Air Pollution and Heavy Metal Emission from Power Plants

Author Note

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Introduction

The purpose of this paper is to introduce and describe the issues caused by the large amounts of pollution that come from the power plants in Kosovo. Additionally also showing the heavy metal emission in Kosovo. The power plants in Kosovo are coal burning plants; they are old, outdated, and inefficient. There are two coal-fired power plants currently being used in Kosovo. The report includes the main pollutants and polluters of the heavy metal emission. Statistical data was used to compare the actual level of pollutants in Kosovo with the limited values of the pollutants from the European Commission directive.

Kosovo’s and KEK’s Background

Kosovo has an area of 11 thousand square kilometers and is known as a country with a relatively small area. In an area of 11 thousand square kilometers, there are 5 major polluters such as ‘Trepça’, KEK, ‘Sharrcem-i’, 'Feronikeli', which largely belong to reduce the resistance of human health. KEK has been serving for a long period of time as a part of the Yugoslavia energetic system, and now it has over 400 thousand consumers, operating in Kosovo (KEK, 2010). In addition, KEK stands for Kosovo Energy Corporation and is involved in spanning coal mining, generation, electricity distribution, and is the only supplier for electricity to the citizens of Kosovo. In 1999, it began operating Kosovo’s energy sector. Today, KEK operates “three open pit lignite mines” (KEK, 2012, par. 3), which are Mirash, Bardh, Sitricia, and
is in the implementation stage of opening a new one called Sibovc South West. Further, it facilitates its operation with two power plants – “Kosova A” and “Kosova B”. Kosova A filter came from the former Soviet Union to Kosovo in the 1960s. Kosova B on the other hand, had come to Kosovo in the 1980s (Salihu, 2004, par.3). Moreover, the capacity for Plant A is 350/800 MW and for Plant B it is 530/687 MW. Lastly, the total amount of coal that KEK produces is about 7.8 million tons a year. As a result, this can cause major problems in the involvement of pollution that goes in the air in relation to Plant A and Plant B.

Problems with Power Plants in Kosovo

Kosovo’s main problem with power plant pollution is due to the fact that the power plants are very old and inefficient. A simple everyday example of this problem relates to cars that need oil changes. In the article, “Energy Projects in Kosovo,” written by Nezir Sinani and Agron Demi many facts of the problems of power plants in Kosovo are listed. “Long-promised energy-efficiency measures have not been established…Because of this, demand for electricity in the country is artificially high, and the citizens of Kosovo continue to face energy blackouts on a regular basis” (Sinani
& Demi, Pg 8, 2011). The energy demand in Kosovo is very high, but supply is very low due to the wasteful, outdated power plants.

Air pollution has been an issue in Kosovo since 1954 with the first Thermal Power Plant of Kosovo began functioning in Obiliq, a small city nearly five kilometers north of the capital city, Prishtina. Obiliq is currently one of the most densely air polluted areas in the region, creating immense health risks due to the dated power plants. In fact, the two lignite-fired thermal power plants in which electricity is produced in Kosovo (Kosovo A and Kosovo B) are meant to generate the capacity of 1,513 MW, but due to the operating conditions not being up to standards, the actual capacity is at 841 MW (Syla, A., Veliu, A., & Berisha, K., 2008).

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo A</td>
<td>A1</td>
<td>65</td>
<td>50</td>
<td>30-40</td>
<td>L/N</td>
<td>1962</td>
</tr>
<tr>
<td></td>
<td>A2</td>
<td>125</td>
<td>113</td>
<td>0</td>
<td>L/N</td>
<td>1964</td>
</tr>
<tr>
<td></td>
<td>A3</td>
<td>200</td>
<td>182</td>
<td>130-145</td>
<td>L/N</td>
<td>1970</td>
</tr>
<tr>
<td></td>
<td>A4</td>
<td>200</td>
<td>182</td>
<td>120-145</td>
<td>L/N</td>
<td>1971</td>
</tr>
<tr>
<td></td>
<td>A5</td>
<td>210</td>
<td>187</td>
<td>135-150</td>
<td>L/N</td>
<td>1975</td>
</tr>
<tr>
<td>Kosovo B</td>
<td>B1</td>
<td>339</td>
<td>309</td>
<td>230-250</td>
<td>L/M</td>
<td>1983</td>
</tr>
<tr>
<td>HPP Ujman</td>
<td>G1</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
<td>L/M</td>
<td>1983</td>
</tr>
<tr>
<td></td>
<td>G2</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
<td>L/M</td>
<td>1983</td>
</tr>
</tbody>
</table>


Due to the atrocious conditions of the aforementioned power plants, heavy metals and greenhouse gases are emitted into the breathing air, thus causing serious environmental concerns. This issue, which particularly relates to the construction of power plant Kosovo A, can only be resolved if an overall redesign of the boilers take
place--however, that does not seem to be a priority. In fact, according to current EU regulations, Kosovo A will not comply even if such measures take place—“Units in Kosovo A are already at the end of their lifespan and further investment in these units may be questionable” (Syla, A., Veliu, A. & Berisha, 2008). Power plant Kosovo B, however, has a longer lifetime than that of Kosovo A. In order to reduce the fine dust particles that are emitted from said power plant, the rehabilitation of filters and the current electrostatic precipitators was proposed in the year 2008 (Syla, A., Veliu, A. & Berisha, 2008).

After the war--the Breakup of Yugoslavia in 1999—energy supply became very scarce and many people suffered with having minimum power throughout the day. Below is a table from UNMIK’s official web page showing the power plants in Kosovo with dates of damage and as well out of service power plants.

<table>
<thead>
<tr>
<th>Units</th>
<th>Production Capacity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo A1</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Kosovo A2</td>
<td>100</td>
<td>Out of service since November 2002</td>
</tr>
<tr>
<td>Kosovo A3</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Kosovo A5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Kosovo B1</td>
<td>250</td>
<td>Damaged by lightning strike July 2003—return online early 2003</td>
</tr>
<tr>
<td>Kosovo B2</td>
<td>250</td>
<td>Damaged by lightning strike July 2002—expected to return to service July 2003</td>
</tr>
<tr>
<td>Gaziwoda (2 units)</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

KEK production possibilities. Retrieved 28.01.2013 from:
http://enrin.grida.no/htmls/kosovo/SoE/energy.htm
Kosovo A2 has been out of service since November 2002 and Kosovo B1 and B2 are both damaged from lightning strikes from the years 2002 and 2003. The two main power plants that provide energy for Kosovo are either out of service or damaged.

Kosovo A power plant is the where the biggest pollution of power plants is coming from. Sinani and Demi state that “Environmental damage is caused not only by the ash released into the atmosphere, which has led to fatalities among the population living around the thermal power plants, but also by carbon dioxide emissions, the exploitation of coal, and the industrial use of water, a scarce resource in Kosovo” (2011, pg. 9).

In addition, Kosovo has a very high debt of unpaid energy. According to The Balkan Insight article, “[K]EK has a policy of cutting off homes with more than 150 euro debt,” (Balkan Insight, Xharra, 2011). Unfortunately, this is only implemented when asked by the government. There are few random checks where people’s power does in fact get cut off. However, there are many homes with thousands of dollars in debt refusing to pay, that still have energy in their homes. Besiana Xharra states, “[K]EK officials refused to answer questions on why it was ignoring its major debtors while targeting homeowners,” (Balkan Insight, Xharra, 2011). To further emphasize this problem, Myzejene Selmani, former head of parliamentary energy commissions, writes, “[K]EK targets only those who have no power, the citizens of Kosovo who owe only 100 euro, meanwhile KEK can’t cut [electricity] to those who have thousands of euros of debt. This way of managing must be stopped,” (Balkan Insight: Selmani, 2011). With that being said, KEK has a total debt of more than 350 Million Euros for unpaid energy supply. Slowly but surely, the large Debt is destroying KEK. This may never be paid.
UNMIK’s official webpage writes, “The power plants consume coal from 2 open pit mines next to the power plant. In 2002 a total amount of coal used is shown below along with the estimated of CO2 released” (UNMIK, 2011).

<table>
<thead>
<tr>
<th>Thermo Power Plant etc.</th>
<th>Burnt coal on tons</th>
<th>CO\textsubscript{2} released in tons (estimation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.542.269</td>
<td>4.467.069</td>
</tr>
<tr>
<td>Private Users</td>
<td>47.724</td>
<td>38.466</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.589.993</td>
<td>4.505.535</td>
</tr>
</tbody>
</table>

*Coal extraction in 2002 and CO\textsubscript{2} released. Retrieved 28.01.2013 from: http://enrin.grida.no/htmls/kosovo/SoE/energy.htm*

Improvement of Kosovo’s energy line started to be implemented by government the in 2011. The Energy Projects in Kosovo article states, “The Kosovo government has declared the 400 kV line Kosovo--Albania to be of general national interest” (Sinani & Demi, pg 20, 2011). Although Kosovo has a large amount of unpaid debt for KEK energy supply, the government is investing in a 34 million euro project to improve the energy line in Kosovo.

**Heavy metals emitted from KEK and their impact**

KEK plants (Kosovo A and B) in Obiliq are the main sources of air pollution, although NO emissions are on an equal footing between the plants, transportation and other industries. An article that talks about air pollution from heavy metals sates: “The problem of air pollution in the surroundings of Power Plants appeared as early as 1954
when Thermal Power Plant of Kosovo has started work in Obiliq. The city of Obiliq, approximately 5 km north of Prishtina-capital of Kosovo, is the site of one the largest air pollution"( Syla A.M , Veliu A.H., Berisha K., 2008). The levels of air emissions from power plants in Kosovo are much higher than the allowed once. This is better explained by the following table:

<table>
<thead>
<tr>
<th>Block</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>B1</th>
<th>B2</th>
<th>Athens Memorandum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>685</td>
<td>652</td>
<td>829</td>
<td>629</td>
<td>878</td>
<td>400</td>
</tr>
<tr>
<td>NOₓ</td>
<td>694</td>
<td>700</td>
<td>692</td>
<td>810</td>
<td>811</td>
<td>500</td>
</tr>
<tr>
<td>Dust/particles</td>
<td>1.535</td>
<td>1.850</td>
<td>1401</td>
<td>248</td>
<td>428</td>
<td>50</td>
</tr>
</tbody>
</table>


Note: Nm³ is normal cubic meter and is the common unit used in the industry to refer to gas emissions.

Air quality in Kosovo, although on a limited scale, is monitored by the Hydro Meteorological Institute of Kosovo which operates with two stations. “One is located near the “Rilindja” building in the center of Pristina, near the road with heavy circulation, and is configured to measure only fractions PM10, PM2.5 and PM1, while the other is in the station suburb hydro facility, equipped with automatic analyzers for sulfur dioxide, nitrogen oxides, carbon monoxide, ozone and fine particles (PM10 or PM2.5)” (Kosova 21).

Other monitoring stations have been installed by the Institute of Public Health, but do not work. “Companies that have a negative impact on air quality are required to
monitor air emissions from their work and submit monitoring reports to Kosovo Environmental Protection Agency (KEPA), but this information is not public” (Kosova 21). The main polluters i.e. KEK, Sharrcem, and Ferronikel, are required to report the amount of pollution they cause to the environment to KEPA. As mentioned above the air pollution limitations are exceeded in Kosovo, and the below table shows correct values measured from the Hydro Meteorological Institute of Kosovo (IHMK).

<table>
<thead>
<tr>
<th>Month</th>
<th>Building Rilindja 2010</th>
<th>PM10 Building Rilindja 2011</th>
<th>IHMK, 2010</th>
<th>IHMK, 2011</th>
<th>Building</th>
<th>PM2.5 Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>125.59</td>
<td>106.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>106.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75.25</td>
</tr>
<tr>
<td>March</td>
<td>76.18</td>
<td>44.5</td>
<td>56.0</td>
<td></td>
<td></td>
<td>45.9</td>
</tr>
<tr>
<td>April</td>
<td>55.83</td>
<td>37.2</td>
<td>45.2</td>
<td></td>
<td></td>
<td>26.7</td>
</tr>
<tr>
<td>May</td>
<td>41.94</td>
<td>36.2</td>
<td>37.2</td>
<td></td>
<td></td>
<td>20.83</td>
</tr>
<tr>
<td>June</td>
<td>53.56</td>
<td>43.3</td>
<td></td>
<td>14.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>57.14</td>
<td>47.1</td>
<td></td>
<td>19.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>68.09</td>
<td>44.9</td>
<td></td>
<td>19.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>52.22</td>
<td>40.5</td>
<td></td>
<td>20.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>65.40</td>
<td>42.7</td>
<td></td>
<td>34.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>105.01</td>
<td>78.8</td>
<td></td>
<td>51.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>128.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Note: Rilindja building located in the center of Prishtina, the hydro station located on the outskirts of Prishtina. European Commission limit values for the annual average concentration of PM10 is 40 μg/m3

The limitation values for air pollution set from the European Commission are set based scientific knowledge for the purpose of avoiding, preventing and reducing bad effects the pollutions transmits to people’s health as well as to the environment. The World Health Organization (WHO) has revised its guidelines in 2005 and declared PM10 annual averages of 20 μg/m3 and PM2.5 of 10 μg/m3” (Kosova, 22). The above is an illustration of the limit values from European Commission Directive 2008/50/EC.
Health Issues Due to Poor Air Quality

Kosovo’s aging power plants are not only an environmental catastrophe but also a threatening source to people’s lives as they are causing serious health issues, especially to those living in the municipality of Obiliq, which is the area where the two
power plants are located. According to an article, Kosovo’s Old Power Plants Sources of Cancer and Lung Disease, written by Arben Salihu, the health issues that arise due to the poor air quality from power plants are enormous (Salihu, 2004).

A report by Kosovo’s Ministry of Environment in May 2003 said: that Kosova A has already exceeded the European standard by 74 times, as it does emit around 2.5 tons of dust per hour (Ministry of Environment and Spatial Planning). Also Salihu concludes in his report that: "In the Obiliq-Kastriot area, where the power plants are sited, air pollution is responsible for 63 percent of baby fatalities and 48 percent of stillborn babies" (Salihu, 2004). Also, Zeqir Veseli, an environment expert, for an article in the newspaper Jeta ne Kosove, said that the hazardous waste called Phenol is released at different intervals in the coal combustion process, thus becoming a cause for many diseases in this region. Phenol is found in soils throughout Kosovo, but larger quantities are believed to be found in the area around Kosovo power plants, because they are centered on coal burning and decomposition of organic waste. He says that “Mostly phenol issues KEK'u, where the coal is concentrated as phenol is a flowing fluid during the drying process of coal needed for power production” (Jeta ne Kosove, 2011).

According to another environment expert, Blerim Vela: “the level of pollution from the KEK plants had already reached dire proportions. The latest health control conducted by KEK’s Institute for Health and Safety at Work concluded that every employee working in the power plants suffered from some respiratory tract disease” (Salihu, 2004). A study by The Kosovar Stability Initiative (IKS) on their Thinking Green Project shows that there have been many warnings that the high contaminated air will have even more destructive consequences in the near future. This warning specifically
stated that “dust from emissions of CO2, SO2, and NO2 contributes to higher risk of upper and lower respiratory tract diseases, including infections and allergies. Poor air quality is directly affecting life expectancy and the general health of the population. While everyone is affected, susceptibility varies according to health or age” (The Kosovar Stability Initiative, 2009).

In the article, Musliu interprets the data of the Directorate for Health and Social Welfare of the municipality of Obiliq which show that the whole municipality faces a elevated rate of illness. As the number of the total inhabitants is has been exceeded by the ones who need or look for the medical help in the Medicine Center of Obiliq, and mentioning that this happened only for the first months (Musliu, 2011). Based on official reports, during the first six months 2011, 20 people were identified who suffered from respiratory problems, while 10 others were found to have malignant cancer. (Musliu, 2011) This data is also supported by a USAID report on Kosovo’s environmental threats where it is stated that: “The Obiliq municipality reported the highest incidence of Lower Respiratory Tract Infections: 449.6 cases per 100,000 inhabitants per week” (USAID, 2009).

Furthermore, a report by the Ministry of Environment and Spatial Planning shows that the current condition of air pollution in Kosovo remains one of the main environmental challenges. The report states that: “Air pollution data is scare; it is nonetheless a major concern. Respiratory diseases are a major indicator of these problems. The major source of air pollution is the coal power plant and pollution relating to traffic. Sulfur, Carbon and Nitrogen oxides, halogens and air born heavy metal are the major pollutants” (Ministry of Environment and Spatial Planning). The picture below
shows the enormous dust and pollution that is caused by the power plants, and also a villager who lives next to these dreadful air pollutants.


According to the chart above, the best indicator for a country is child mortality. As shown, the children younger than one year old were most affected because of these two power plants. Then, adults from the ages from five to fifty had the most cause of these diseases compared to the elderly from the year of fifty and above. Since the children at most five years old had the highest number of cases for the infection, it can be explained that if these numbers continue to increase over the years, many children will end up dying or having severe physical pain which can lead to the death of young children.

Even though the Kosovo government is stating that they are mostly providing a bigger and new power plant is because Kosova A is polluting the atmosphere and they want to decrease this issue, but really the old power plant does not provide enough
energy for houses throughout Kosovo so they need a bigger and stronger one to do that and they will go all out if they have to in order to provide such a large power plant (SETimes, 2012, p. 1). Together with the high infectious diseases in Kosovo, there was a situation in 2000 to 2001 that showed there was not much change in the percentages of these diseases of either their increases or decreases. Moreover, according to the article: "The most frequent diseases in all cities of Kosovo were Upper and Lower Respiratory Tract Infections, Diarrhea, Intestinal Parasitic Infections, and Scabies. Similarly, the cases that were shown for these infectious diseases are Upper and Lower Respiratory Tract Infections: 674.9 cases/100,000), Diarrhea: 645.8/100,000), Intestinal Parasitic Infections: 104.2/100,000), and Scabies: 206.2/100,000)" (Molano, 2002, par.2). Furthermore, the chart below shows that different health impacts that were caused by the power plants, cases in a year, cases involving 10,000 cases, and that total amount of daily cases. The result shows 8,435-9,019 which is the total for all of the health impacts and cases involved (World Bank, 2011).
An article that was done in the year 2012 “Ndotje Kercenon bonoret e Obiliqit” written by Ariana Kasapolli- Selani talks about the issue of air pollution and the power plants in Obiliq. The involvement is the causes of cancer disease which is considered to be the highest causes in relation to high pollution of the environment. In addition, according to Shulemajes, the number of patients is very large in the Family Medicine Center compared to the inhabitants of Obiliq. Shulemaja in translation to the statement she made in Albanian says “in 2012 we observed an increase in the number of cancer
patients, while fourteen of them have been diagnosed, the number of people affected by cancer in previous years has not been so high” (Salani, 2012, par. 4).

The members of the Family Medicine Center are trying to persuade the prime minister for this issue, but it has not yet given positive news. Later on in the article, there was a discussion about a project being implemented to improve the environment by taking out eighteen thousand tons of hazardous material. To conclude, there has been many debates that discuss the issues of the air pollution coming from the power plants in Kosovo, and a rebuild of a new power plant that need to follow certain European Union standards (Selani, 2012, par. 12).

**Impact of air pollution on health**

Research demonstrates that air pollution has a huge impact on public health, and in particular particulate matter. According to WHO (2005), the following has been attributed to short-term effect of air pollution on people: the extent to hospital for illnesses respiratory and cardiovascular emergency visits, visits to primary health care, use of drugs for cardiovascular and respiratory tract, restricted activities, lack from work and school, acute symptoms (sneezing, coughing, phlegm, respiratory tract infections), physiological changes (such as lung function), and even death (Kosova 23). As stated above, air pollution affects health in many ways, but the main effects of PM in public health are respiratory diseases and cardiovascular effects. According to Lockwood: “*It is almost intuitively obvious that air pollutants will have important effects on respiratory health. Virtually all airborne pollutants gain access to the body via the respiratory track*” (Lockwood, Alan).
The overall health of Kosovo’s population is in danger of the pollutants, but the ones that are mostly affected are the workers in KEK. According to Selimi “[c]orporate employees are considered the most endangered category in terms of respiratory diseases in the country. This is due to the use of coal as a source for generating electricity” (2011). Having in mind that Obiliq is one of the most endangered zones of pollution; we expect the rate of deadly diseases to be at high levels. According to Selani, “[o]ver the past year, 14 new cases of cancer are presented from Obiliq”(2011).

**Lead Contamination - Health concerns related to lead contamination in Kosovo**

Lead emissions to air and water from lead and zinc mines and plants that process impurities, in particular old lead smelters are spread miles wide and are known as hot spots. Lead is released into the air mainly from leaded gasoline vehicles, and this phenomenon is more likely to occur in urban areas. Kosovo has lead and zinc mines, mainly in northern Mitrovica. Other mines are in the southeast of Pristina. “A lead foundry has worked for decades on Zvecan until the end of 2000 when it was closed”(Kosova 30). So, Zvecan and Mitrovica are hot spots about the presence of lead. “Lead emissions in the air have dropped significantly since the closure of the smelter in Zvecan, but the mining of lead still contaminates the air, water and land”(Kosova 30). Similarly, the land around Zvecan, which is still contaminated by lead particles deposits, is the major source of exposure to lead. “The use of leaded gasoline was authorized at the time of the former Yugoslavia and Kosovo fix the issue recently through an administrative instruction issued in September 2011”(Kosova 30).
Recent studies show negative effects on intelligence even lower blood levels (mean approximately 2 microgram of lead per deciliter of blood). These studies are used as the basis for calculating the harmful effects of lead on children’s intelligence in Kosovo. As the article about Mines and Communities states: “Lead can enter the body through the following means: inhalation, ingestion of the soil itself or food grown where the soil is contaminated and through the placenta of the fetus in the womb” (Mines and Communities).

“Villagers of Dardhishte, near Obiliq have suffered for generations from the illness caused by the power plants that actually has caused them early deaths, and from the thermal power plant, Kosovo A, whose closure has been postponed until 2025” (Musliu, Jeton). The enormous effects of the thermal power plant on people’s health, can better appeal with the following true life story. With eyes full of tears and a trembling voice, he mentioned his relatives who suffered or are dead from cancer” (Musliu 2011). Medical claims are also supported by the statistics, although those given very little attention. Records of the Department of Health and Social Welfare municipality of Obiliq show that all municipalities face a high degree of disease. “The number of those who sought medical help in the Main Center of Family Medicine in Obiliq, only for the first six months of 2011 exceeded the total number of inhabitants”(Musliu 2011). This statistic shows that people living in the region of Obiliq, in one way or in another are threatened and somehow required to seek medical help.

In conclusion, the damage that is emitted from heavy metals is huge and has a bad impact on people’s health by causing different diseases which can even lead to
death. The risk of being in danger from the heavy metal emissions depends on the length exposure.

**Striving to Meet European Union Environmental Standards & Regulations**

Air pollution and air quality are some important aspects of environmental policy that are closely monitored, regulated, and enforced by the EU. Kosovo will need to make, some drastic changes to its energy sector, and more specifically, some enhancements to the methods in which pollution emissions from the coal-fired power plants can be reduced.

The leaders within the EU have agreed upon and set some specific goals regarding environmental regulations and energy production policies. It is required for all of the EU member countries to conform to these regulations by 2020. Because of the year 2020 deadline and the specifics of the regulatory goals, this policy has become known as the “20-20-20 targets” (European Union Office in Kosovo, 2012). The specific goals outlined by this target policy are: to reduce the greenhouse gas emissions of all EU countries to a level that is at least 20% below the levels of 1990, to increase the proportion of EU energy consumption that is produced by renewable sources by at least 20%, and to reduce the amount of primary energy used by 20% (in comparison with future projected levels) by increasing the efficiency of energy production through various means. It is required that these targets must be met by all EU member countries but they also offer a desirable goal and set a positive example for outside countries that may be bidding for potential selection into the EU. Currently the EU is continuing in its work towards adopting more and more adequate and effective policies towards reducing
greenhouse gas emissions, increasing efficiency of current power sources, and increasing the use of renewable energy sources (European Union Office in Kosovo, 2012).

Kosovo in particular, is a country that has a great need for some serious upgrades to its energy production sector. The purpose of these changes would be to make energy production more efficient and less pollutant. The article about the stability initiative in Kosovo states that: “Kosova is the only country in Europe that produces 98 percent of its electricity from lignite coal” (The Kosovar Stability Initiative, 2009). Relying upon this primitive form of energy production for such an exorbitant majority of the country’s total energy demand continues to have significant consequences. A study conducted by National Institute of Public Health in Kosova, that measured the levels of some of the air pollutants present in Kosovo’s capital city of Pristina, illustrates how very high the levels of air pollution actually are (The Kosovar Stability Initiative, 2009). This report also includes some specific information about the particular amounts of air pollution as emitted directly from the KEK power plants. However, comparing the EU allowable air pollution standards, to the actual amounts of air pollutants that are currently being spewed into Kosovo’s air, makes it difficult to ignore how serious of an environmental issue improving the air quality in Kosovo is.

**Economic Problems Caused By Power Plants**

Economics, and the economy of a country, is always a significant area of consideration for politicians and policy makers and actors following implementation. There are some simple and sensible actions that can be taken in order to plan ahead
and become a more efficient governing body and overall country. This can be related to the problems caused by the coal-fired power plants regarding both health and environmental problems and damages. A second aspect of the problem that this idea of economic sensibility can be applied to is the fact that the intense amounts of air pollution are effecting the natural environments of Kosovo in some terribly negative ways. The following chart shows some estimates of the yearly costs that Kosovo pays for environmental damages (this specific data was collected and projected as of 2010).

<table>
<thead>
<tr>
<th>Pollution or contamination/estimate</th>
<th>Annual Cost (€ million)</th>
<th>% of 2010 GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Mid</td>
</tr>
<tr>
<td>Outdoor air</td>
<td>37.2</td>
<td>95.6</td>
</tr>
<tr>
<td>Lead</td>
<td>41.7</td>
<td>67.9</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>19.0</td>
<td>25.1</td>
</tr>
<tr>
<td>Forests</td>
<td>16.7</td>
<td>18.1</td>
</tr>
<tr>
<td>Water, sanitation and hygiene</td>
<td>8.0</td>
<td>11.3</td>
</tr>
<tr>
<td>Water from Heavy Metals</td>
<td>0.4</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>123.0</td>
<td>220.8</td>
</tr>
</tbody>
</table>


In both the case of many health problems and the case of significant environmental damages, it would be more economical to try to prevent these problems from occurring, rather than trying to fix them as best as possible after they have already happened. It is also worth considering that if a policy is being designed in order to prevent a certain sort of disaster or problem from occurring, that policy can be well
thought out and consist of actions that are as cost-efficient and as economically-effective as possible.

**Conclusion**

In conclusion, there have been many arguments that deal with the power plants in Kosovo. The inefficiency of the power plants are known to be the problems that were from the war, but now there is a rebuild of the situation even though there still needs to be some problems that need to be dealt with. Furthermore, since Kosovo does not have the right investment to buy new power plants, their best solution is to fix the problems that were done in order to have them work again. Even though they are trying to fix the problem, there are still major environmental problems that are causing pollutions throughout the air which are causing major health risks. Some of the health risks that were explained previously are cancer, respiratory tract disease, infections, allergies, and many others that also lead to death. As a result to these issues, it caused major political and policy problems and the involvements of the European Union standards and regulations. Moreover, there have been discussions that deal with Kosovo not have many regulations and so they need to provide strong regulations in order to be in the European Union, if they ever want to be in the EU. To conclude, pollution does exist everywhere, but the society needs to make a difference to do something about this issue. Related to Kosovo, the citizens of Kosovo, need to make a stand and try to make certain policies be enforced in order to reduce the health risks of these huge power plants so that their bodies and country are both healthy.
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Appendix 1.0

Group Work Description

The whole group participated in writing this research paper. We had separated tasks based on what we considered each of us is more interested to work on. Initially, every member of the group reviewed the articles that were already provided in the Wiki Bibliography. This helped so each of us could propose what would be the main issues tackled in this paper. Once we had an outline for the paper, each of us started to write. Furthermore, some of us dealt with organizing the flow of the paper, one dealt with graphics and images, another group member dealt with the reference list. After completing the given tasks, each of us read the research paper and edited it. Through good communication and instructions the group was able to finish the given tasks correctly and in time.

Appendix 1.1

Note to Future Researchers

Even though our group put a lot of effort to provide all the issues from all the possible sources regarding the issue of air pollution from power plants, however there is more that can be done. We suggest that other researchers interested in this topic could further analyze this environmental issue by analyzing the data in several years regarding emissions, health effects, and economic problems by providing insights whether there has been a trend of change throughout the years. This will probably be challenging since it is hard to find data for each year, but we encourage that future researchers do their best.