Balkans' energy supply mix is heavily dependent on coal and oil. In short, a shift to cleaner fuels is evident and unavoidable. Also, low natural gas penetration on Western Balkans brings future growth opportunities. Considering the structure of the primary energy supply in the Western Balkans, lignite occupies a considerable proportion (about 38%) of the total primary energy production in the region,
especially in Bosnia, Kosovo, and Serbia, where it is the main fuel for the operation of thermal power generation plants (tab. 2). Oil comes next: its share is about 37%, followed by natural gas 13%, hydroelectric energy 7%, and renewable energy sources (mainly through wind farms) 5%.
As far as the electricity generation is concerned, Serbia occupies the largest total electricity generation, where lignite dominates as its share reaches the 74% of the total electricity produced. In Bosnia &
Herzegovina, which follows Serbia considering the total generated electricity, thermal power generation dominates as it consists the 67% of the total generation. In Croatia, the electricity generation is (approximately) equally distributed between fossil fuels and renewable energy sources. It should be noticed that among the Western Balkans Croatian power system is the only one where wind farms have been incorporated so far. According to the European Wind Energy Association (EWEA), at the end of 2013 302MW of wind farms were in operation in Croatia. In Serbia, the construction of the first wind farm has already begun (within 2013), and it is expected to be completed in 2015. The use of lignite and natural gas with lower shares, are the main sources of the electric energy production in FYROM. Considering
the Albanian power system, the structure of the local electricity generation heavily relies on the operation of the hydro power plants, and in lower levels on oil products. Consequently, Albania could be considered as a leader in the utilisation and exploitation (proportionally) of renewable energy sources in the region. The penetration of the solid fuel power plants in the Albanian power system will be one of the most important challenges to be faced, assuming that the electricity demand will rise in the long term.
The Baseline scenario was formed according to the PRIMES model in order to simulate the equilibrium solution for the electricity supply and demand of the power system in the Western Balkan for the period
between 2015 and 2050. In this way, supply corresponds properly to the growth of the demand. Main targets are the minimisation of the total costs and the reduction of pollutant emissions (mainly of carbon
dioxide – CO_2). This scenario simulates each power system, which means that the procedure

is a projection and not a prediction. Via the results an insight to the future development of energy balance is
provided, where an extensive analysis of the electricity generation structure and of the installed capacity is included. Moreover, data concerning the emissions of CO2, the investment for the construction
of new power capacities and the refurbishment of the existing ones, fuel consumption for electricity and steam generation, and others are calculated. The main orientation of the Baseline scenario is the
current condition of the West Balkan countries in the fields of energy and economy. Neither specific energy nor environmental policy were applied, including strategies like carbon values, subsidy policies regarding the support of the renewables energy sources , the emissions trading system, energy efficiency schemes and others. As far as thermal energy generation is concerned, the projection shows that the power sector in the Western Balkans will continue to rely on the thermal power capacities until 2050.
Electricity production by solid fuels (mainly from endogenous lignite) is expected to increase and its shares are projected to remain above 50%. The role of solid fuels in this area will remain very important, since the endogenous lignite reserves are significant and will have to be exploited at the most efficient way. In this case, such evolution would not be in accordance with the European Union legislation concerning the climate change mitigation and the its long term energy policy, or global agreements like the Kyoto Protocol. However, the viability of the regional power system is a matter of priority, as the energy sector is the backbone of the economy. Consequently, decisions concerning the operation and investment on coal-fired power plants will be an important part of the formulation of the action energy plan of these states in the future.
Natural gas power shows significant deployment in the long term, because of the low power generation costs (especially if considering the operation of the natural gas-fired combined cycle power plants
(NGCC) and their modest environmental impact), reaching 16.5% from the total electricity production by 2050. Moreover, as far as not only Western Balkans are concerned, but also the whole region of the
South-Eastern Europe, it should be highlighted that South Stream natural gas pipeline is emerging as an important factor in the Western Balkan’s energy supply and security, bringing closer Serbia, Croatia,
Bosnia & Herzegovina, and Slovenia. At the same way, Trans Adriatic Pipeline (TAP) will supply and interconnect Turkey, Greece and Albania. The Baseline Scenario projections

indicate that, according to
tab. 4, electricity generation from crude oil and its derivatives will slightly increase in the long term, reaching an intermediate reduction in the period between 2015 and 2030. It is indicated that their shares
will be limited at 1.2% in 2050.
Intermittent renewables emerge under the Baseline conditions, attaining 6% of the total electricity generation by 2050. Furthermore, as far as renewable energy sources are concerned, it should be
included that hydro power plants will continue to constitute a fundamental part of the regional power system, especially for covering the baseload demand. The projections show that the shares of hydro
power will show intermediate fluctuations between 24% and 37% between 2015-2050.
Under the Baseline scenario assumptions, it is estimated that, in the Western Balkan region many power plants will be decommissioned or refurbished, but there exist significant possibilities for further
investment in new power capacities. The construction of new intermittent renewable power facilities and modernized lignite power plants will strengthen the achievement of perspective and long term planning, especially in terms of environmental sustainability and energy equity. The projection shows new investment in lignite power plants and shows also as optimal investment more than 10 GW of new
natural gas power plants. In this way, the gasification process is in accordance with the regional energy policy towards the diversification of the energy mix and the security of energy supply. The solid fuel
(lignite) power plants require further refurbishment and modernisation. According to the results, considerable investments are projected.
However, under the projections of the Reference scenarios it is assumed that their long-term use and future participation in the regional power generation system will be highly sensitive on RES supporting policies, carbon prices or probably the development of the carbon capture, use and storage (CCUS) technology. Gasification trends remain valid and achievable in all the scenarios, if considering the
value of natural gas in terms of energy efficiency and environmental concerns. The gasification of the regional power generation system in the upcoming years remains a dominant factor, but heavily relies on
the growth of the natural gas prices, any policy constraints or renewable energy supporting schemes. Further investment in natural gas power generation technologies will be some of

the priorities according
to the regional energy policy framework, if taking into consideration the value of their operation in order to adapt on the intermittency of the renewable power capacities. As far as thermal generation as a
whole is concerned, evidently the Western Balkan region will continue to rely on “black” energy (fossil fuels). Especially if considering the economic viability, the industrial development and the energy
equity in these countries, mainly in terms of energy supply and electricity prices regulation, unavoidably thermal energy sources will remain the catalyst in the energy sector. However, such evolution does not act as an obstacle or does not impede the support and the penetration of the RES.
Western Balkans need to pursue modernization of their existing capacities and energy efficiency policies, to move in the direction of strengthening investment projects in energy infrastructure in the areas of advanced coal-fired plants and renewable sources, to guarantee the supply of oil and natural gas through long term agreements and establishing regional gas grids, and plans for the CCUS. Other important factors should be taken into consideration, such as the changing features of energy demand in levels of energy infrastructure, the increase in electricity imports and the rise in the pricing of fuels in order to successfully address the problems of supplying and moving to a competitive low carbon economy. The diversification of energy sources and the environmental issues are accelerating the process that will transform the Western Balkans to a region for transportation, storage and power supply.
source: ESIASEE EnergyWatchSEE