Serbian thermal power plants are amongst the primary sources of NOx and dust pollution and the single largest source of SO2 in Europe. Strangely, Europe is more worried about this than Serbia itself although Serbian citizens suffer gravely. The UN World Health Organization (WHO) identifies Serbia as the country with the highest increase in mortality rates due to lung cancer in Europe.

Extremely high dependency on coal (lignite) for electricity production causes serious negative effects for Serbia's agriculture, health system and economy. Even the State-owned electric power company (EPS) admits, although never officially, that external costs of outdated thermal power plants in Serbia reach about €13 cents per each kWh of electricity produced. This means that real price of electricity production in Serbia is about €18 cents per kWh. In spite of this, draft of the new Energy Strategy envisions over 1 GW of new coal-fueled power plants by 2030. To make things worse, 76% of the coal reserves which Serbia counts on are based in Kosovo, meaning the country will import coal to burn it, thus paying for additional CO2 emissions into the atmosphere and continued external costs suffered by its citizens. The heating sector is heavily dependent on gas imports which still further compromises energy security of Serbia.

Serbia's commitment to coal

In the energy sector, as well as in many other ways, Serbia is almost perfect representative of the South East Europe (SEE) region. The region as a whole is heavily reliant on Thermal Power Plants (TPPs), with approximately 70% of energy being produced from coal. The territory covered by the Energy Community Secretariat , has 65 TPPs with the total installed capacity of close to 11 GW, which are, on average, over 30 years old. The remaining energy production capacities, especially in the Balkan countries, come from large hydro power plants.

Of Serbia's total energy consumption, about 21% comes from renewable energy, i.e. large hydro power plants. Although relevant Serbian authorities in charge of energy policy often state that, according to EU's 20/20/20 targets , Serbia has already not only achieved but exceeded its mandatory target, it's not really how the game goes. So, the national target that Serbia has to achieve by 2020 for energy consumption from renewable energy sources is 27%. There is nothing unfair about that – Bosnia and Herzegovina's target is as high as 40% (!), since they are currently consuming 34% of its total energy from hydro power; Albania's target by 2020 is 38%, because it currently has 31.2% in large hydro; Montenegro's is 33%; and Former Yugoslav Republic of Macedonia has a target of 28% — all higher than Serbia.

This part of the story looks nice, clean and green. That is, until you take a look at the remaining, almost 80% of capacities for energy production in Serbia. That's where black takes over. This remaining percentage, unfortunately, is almost entirely down to TPPs and lignite – as the fossil fuel with the most negative environmental impacts. According to data

from the Annual Health Statistics Report , published by the Institute for Public Health of Serbia “Dr Milan Jovanović Batut”, the situation in Serbia is alarming. As a direct consequence of burning lignite, Serbian citizens suffer massively from degraded quality of life, life expectancy and health problems. The World Health Organization (WHO), in its European Health Report 2012 , identifies Serbia as the country with the highest increase in mortality rates due to lung cancer in Europe. Although admittedly this is not solely due to black energy production from lignite, it cannot be argued that energy production has by far the most dominant influence. Sadly, this is easy to prove: (a) the mortality rate in the Kolubara region (coal mine) is 25% higher than Serbia’s average; (b) the average life span of the citizens of Lazarevac (coal mine), Obrenovac (TPP “Nikola Tesla”) andPožarevac (TPP “Kostolac”) is on average 1.84 years shorter than the average life span of other Serbian citizens.In addition, Serbian thermal power plants are among the primary sources of NOx and dust pollution and the single largest source of SO2 in Europe .

These facts should certainly worry Serbia’s European neighbors and it, therefore, makes sense to have the Energy Community Secretariat “on our backs” with demanding renewable energy targets, energy efficiency requirements, and tough environmental standards, such as the implementation of the Large Combustions Plants Directive (2001/80/EC) .It is inconceivable that EU is turning to green power only to find its accession countries polluting them nevertheless. Harmonization of environmental standards is one of the central objectives of the EU and the Energy Community which borders the EU. With harmonization come shared cost and shared rewards, with no country able to create economic advantage by emitting more toxic pollutants or more CO2 than its neighbors. Nowhere is this process more important or more visible than in the energy sector.

On the other hand, compared to the EU and Energy Community, all of the negative impacts of Serbia’s energy policy to date, and there are many, should worry Serbian citizens, Serbian Government, and relevant Serbian Ministries much more.We are the ones directly affected, we suffer most and we pay the highest price. So how come Serbia doesn’t seem worried? How come that reforms of the Serbian energy sector – to make it more efficient, more sustainable, more stable, more independent, less reliant on imports, more green, and less black – are so very difficult and slow? How come there are so many regrets because we are leaving the “good old” State owned monopoly system and “cheap” coal-based energy production behind? Why is it that we accept energy sector reform and growing trend towards renewable energy sources only when it comes as a demand from the Energy Community and as a necessity of the EU accession process?

The necessary turn to renewables

Instead of coal, to increase its energy safety, independence and sustainability, Serbia necessarily has to turn to its renewable energy sources. Unfortunately, the draft strategy fails to truly recognize this need and sets renewable energy targets at levels which are likely

to barely meet Energy Community targets and, thus, the country's international obligations. By 2020, according to the draft strategy and National Renewable Energy Action Plan (NREAP) , Serbia should have installed 1,092 MW from renewable energy. By 2025, this should be increased to approximately 1,300 MW and by 2030 this should go up to about 1,700 MW. Comparing these numbers to predictions of total installed capacities in Serbia shows that about 14% of total installed capacities will come from renewables in 2025 and about 17% in 2030. As EU sets increasingly higher and more ambitious targets for itself for 2030, it is likely that Serbia will have to do better than this. The country will certainly be able to do it as it has significant potentials (approximately 2,000 MW from wind only), but this does prove that renewable energy is still seen only as vehicle to satisfy one of the EU accession criteria rather than as a mechanism which Serbia is fully dedicated to in order to become cleaner, healthier and energy-wise more sustainable.

Overall, albeit some difficulties and conservative thinking, Serbia did create a plan for installation of new green capacities in the electricity production sector and is slowly progressing towards reaching them. Finalization of the legislative framework is still outstanding, but it is to be expected soon. At the time of this writing, the new Energy Law is being worked on, and a bankable Power Purchasing Agreement – PPA is being discussed with international financial institutions, namely EBRD, IFC and OPIC. Finalization of the legislative framework will enable the construction of more robust renewable energy projects. All of this is happening in the electricity production segment of the energy sector. Serbia then quickly needs to turn to utilization of renewable energy in heating and then also traffic.

As previously mentioned, the country's mandatory target for energy consumption from renewable energy by 2020 is 27%. Of that, according to the National Renewable Energy Action Plan (NREAP), 30% should be achieved in the heating sector (from the baseline of 25,6%); 36,6% in the electricity sector (from the baseline of 28,7%); and 10% in the traffic sector (from the baseline of 0%). By 2020, it is anticipated that final gross consumption of energy in the heating sector alone will reach 45,5% and the reform is badly needed in this segment as well. The sector itself is heavily reliant on gas: as an example, 85% of the district heating system of the City of Belgrade is gas-fueled, and a little bit less than 15% relies on fuel oil . This makes the entire heating system volatile to imports of the natural gas. On January 6, 2009, the ongoing Russia-Ukraine natural gas dispute resulted in the temporary cessation of all gas deliveries to Serbia from Russia. At the time, the country was experiencing its coldest weather of the season. The combination of the two events triggered Serbia-wide emergency situation. Beogradske Elektrane, the district heating company of Belgrade and Udruženje ToplanaSrbije, the district heating association of Serbia, announced that the district heating plants that have the ability to switch to fuel oil should do so. Naftna Industrija Srbije, the Serbian Oil Industry, promised to provide all means

necessary to provide sufficient quantities of fuel oil until the country's gas supply stabilized. Srbijagas, the state gas company, urged all customers to immediately stop using natural gas in order to minimize the severity of the impact caused by a complete cut-off of Russian gas delivery. The gas supplies of the system were only sufficient for the next couple of hours, required to safely shutdown the plants. By the morning of January 7, Serbia remained completely cut off from natural gas supply, as the domestic production of gas was not sufficient to keep the natural gas pipeline operating. Tens of thousands of households were left without the heating during those couple of days and hundreds of thousands of Euros were lost due to suspended or reduced production caused by the natural gas crisis . If anything is to be learned from this lesson, it is that Serbia's heating sector must become more self-sustainable.Precisely for this reason, utilization of renewable energy and modernization of district heating systems will have to become imperative for the energy sector.

The light at the end of the tunnel

Serbia is yet to benefit from the green economy. In 2010 major investors in wind energy established the Serbian Wind Energy Association (SEWEA) with the goal to act as partners to the Government of Serbia in order to establish investment-friendly renewable energy legislation. The investors gathered around SEWEA thus far invested in Serbia about €30 million solely into development of their projects (although none has started construction yet). About 90% of this money went straight into Serbian economy and budget, through employment of local engineering and electrical companies which were developing technical documentation, purchase of land, different taxes in the construction permitting process, employment of local staff, and similar. Actual construction of their projects will mean additional €700 million in the next three to five years and could even reach €1 billion of investments, if the Government-imposed cap of 500 MW on wind increases. A considerable amount of this money will be directly invested in the Serbian construction sector which suffered badly through the economic crisis and due to inadequate legislation on planning and construction which is currently being fixed. The impact of the wind farm development in Serbia could even be larger if Serbia succeeds in transferring some of the sector's know-how and technology in the country which is entirely possible with beneficial investment conditions. This makes renewable energy resources, and wind in particular, one of the greatest investment potentials in Serbia. Hopefully, the new Serbian Government will know how to utilize this potential to the benefit of the country's overall economy.

Besides economic, there are many other benefits of renewable energy sources for Serbia. Renewables can increase Serbia's energy independence and security. This is especially true in two sectors – wind, as 70% of production is realized during winter when Serbia imports the most; and heating – as about 85% of the district heating systems in Serbia rely on natural gas, which is almost fully imported from Russia and which makes the heating

sector extremely volatile to changes in gas prices and import shortages .Politically, renewable energy will bring Serbia closer to the EU and vice versa – lack of renewable energy utilization will prove to be a serious obstacle in the EU accession process.
Inseparable with this is the implementation of energy efficiency policies without which Serbia will never be able to meet its mandatory renewable energy targets.Environmentally, renewable energy will ultimately result in a cleaner and healthier Serbia and less negative environmental impact on its neighbors.
Summing up this brief analysis of the energy sector in Serbia, there are several important conclusions. In the electricity sector, Serbia is heavily dependent on coal. The new Energy Strategy to a large extent continues in that same direction with over 1 GW of new thermal power plants planned to be installed by 2030. However, 76% of Serbia's coal reserves are in Kosovo. Realistically, those reserves are out of Serbia's reach and if we count on them, it means we count on importing them. We will therefore make electricity production in Serbia dependent on coal imports. Even "clean coal" technologies have serious negative impacts on environment and run high external costs. The calculation is simple: we pay for coal imports (from Kosovo or elsewhere), we pay for CO2 emissions, we cover external costs of burning coal (costs incurred to our healthcare system, costs to our agriculture, costs to our tourism industry, costs incurred to our economy because of years of life lost by our citizens or reduced production due to illnesses). In the heating sector, Serbia is, even more than in electricity sector, dependent on imports – 85% of district heating system is dependent on gas, and 84,5% of gas is secured through imports. This makes the heating sector extremely volatile to any political or economic frictions between EU and Russia, as Serbia heads towards the EU.If we do not quickly turn towards renewable energy sources, Serbia's energy security will be seriously compromised. In today's world wars are fought over energy security. This is why the EU is investing so much into renewables in order to reduce dependency on energy imports. Turkey, Ukraine, China, Russia even – all are turning to their own renewable energy sources. Serbia cannot afford to go into the opposite direction.