

EVALUATING THE ENERGY DEMAND AND SOURCES IN BALKAN COUNTRIES

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Abstract

Balkan region can be considered as a transition location between Europe and Asia. The area is rich in terms of water and forest resources. The countries that include Albania, Bulgaria, Croatia, Macedonia, Bosnia and Herzegovina, and Serbia are not energy rich countries in terms of energy resources and power generation technologies. On the other hand, these countries have increasing power and energy demand that should be balanced with cost effective, reliable and long term resources. Energy is accepted as a very important requirement for developing and under-developed countries and its importance is increasing as the population increases and technology develops. The companies that have international capital hesitate to invest in the region due to the problems with political and economic stability in the region. As a result of their geopolitical location, the region is in the middle of energy transportation routes. Hence, this advantage can be used for economic benefit. Another important issue is the natural gas pipeline projects that include Nabucco and South Stream that will pass through Balkan countries. These projects bring some reliability and new opportunities for the economy of the countries. The current electricity generation infrastructure in the region is old and usually coal based and hydroelectricity supported. In this research, the energy status of the Balkan countries first presented and then the supply-demand growth of energy are analyzed to show the shortages, surpluses and dependency of the countries.

Keywords: *Balkan Countries. Energy Demand. Natural Gas Pipelines. Energy Sources.*

Introduction

The world is known with its limited resources, and energy is the crucial resource for the planet. It is the most important element for people to continue their lives, businesses to run, vehicles to operate, and countries to grow. On the other hand, the resources are limited, the demand is growing, and there is distance between the resources and demand location. The energy resources are usually located in unstable countries where socio-politics and socio-economic events play an important role.

Electricity is the most used form of energy. It is considered essential for countries to have a strong electricity generation, transmission and distribution infrastructure to

have stable developing economy and a crystal clear future. Balkan countries have won their independence not so long ago. The infrastructure in these countries including energy transportation and power plants is not new and needs to be renewed with cutting edge new technologies. The region had wars, troubles, and economic crises in past. The countries have shown economic growth after their independence especially after support of the European Union. The countries have historical and cultural relations with Turkey that increase the potential for economic relations (Cimen, 2009). On the other hand Balkan countries are on the passage of energy corridor from energy rich Caspian and middle east countries to west European countries. New natural gas pipeline projects and oil transportation projects will contribute the region's economy. Balkan countries first need to do a fundamental analysis for energy dependence and possible effects of the projects to their future. Next section provides the country profiles in Balkans.

Country Profiles In Balkans

Macedonia

Macedonia is a developing country with 1.3% economic growth in 2010. The estimated population in 2011 is 2,077,000 and gross domestic product (GDP) is \$9.17 Billion (IEA, 2011). It imports all of its natural gas and almost all of its oil. Although energy consumption growth is 4.2%, there is no growth in energy generation. Figure 1 shows the electricity consumption and generation in Macedonia after 2000. Figure shows that the country cannot meet all of its demand with its own resources (EEC, 2012).

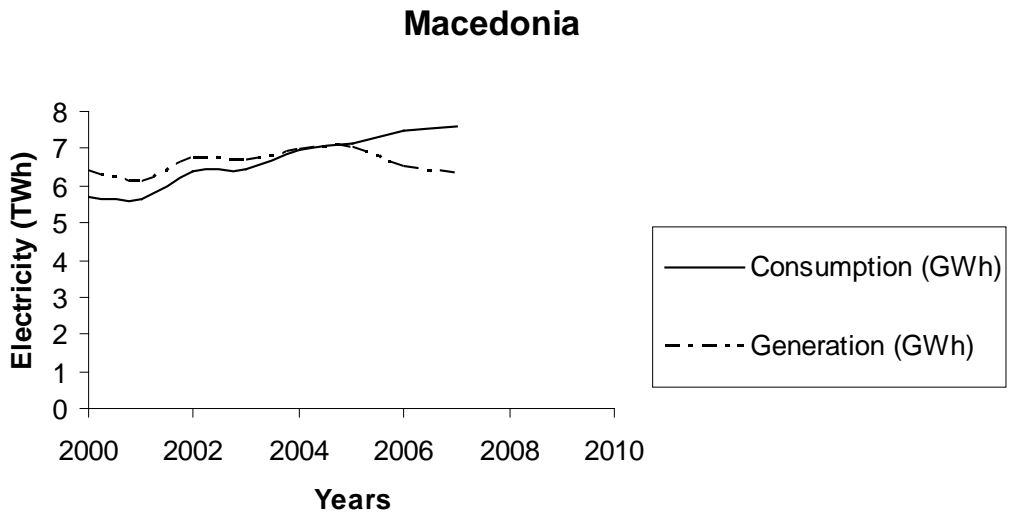


Figure 1: Electricity demand and generation in Macedonia

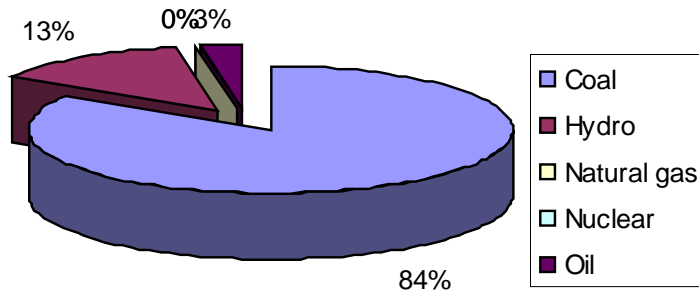


Figure 2: Electricity generation resources in Macedonia

Figure 2 shows the resources that are used in electricity generation. The electricity is mainly generated using coal resources which cause extra costs and emissions. Hydro and oil are other resources of electricity. Even if all power plants work with % 100 capacity, country still needs to imports almost 17% of its power demand.

Albania

Albania is a country in southeastern Europe bordering Macedonia, Kosova, Montenegro and Greece. With an around 3,000,000 population and \$12.85B GDP, country has growth potential in its region. The GDP growth rate is 2 % (3.1% in 2010) and industrial production growth rate is 3% (2010). Figure 3 shows the electricity demand and generation change in Albania. There is a gap between generation and consumption and the shortage in power should be imported.

Albania



Figure 3: Electricity demand and generation in Albania

It is interesting to realize that almost all energy is generated using hydro resources. Figure 4 shows the energy resources that are used to generated power in Albania (EIA IEA, 2011). Hydro resources are cheap resources but not reliable as it depends on the climate. Resource diversification should be provided to have a more reliable power supply.

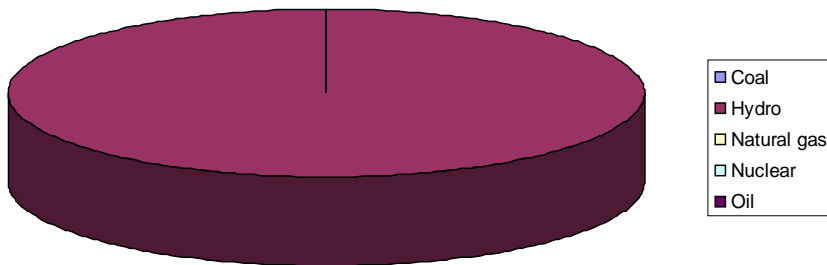


Figure 4: Electricity generation resources in Albania

Serbia

Serbia is country with 7,300,000 population and around \$39 B GDP. The growth rate is around 2% with a service sector occupying the large share in GDP. The

industrial production growth is 3.2% which shows that energy demand would also increase accordingly. Figure 5 shows the electricity generation and consumption change in Serbia. Figure shows that country can meet its demand with its own resources but the gap is not reliable yet.

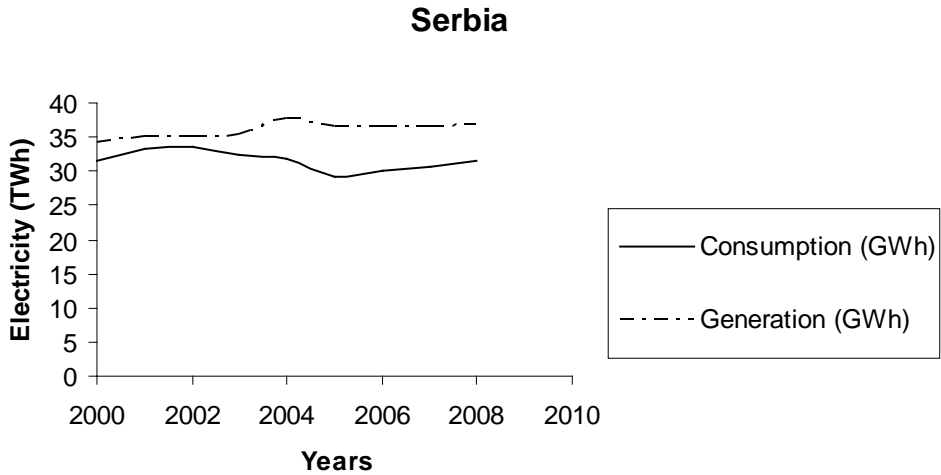


Figure 5: Electricity demand and generation in Serbia

On the other hand, the energy resources used for generation are shown in Figure 6. Coal has the largest share in generation portfolio followed by hydro. The cost of energy generation is not cheap and the resource mix is not reliable.

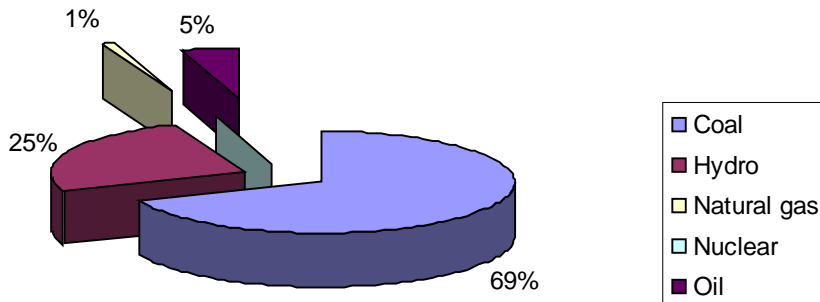


Figure 6: Electricity generation resources in Serbia

Croatia

Croatia is a country with 4,400,000 population with \$60B GDP. The demand growth in energy is around 4.3%. Figure 7 shows the electricity demand and generation figure in Croatia. Figure shows that country could not meet its demand using its own resources and the gap between generation and consumption is growing. The remaining energy should be imported from other countries.

Croatia

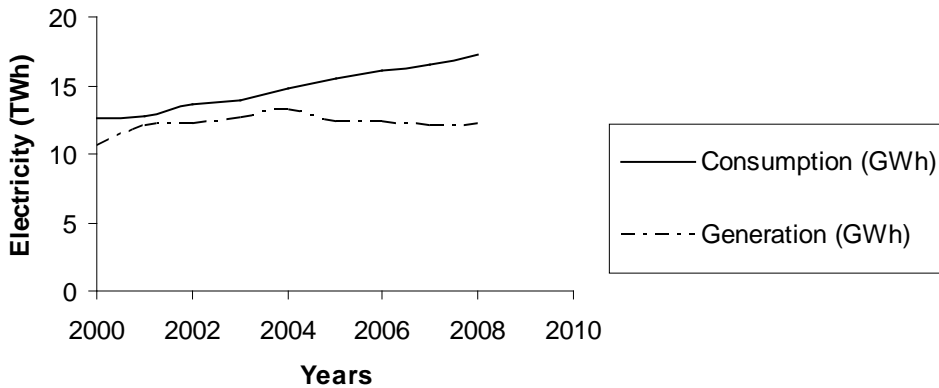


Figure 7: Electricity demand and generation in Croatia

Figure 8 shows the energy resources used in electricity generation. Hydro is the main resource whereas coal and natural gas are the secondary resources used in energy generation. The energy generation is expensive and not reliable.

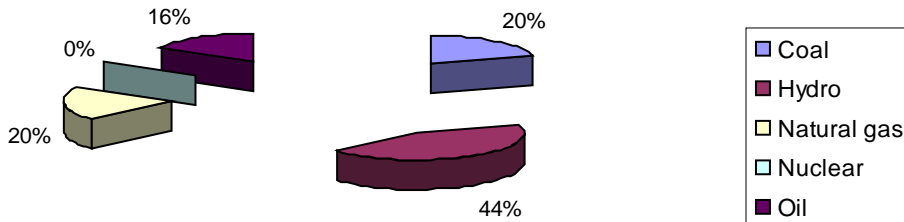


Figure 8: Electricity generation resources in Croatia

Greece

Greece is the country seriously affected by economic crises. The debt ratio is so high that makes it difficult to turn it with its own resources. The population is around 10,700,000 and the GDP growth rate is -4.8%. Though its energy demand is growing that makes it difficult to meet with its own resources. Figure 9 shows the electricity demand and generation in Greece. It's shown that it is very difficult for the country to meet with its own resources.

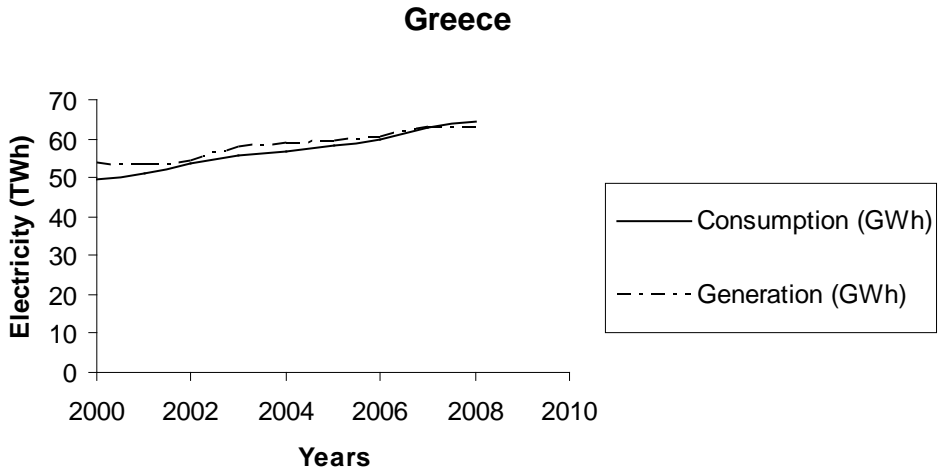


Figure 9: Electricity demand and generation in Greece

Figure 10 shows the main resources used in electricity generation in Greece. Coal has the largest share with 58%, natural gas and oil are other resources used in generation.

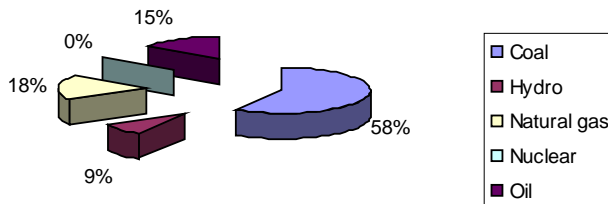


Figure 10: Electricity generation resources in Greece.

Natural Gas Pipeline Projects

Nabucco is a large pipeline project which connects the energy-rich Caspian and Middle East region with the west Europe passing through Turkey, Bulgaria, Romania, Hungary and Austria. The length of the pipeline will be 3900 km with 31 bcm annual natural gas carrying capacity. Figure 11 shows the proposed map of nabucco pipeline project (World Bank, 2012).



Figure 11: Overview of nabucco pipeline

It is expected that the natural gas supply will secure the supply, provide reliability and decrease the cost. The natural gas based power plants have considerable share in the energy portfolio of Balkans. The nabucco project will feed the natural gas network of Balkans directly or indirectly bringing more reliability to energy market. There are other natural gas pipeline projects that will affect the Balkan regions and result a socio-economic change. Figure 12 shows the routes that pipelines follow through Turkey and Balkans. The nabucco and the blue stream project play an important role to develop economic relations between Turkey and Balkan countries (EIA, 2011).



Figure 12: Natural gas pipeline projects in Turkey

Figure 13 shows the general map of natural gas pipeline projects from Russia, Turkey and North African countries such as Algeria and Egypt. Even though these projects mainly developed to secure the natural gas supply of west European countries, they also bring economic opportunities to Balkans as they have to pass through these countries.



Figure 13: Natural gas pipeline projects in Balkan region

The crude oil is also an important energy source that is needed in Balkans. The Balkan countries do not have rich oil fields that will meet their own demand. Figure 14 shows the oil pipeline projects in Balkan region. More supply will provide lower costs that will decrease the cost of power generation with oil and natural gas (IEA, 2011; EEC, 2012; World Bank, 2011).



Figure 14: Crude oil transportation projects in Balkan region

Conclusion

Balkan countries are not energy rich countries. The current power generation infrastructure is old, the plants are old coal-based, natural-gas based, hydro or oil based which decreases efficiency and increases cost. On the other hand, countries are located on the passage of energy routes that transports natural gas and oil to west European countries. This advantage brings opportunities for low-cost and reliable energy plants to be built. As a result, if the countries properly utilize the pipelines, the medium will be more attractive for new investments to come.

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