research and development, and
- Implementation of advanced technology and modern management within institutions and public enterprises of energy.

Conclusions

The above mentioned problems can not be solved without undertaking serious measures in restructuring of the energy sector in general. Restructuring of the electricity sector can ensure operation in commercial basis and can relief the competition in the electricity market in Kosova. This would enable the overcoming of the above mentioned problems, resulting in efficient use of current assets of lignite and electricity.

Environmental protection in Kosovo is facing big challenges. It is necessary to support economic and sustainable development, effective infrastructure and environmental balance and achieve effective and efficient use of land and natural resources in a way that will prevent conflicts of economic and ecological interests.

Kosovo's prosperity, our standard of living, and our quality of life will be greatly influenced by how we extract, transform, allocate, and consume our energy resources

Environmental protection in Kosovo is facing big challenges. It is necessary to support economic and sustainable development, effective infrastructure and environmental balance and achieve effective and efficient use of natural resources and land, in a way that will prevent conflicts of economic and ecological interests.

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