FRIEDRICH EBERT STIFTUNG
Belgrade

Green Growth Perspectives for Serbia

Transparently Renewing Efficiency

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- Serbia is in a position to pursue long-term sustainable 'green growth' strategies. Society in Serbia can be mobilized around this goal, since green growth strategies are able to simultaneously deliver on GDP growth, impairment of regional disparities and employment creation, generating numerous, yet dispersed winners. Such development can be achieved only as a path that genuinely responds to the needs of Serbian citizens. Public participation in policy making, implementation, monitoring and evaluation are essential if such a policy is to be pursued.

- The development path that Serbia followed during transition has not yielded outcomes that match the expectations of Serbian citizens. Employment growth, freedom of entrepreneurship, effective social protection and export growth, were promised at the beginning of the transition. The financial crisis may have exacerbated the problems, but many authors indicated long before the onset of the crisis that the development model focusing on stringent macroeconomic policies together with liberalized capital flows accompanied by high inflation rates do not provide a framework for the emergence of the rule of law that facilitates sustainable development. The model lacked the support of any sustainable development components.

- Efficiency in the energy sector critically determines overall economic competitiveness. The Energy Sector in Serbia constitutes a large part of its national economy in all aspects. Energy supply comprises imported fuels that constitute a large share of overall imports along with locally produced energy, based on low quality domestic lignite with its inherent inefficiency in extraction, relatively large hydro facilities and fuel wood. Such a supply, characterized by high direct and indirect costs is inefficiently converted and transported to sectors with low purchasing power or industry to which it is provided at a price not allowing for full cost recovery.

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SUMMARY

Serbia is in a position to pursue long-term sustainable 'green growth' strategies. Green growth strategies should be considered as a possible set of no regret development strategies. Society in Serbia can be mobilized around this goal, since green growth strategies are able to simultaneously deliver on GDP growth, impairment of regional disparities and employment creation, generating numerous, yet dispersed winners. Such development can be achieved only as a path that genuinely responds to the needs of Serbian citizens. Public participation in policy making, implementation, monitoring and evaluation are essential if such a policy is to be pursued. Energy and resource efficiency is the key sector in which reform should begin. Relevant international standards, both EU and non-EU, for governance in general and the energy sector in particular, should be used as tools in this endeavor.

The development path that Serbia followed during transition has not yielded outcomes that match the expectations of Serbian citizens. Employment growth, freedom of entrepreneurship, effective social protection and export growth, were promised to Serbian citizens at the beginning of the transition. The financial crisis may have exacerbated the problems, but many authors indicated long before the onset of the crisis that the development model focusing on stringent macroeconomic policies together with liberalized capital flows accompanied by high inflation rates do not provide a framework for the emergence of the rule of law that facilitates sustainable development. The model lacked the support of any sustainable development components.

Chronic, significant current account deficits have been financed by loans, remittances and foreign direct investments ending primarily in non-exchangeable sectors such as trade, financial services, communications, or industries with high barriers to entry (the cement industry, tobacco industry, steel production and among others). The current account deficit has fallen below 5% of GDP in the last two years and the fiscal deficit is shrinking following tightened public finance management. The import of oil has been reduced in physical terms, while the import of gas and oil have been reduced in financial terms due to low global prices. Some new exporting industries have emerged. These new export capacities are also supported by large state subsidies, low wages and low corporate taxes. Total social welfare and the sustainability of such competitiveness does not seem to be high. High added value industries do not seem to have emerged.

Efficiency in the energy sector critically determines overall economic competitiveness. The Energy Sector in Serbia constitutes a large part of its national economy in all aspects. Energy supply comprises imported fuels that constitute a large share of overall imports along with locally produced energy, based on low quality domestic lignite with its inherent inefficiency in extraction, relatively large hydro facilities and fuel wood. Such a supply, characterized by high direct and indirect costs is inefficiently converted and transported to sectors with low purchasing power (such as households and the public sector) or industry to which it is provided at a price not allowing for full cost recovery, facilitating major shares of overall export. Due to the direct or indirect regulation of energy prices, barriers to entry to the sector are high, and new technologies or market players are hardly able to enter the sector. This paints a picture of a Serbia locked in unsustainable economic growth, well described already in 2004 in Stuck in the Past, a study, published by UNDP in Serbia.

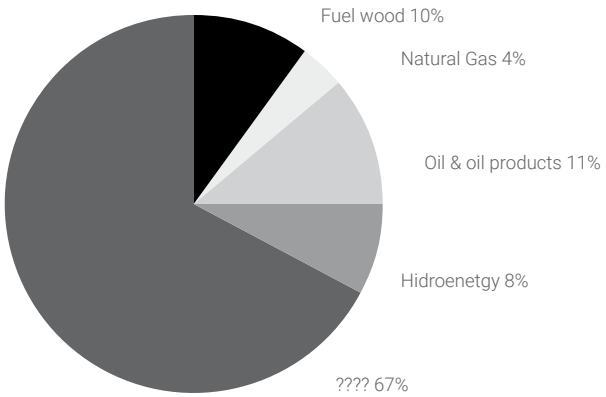
CURRENT SITUATION

ENERGY SUPPLY AND DEMAND CHAIN

"Energy is affordable if total social costs of energy services could be covered by productivity gains facilitated by suitable and secure energy supply in a way that people could conduct economic activity to support an appropriate standard of living for themselves and their families within a healthy environment."

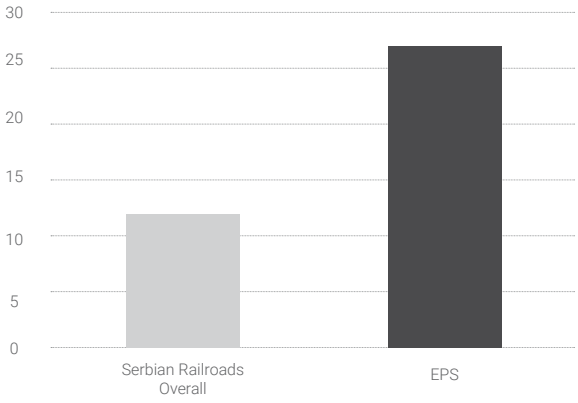
The cost of fuels imported into Serbia is higher than the average cost of supply of the same type of energy into competing economies. Serbia imports high quality fuels (natural gas, oil and, to a certain extent, oil derivatives) constituting around 28% of total primary energy supply. Being a landlocked country that does not fully utilize the River Danube for river to sea transport, Serbia is isolated from the main energy markets, and energy imports are mainly conducted via pipeline transport. This exacerbates the issue of security of supply but also puts Serbia in an inferior position given its inability to choose between either supplier or supply route in natural gas supply sector.

Figure 1. Primary energy production in Serbia in 2015. (IEA, 2017b)



The energy supply chain from domestic energy sources is the leading industry in Serbia in terms of physical volumes, a dimension too frequently overlooked in contemporary development planning.Domestic energy production consists predominantly of the production of lignite, coal with a low calorific value and relativelyhigh sulphur content. The Electric Power Industry of Serbia (EPS) extracts annually more than 30 million tonnes of lignite andremoves more than 100 million tonnes of overburden in this process. The annual volume of lignite transport via EPS internal railroads is twice as high as the total volume of goods transported on Serbain railroads in 2016.

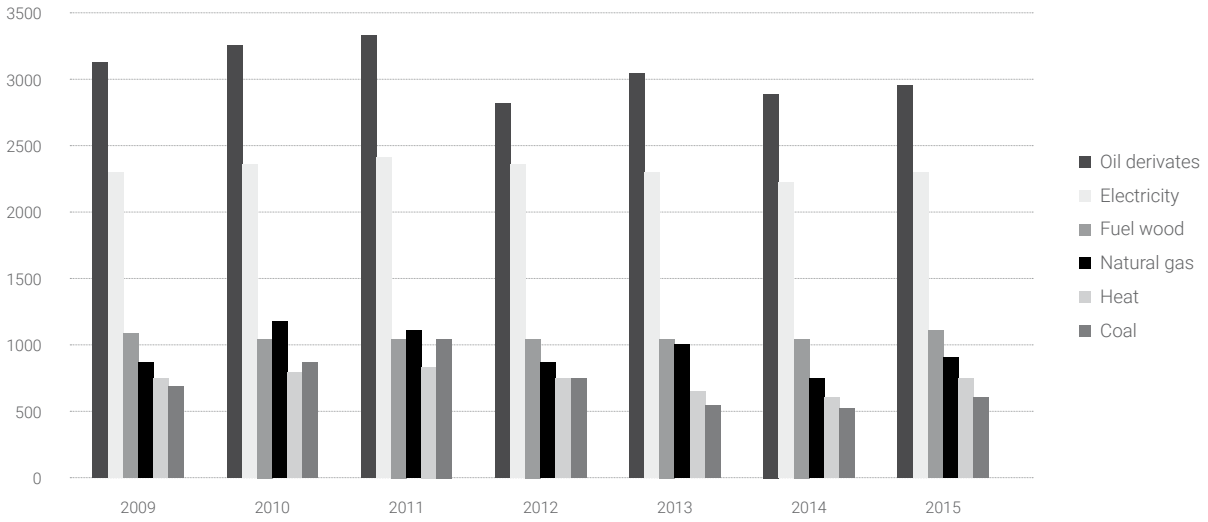
Figure 2. Annual volume of transport by rail in 2016: EPS and Serbian Railroads. (EPS, 2017), (Republički Zavod za Statistiku, 2017)



The current share of hydro energy enables a mix in which the final electricity price is formed as an average price within the EPS portfolio, at a much lower level which, together with price regulation, sets high barriers to entry for new players and new technologies.

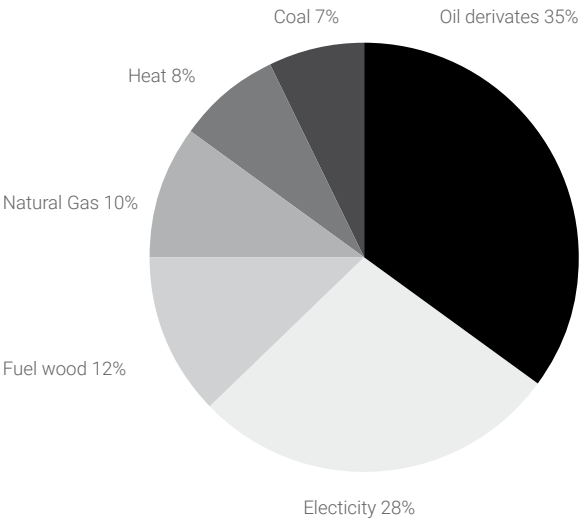
Domestic oil production increased by more than 60% in the period since 2008, and the privatization of the Oil Industry of Serbia (NIS) reduced import dependency, improved both the security of supply and the current account balance of the country. Very low natural resource rent is, however, highlighting the social costs of these developments, questioning not only the sustainability of these achievements but also the influence of these developments on total social welfare. Serbia lacks the institutional framework in which these trade-offs can be analyzed.

Figure 3. Final consumption by fuel in Serbia in ktoe (thousands of tonnes of oil equivalent) 2009-2015. (IEA, 2017)



Shares of fuel in final energy are a consequence of the limited options consumers face. Shares of individual fuels have remained relatively stable since 2009.

Figure 4. Shares of fuels in final energy consumption in Serbia in 2015. (IEA, 2017)



Oil derivatives head final consumption followed by electricity and fuel wood. Taxes and excise duties on oil products are a major source of revenue for the state budget.

Electricity represents 28% of final energy consumption and is produced in large hydropower plants (HPP) and in thermal power plants (TPP) burning lignite.

The net efficiency of TPP is around 30%. The average age of existing thermal power plants is more than 30 years.

Assets operated by EPS are not utilized to the optimal economic level. The power production system has not been designed to serve the load it does today. The system was designed to match a relatively strong industrial sector with flat load characteristics to which large lignite-fired units provided electricity. Electricity demand today predominantly comes from the household sector and is characterized by high seasonal and intraday fluctuations.

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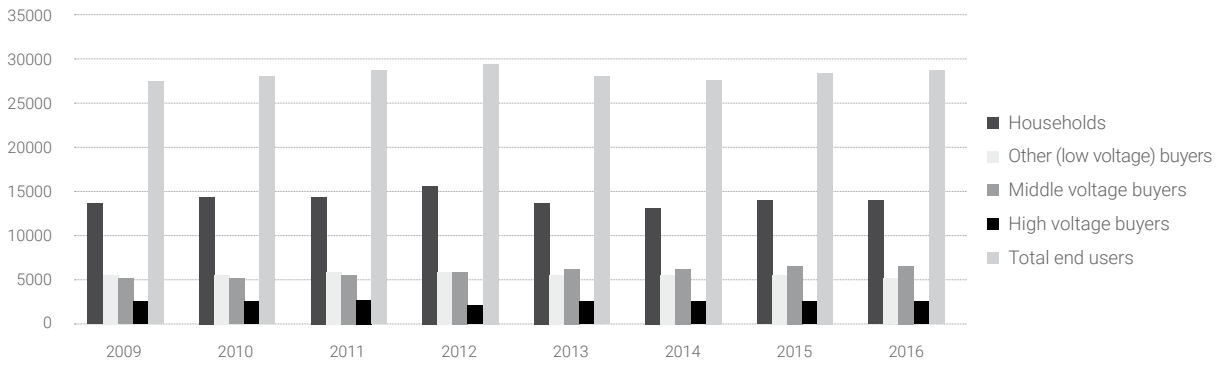
Table 1. EPS electricity plants - power and production in 2016, (EPS, 2017). Author's calculations

Power plants	Type	Installed power	Electricity Production GWH	% of group electricity generation (TPP and HPP)	% of total electricity generation
TPP Nikola Tesla A	TPP	1597	10,845	43%	30%
TPP Nikola Tesla B	TPP	1190	6,418	26%	18%
TPP Kolubara	TPP	216	706	3%	2%
TPP Morava	TPP	108	294	1%	1%
TPP Kostolac A	TPP	281	2,042	8%	6%
TPP Kostolac B	TPP	640	4,711	19%	13%
TP-HP Novi Sad	TPP	208	90	0%	0%
TP-HP Zrenjanin	TPP	100	0	0%	0%
TP-HP Sremska Mitrovica	TPP	28	0	0%	0%
HPP Djerdap 1	HPP	1099	5457	48%	15%
HPP Djerdap 2	HPP	270	1615	14%	4%
Vlasinske HPP	HPP	129	340	3%	1%
HPP Pirot	HPP	80	137	1%	0%
HPP BajinaBašta	HPP	420	1733	15%	5%
RHPP BajinaBašta	HPP	614	728	6%	2%
HPP Zvornik	HPP	96	463	4%	1%
HPP Bistrica and HPP KokinBrod	HPP	124	456	4%	1%
HPP Potpeć	HPP	51	222	2%	1%
HPP Elektromorava	HPP	18	81	1%	0%
HPP Uvac	HPP	36	76	1%	0%
Smal HPP	HPP	21	47	0%	0%

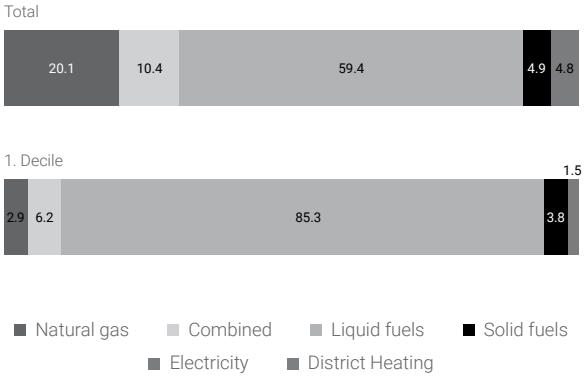
Figure 5. Electricity consumption by category 2009-2016. (Agencija za energetiku Republike Srbije, 2017)



This trend, with households comprising the dominant sector of consumption (over 50%) has continued for many years. Nevertheless, reliable assessments of the shares of certain energy services (water heating, cooking, space heating and so on) in total household electricity consumption are not available. Possible policy choices enabling an economically justified fuel switch, therefore, may not emerge.

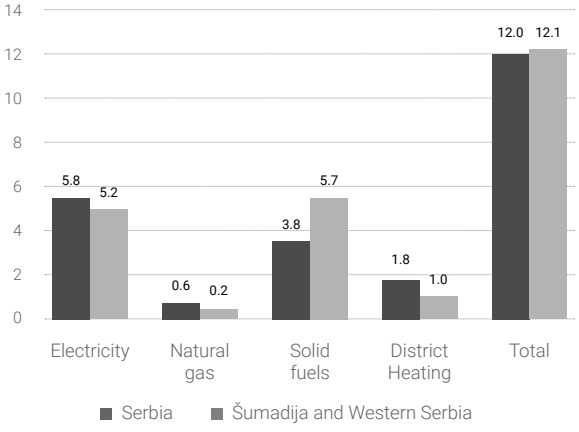
What main options for space heating do households, public and commercial buildings deploy? A thorough understanding of the provision of heat in all sectors is the cornerstone for gaining an understanding of the energy sector in Serbia. Inefficiency of heat provision influences energy poverty, causes system- wide peaks in the electricity sector due to supplemental heating and causes congestion in winter gas supply. The delivery of this particular energy service critically frames the possibilities for green growth based on improved energy and resource efficiency

Figure 6. Structure of households by type of in dwelling heating in the Republic of Serbia, 2015. (Republički Zavod za Statistiku, 2016)



Households use solid fuels as the predominant fuel for space heating. While the percentage depends also on the price of gas and electricity it is relatively stable at levels above 55% of all households in the country. Fuel wood is the single dominant source. This fuel is used mostly in devices with an efficiency below 40% (HBS 2014), (GiZ 2017). Such inefficiency puts pressure on the fuel wood resource far beyond reasonable levels. At the same time, due to the poor efficiency of the most common device used, low purchasing power of households and substandard housing stock, this overuse of resources, both fuel and financial, does not deliver proper energy service.[1] On very cold days as fuel wood prices in the market rise, and stock depletes, households tend to supplement their heating with electricity due to the fact that electricity payment can be postponed, or not effected at all.[2] This additional demand, together with the demand from consumers of the district heating system, which will be described further in this study, creates system - wide peaks,[3] that force EPS to withhold reserve capacities with high opportunity costs. Thus, inefficiency is spread through the entire energy sector, and productivity of expensive assets falls to a low. Demand for other goods and services due to high energy related spending remains locked. This limits potential for sustainable employment opportunities. This phenomenon is unequally distributed across the country.

Figure 7. Energy expenses as a percentage of total disposable income in 2015: Serbia and regions of Šumadija and ZapadnaSrbija. (Republički Zavod za Statistiku, 2016)



1. Households heat on average around two thirds of available space.

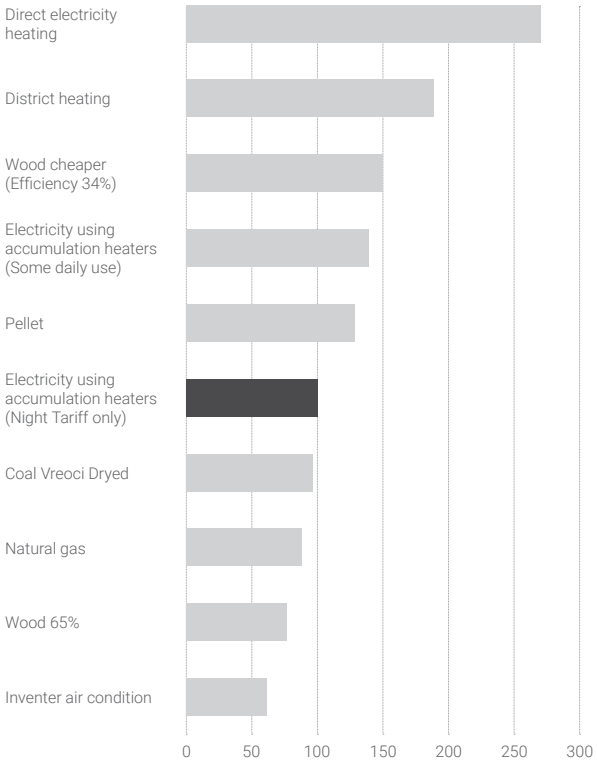
2. Recent announcement of EPS revealed that consumers owe around 800 millioneuros to thecomany, this debt being almost evenly distributed betweenhouseholds and industry.

3. System-widepeaks are always recorded during weekends or holidays.

District heating systems provide space heating to 20.1% of households across Serbia (Republički Zavod za Statistiku, 2016). These systems are based on heat-only boilers (around 6,700 MWth) in some 55 cities in Serbia.

Heat is produced using only fossil fuels in devices with very low utilization. These systems are based on heat-only boilers designed to serve the remotest consumers on the coldest days. Service of domestic hot water preparation is not rendered. Therefore, the equivalent utilization of boilers is in the range between 1000 and 1500 hours annually, suggesting very low productivity of assets. Heat is distributed using hot water as the energy carrier through lengthy underground pipes with significant loss to housing stock with a large potential for building efficiency improvements. Pipelines are frequently in bad condition and leaking occurs in many of these systems. Heat distribution itself is managed using the so-called qualitative system, meaning that variation of the primary water temperature is the only way for achieving regulation. This regulation is unsophisticated and also contributes to system losses. Regulations of flow in the system are not deployed frequently, but in systems where such regulation is being introduced major savings are possible.

Figure 8. Index of prices of different heating options (electric accumulation heater using night tariff = 100). (Agencija za energetiku Republike Srbije, 2017 b), (RES fondacija, 2017)



Price of the district heating service is regulated by local self-government. The price, taken in the mod term, does not provide for cost recovery to the utilities providing the service, while at the same time is not competitive to possible alternative heating solutions.

Utilities budgets have been subsidized by local budgets in the past, but an increase in fuel prices and poor liquidity of local budgets has placed additional constraints on this mechanism. The result is very similar to that already described in the case of individual fuel wood heating: inefficiency in the district heating system is spread through the entire system since households tend to supplement heat where needed with electricity. The district heating service creates losers across the system: consumers pay a great deal for a service that sometimes does not suffice; providers cannot cover their costs and residents who do not enjoy the service cover the cost of the service as well.

Core business operations are at the heart of the problem in the provision of this service and the focus on regulation, metering restructuring or other possible sources of savings is, in this case, misleading. Heat that is produced using genuine fuels without the combined production of other products or without usage of waste heat or locally available heat is uncompetitive in district heating.

The price of the service is not affordable to consumers; moreover it is not competitive considering the price of similar services in countries with more severe climate conditions and where full cost recovery is achieved.

Figure 9. District heating average prices in EUR/MWh in selected countries (data for 2013) and Serbia (2017). Werner, 2016), author's calculations based on utility data.

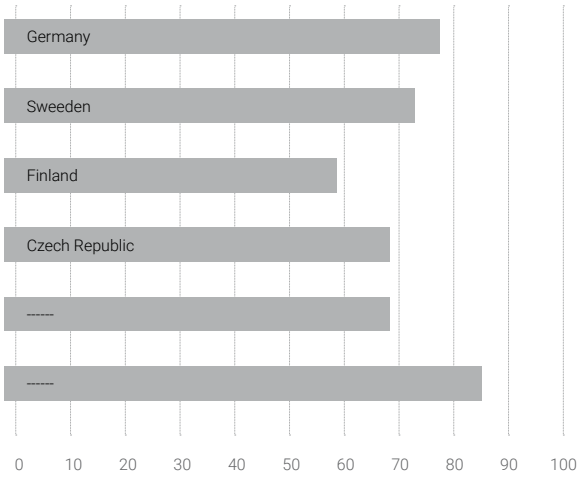
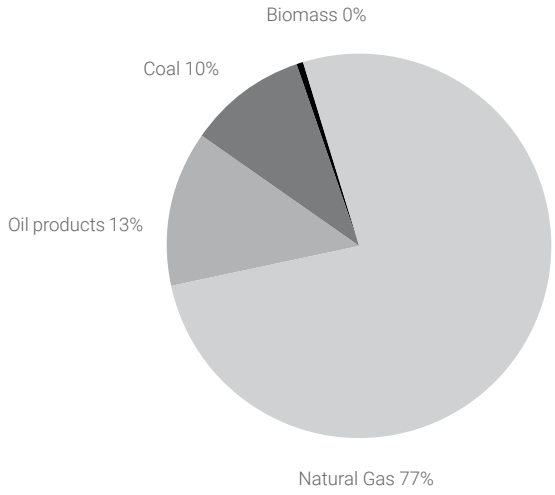


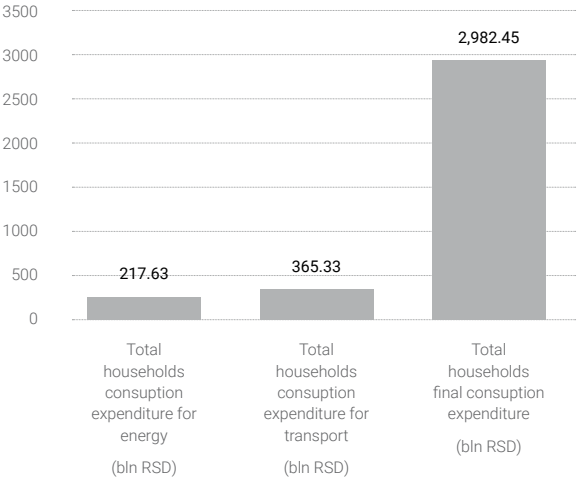
Figure 10. Share of fuels in heat production in district heating systems in Serbia in 2016. (Republički Zavod za Statistiku, 2017)



District heating systems use some 24% of total gas consumed in the country. This consumption takes place exclusively during the winter season and creates huge seasonal fluctuations.[4] During the winter consumption reaches the limits of the supply infrastructure from Hungary. In the winter months, even before the crisis in Ukraine, some industrial consumers were forced off the grid in order to enable sufficient gas supply for district heat. The solution to this problem is found in large public investment in the gas storage facility at Banatski Dvor. While such a facility could certainly play a role in the gas system, it now effectively also plays a role in heat storage. This leads to another case of unproductive use of expensive capital assets financed by the public, further raising the total costs of energy supply for businesses and households.[5]

Households spend significant monetary resources on energy and transport. Combined, this consumption has reached five billion Euros

Figure 11. Household final consumption expenditures in bn RSD in 2015: electricity and fuels, transport and total. (Republički Zavod za Statistiku, 2016).



4. Ratio of winter to summer consumption in natural gas goes up to 3:1.

5. "With extremely high interest rates, procuring and storing gas at relatively high prices for future use in inefficient district heating systems does not make economic sense. It simply adds to the underutilized stock of capital engaged in the provision of subsidized district heating services. Security of supply arguments are used to justify it but there is no viable market demand capable of paying the full cost of such services" (Kovačević 2007)

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ECONOMIC POLICY

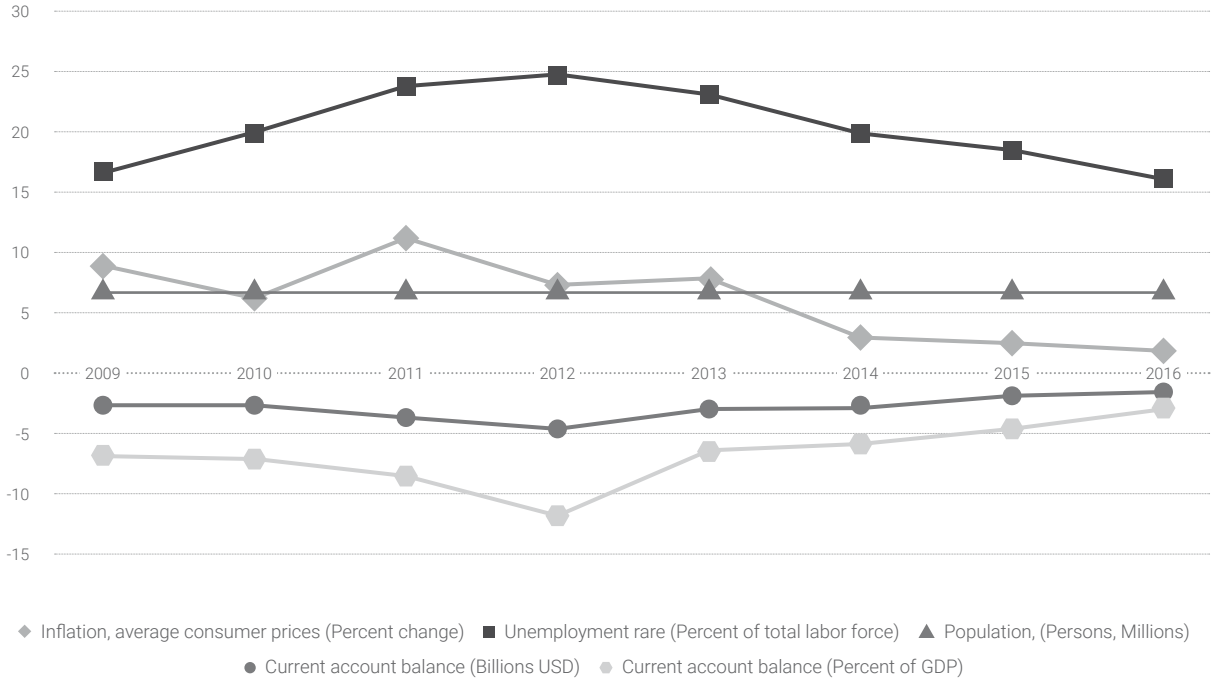
"... As a second example, we consider macroeconomic stabilization policy to address the inflation that accompanied price decontrol. We ask: what is the effect of high interest rates on the size of the constituency for the rule of law? We show that at high interest rates, the relative returns to stripping assets and opposing the establishment of the rule of law may both rise; thus, a too stringent macroeconomic policy can undermine the constituency for legal reform. As a third example, we consider the liberalization of international capital flows. When capital flight is easier, the relativereturn to stripping assets will rise and the constituency for the rule of law will fall."

(Hoff & Stiglitz, 2005)

Private expenditure-driven growth has been the country's economic strategy since the beginning of transition. Notional openness in the economy has not fully materialized in reality due to political risk in a country with low enforcement of property rights and low physical openness.[6] This has facilitated an emergence of low-volume high-margin industries: an aspect of the economy that may be seen as an obstacle for sustainable development and green growth.

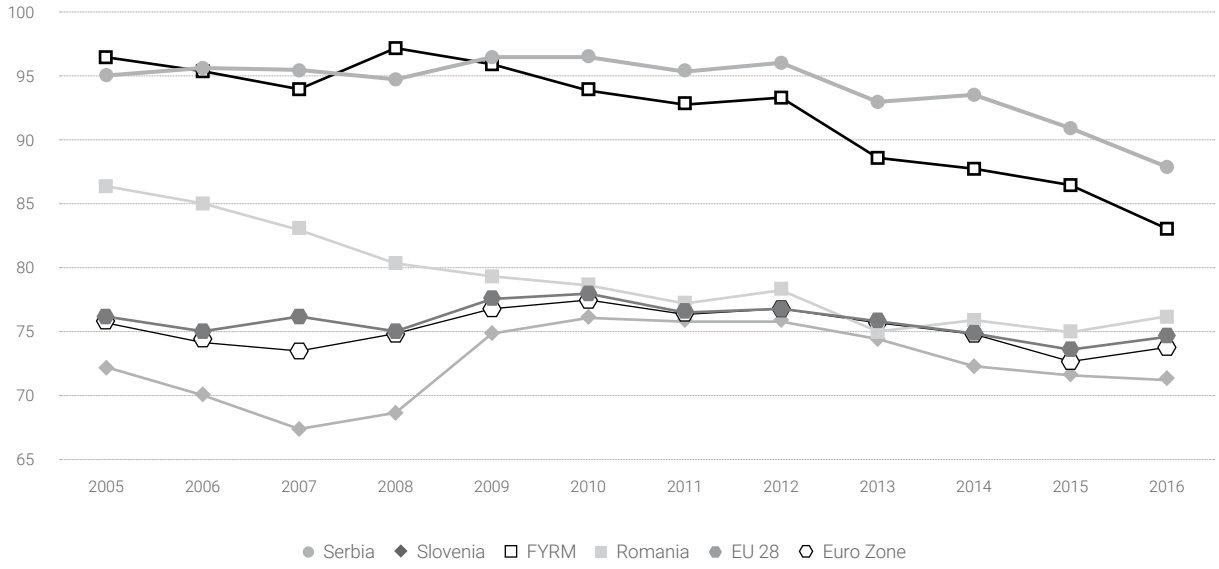
Private-driven consumption is partially enabled through low prices of electricity and the subsidized price of the district heating service. In such a manner consumption is being shifted from public to private consumption and away from investment consumption. In addition, demand is shifted to imported goods having detrimental effects on local employment.

Figure 12. Major macroeconomic parameters of Serbia (IMF, 2017)



6. For economies of Serbia's size, the share of exports in total GDP may be a good proxy for openness.

Figure 13. Shares of consumption in GDP for Serbia and selected countries (EUROSTAT, 2017)



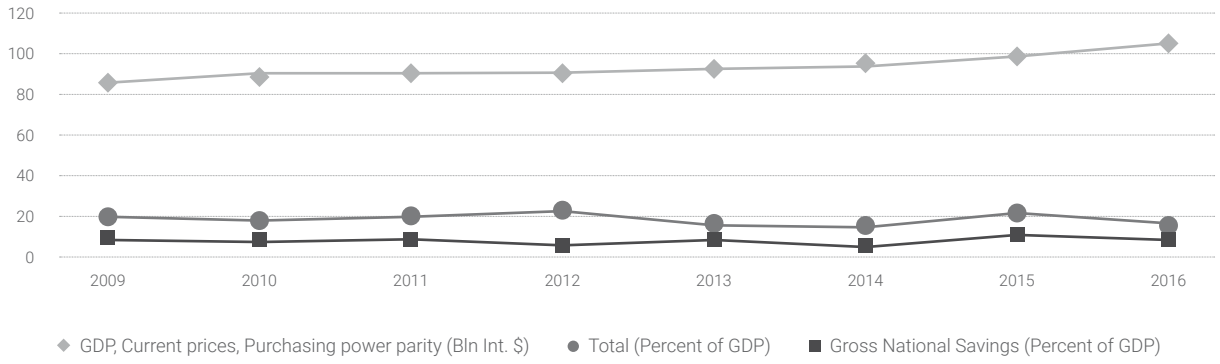
Natural resource rent, on the other hand, has been set at very low levels and in addition to this, payment enforcement has not been robust. The effect is the same as in the previously described situation: public goods have been transferred into private hands either directly or indirectly through subsidized energy prices. The result is a financing gap in the major energy industries,[7] and a severe debt to the environment.

The country is still facing significant trade and current payment account deficits. These deficits have been financed from three main sources: foreign direct investments, remittances, and commercial lending. Despite continuously higher inflation rates than in competing economies and low productivity, the exchange rate policy has managed to secure some stability within the currency maintaining the position of indebted households and companies. Foreign direct investments went to sectors of non-tradable goods and services such as banking and telecommunications, industries with a high barrier to entry such as cement, tobacco, beer, or energy intensive export-oriented industries such as steel or rubber. In recent years a large share of foreign direct investments has been supported by state subsidies. Vehicles export has become the largest export industry while the import of vehicle parts has become the largest import category. In addition, some new industries have emerged as top exporters. The Development Agency of Serbia advertises low labour costs, low corporate and profit taxes and state subsidies as comparative advantages. In essence, this is a transfer of public wealth (taxes, state subsidies) or private wealth of the poor (low wages) to private wealth of companies. Low global energy prices combined with these massive transfers facilitating exports may have supported the reduction in current payment account deficits as well as foreign trade deficits. The share of investments in GDP, however, remains low, as well as GDP growth rates and gross national savings.

It remains to be seen whether the achieved budgetary savings will be maintained in the future, and if so whether public investments will grow. Large public investments provide some immediate effects on GDP growth, but it is the quality of these investments that determines whether this growth contribution will be a one-off, or will deliver sustainable benefits.

7. When the Oil industry of Serbia was privatized in 2008, its new ownerpaid 400 million for the majority ownership but committed to invest an additional 500 million in the modernization of the equipment. A more recent example comes from the EPS. Its investments in 2016 were realized at the level of 49% of planned investments (EPS 2017)

Figure 14. GDP, investments and savings as a share of GDP in Serbia, 2009-2015 (IMF, 2017)



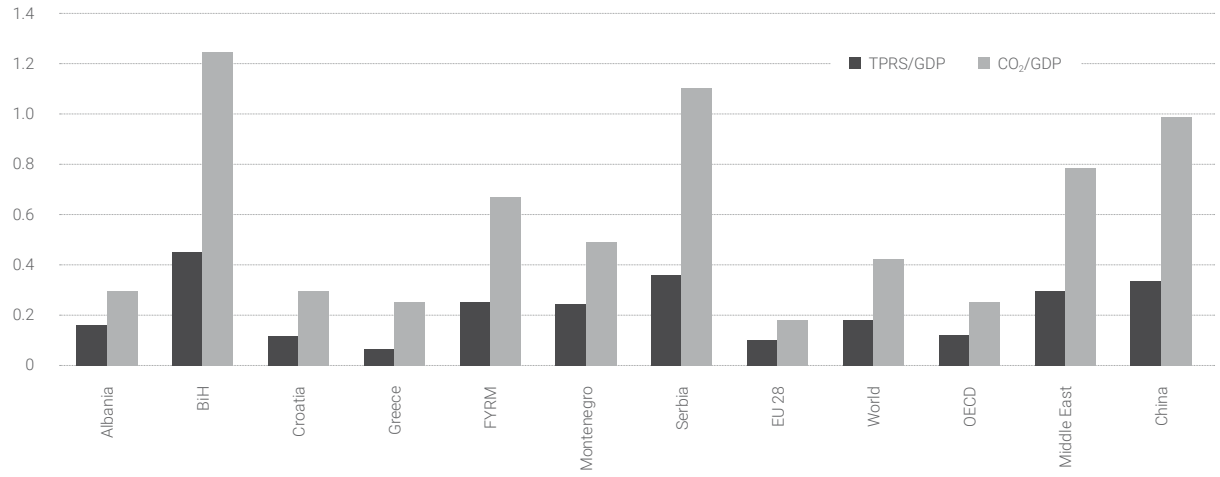
ENERGY EFFICIENCY AND GREENHOUSE GASES EMISSIONS - CURRENT STATUS TRENDS AND POTENTIAL FOR IMPROVEMENT

"To accelerate growth, reduce poverty and improve living standards, Serbia and Montenegro need comprehensive policy reforms to establish an enforceable concept of property rights and public goods; build capacity; improve institutional and corporate governance; develop better long-term policy planning; improve information flow and structures; strengthen coordination in energy, health and poverty policies; and enhance international cooperation. To improve energy efficiency and reduce poverty the new energy policy should remedy the uneven distribution of welfare benefits, especially the sizeable cross-subsidy from poor to rich. Implementing energy efficiency measures could contribute to a boost in the GDP growth rate to 5%-7% a year -a leap that no other policy change could achieve." (UNDP, 2004)

Energy use in Serbia is inefficient. According to global energy statistics 2017 (IEA, 2017b), based on 2015 data; Serbian energy intensity, calculated as the total primary energy supply divided by GDP based on purchasing power parity, and expressed in USD 2010 was 0,17 (toe/000 2010 USD). Serbia is ranked as the 35th most energy intensive country in the world out of 146 covered by IEAs reports.

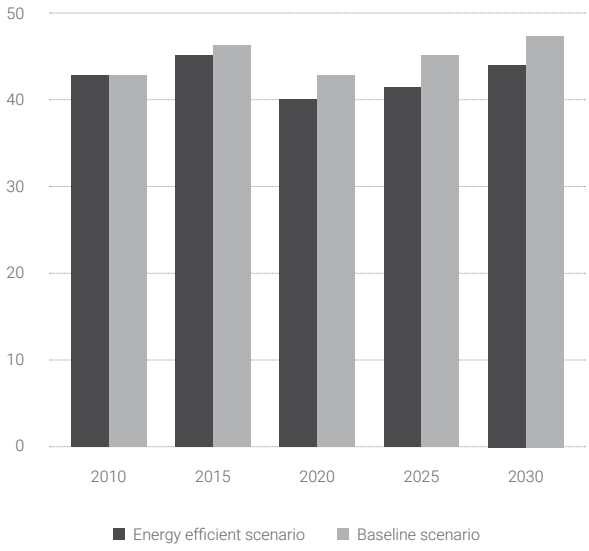
Serbia emits comparatively very large amounts of GHG emissions from the combustion process per unit of GDP in PPP terms. According to this indicator and based on the IEA data, Serbia ranks 15th in the world with 0.51 kgCO2 emitted per thousand 2010 USD.

Figure 15. Energy and carbon intensity of selected economies in 2015 (IEA, 2017)



The main domestic energy source, lignite, is hard to extract and carbon rich, with a low calorific value and a high content of other polluting substances, sulphur dioxide in particular. It is used in plants that are more than 30 years old and which, despite their relatively adequate technical conditions, belong to technological history. Their net efficiencies are well below the efficiencies of contemporary plants that could be characterized as Best Available Techniques (BAT). Inefficiency therefore begins with the extraction of lignite and production of electricity from it in ageing power plants. Supply factor inefficiency is frequently overlooked in policy discussions. Current strategic documents do not envisage increased efficiency in energy transformation in power plants until 2030.

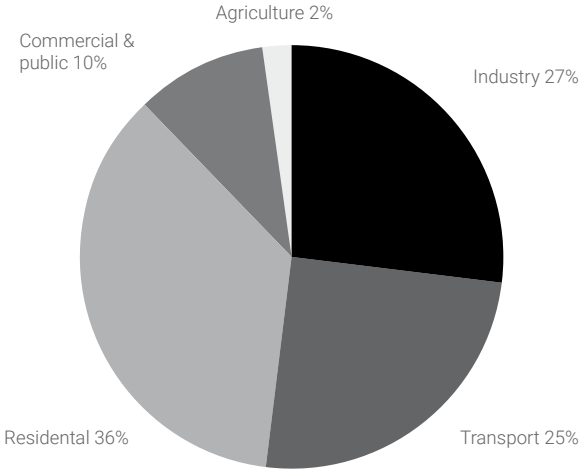
Figure 16. Efficiency of energy transformation in power plants in Serbia up to 2030 (NarodnaSkupština Republike Srbije, 2015) Author's calculations



Distribution and transmission losses are still higher than comparable benchmarks.

Energy is produced inefficiently and transported and distributed with comparably high losses. Inefficiency in final consumption is usually the only inefficiency visible to the public. Households and transport are sectors in which the largest share of energy is consumed in Serbia.

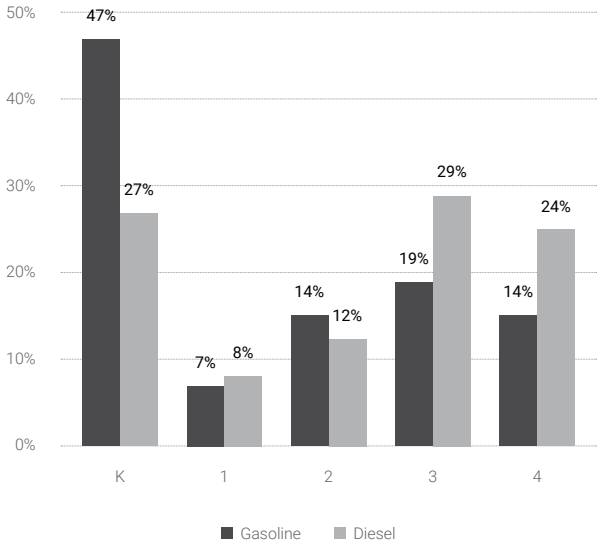
Figure 17. Shares of individual sectors in final energy consumption in Serbia in 2015. (IEA, 2017)



Electricity and fuel wood consumption in households constitute the largest share of the energy balance and are the sectors where particular attention needs to be paid.

Transport, as an energy consumption sector in Serbia, has similar attributes to other consumption sectors. The fleet is relatively old and inefficient. The newest data on vehicle compliance with certain Euro norms are already 5 years old.

Figure 18. Share of passenger vehicles compliant with certain Euro standards in Serbia in 2011. (InstitutSaobraćajnog fakulteta, 2012)



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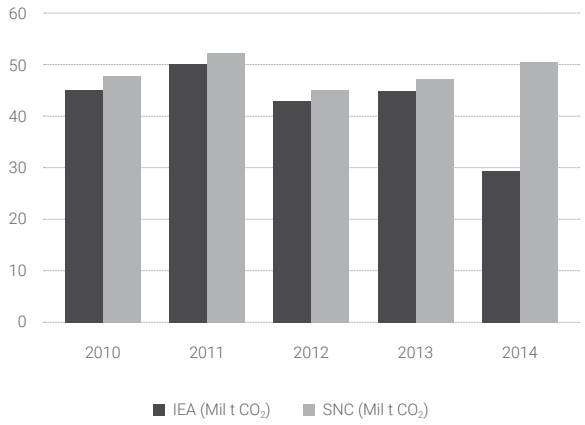
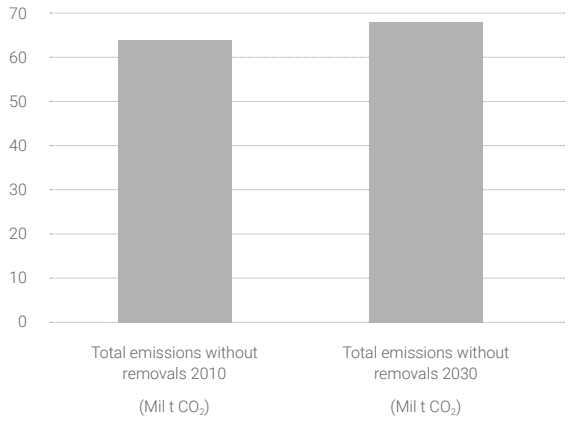
Serbia does not have a comprehensive climate change policy, nor does it pursue ambitious mitigation targets. Serbia submitted its Second National Communication (SNC) to UNFCCC in October 2017.The last inventory contained in this document is that for the year 2014. Due to the floods, but also other factors, energy production in the country and primary energy supply were reduced in 2014. The inventory for 2014 presented in the SNC, however, records an increase in GHG emissions from fuel combustion as opposed to the IEA data.

Figure 19. CO2 emissions from fuel combustion in Serbia, 2010-2014, as per different data sources. (IEA,2017), (Vlada Republike Srbije, 2017)



Climate policy still makes no mention of low carbon or green growth scenarios. Low carbon development is not referred to in the SNC. Alternative scenarios characterized as high emission reductions scenarios deliver an increase of 4% in 2030 compared to emissions in 2010. Ina country with high carbon and energy intensity, relatively low employment rates, and on the road to accession to the EU, such scenarios must be seriously re-examined as they constitute a weak, risk-prone, basis for development policy making in the country.

Figure 20. Emissions without removals in 2010 and in 2030 according to the most ambitious scenario (Vlada Republike Srbije, 2017)



The SNC contains three scenarios for GHG emission reduction up to 2030. All scenarios envisage an increase in emissions compared to 2010 and 1990 if emissions from the territory of Kosovo are deducted from the baseline. It has been stated that even such an increase can only be achieved with financial assistance for the implementation of "activities that will lead to total and GHG emission reduction by 2030 (projected in scenarios), developed and based on existing strategic documents from different sectors." According to this document, GHG emissions reduction will be, for example, achieved through the construction of seven new lignite-fired thermal power plant units with a total capacity of 2,850 MW.

Massive energy savings and reduction of GHG emissions are possible in households, and the transport, industry, public and commercial sectors. Provision of heat in households can be considered completely unsustainable across the building stock of the country. Specific energy consumption ranging from more than 110 kWh/m^2 annually (fuel energy basis) in the most efficient district heating systems to more than 350 kWh/m^2 annually for individual households using solid fuels, clearly shows considerable room for improvement (GiZ, 2017, HBS 2014). Intervention in both heat provision efficiency and energy efficiency of the stock are needed. 40 % improvement in energy efficiency in public

buildings (schools and hospitals) has already been achieved within the framework of the Serbian Energy Efficiency Project financed by the World Bank.

District heating system efficiency could be significantly improved with a set of energy efficiency measures for heat distribution, preparing district heating systems to complete the abolition of fossil fuel usage in the medium to long term. Waste heat from large power plants that is completely unused, other waste heat, abundant forestry biomass trapped in degraded woods that prevents the emergence of a sustainable wood industry, agricultural biomass and heat pumps accompanied by some gas-fired CHP in large cities should completely re shuffle the provision of the district heating sector (World Bank 2010). Some creative elimination in this sector is urgently needed.

High inflation accompanied by regulatory barriers and insecure property rights[8] provide for the environment in which discount rates have been exceptionally high, shifting investments towards low capital costs investments. This framework poses barriers for energy efficiency investment. The same is valid for investments in renewable energy generation which are the second set of options for climate change mitigation activities. It remains to be seen whether lowered inflation will change incentives in investment decisions within the private and public sector.

While energy efficiency measures and low purchasing power of households and industry, as it is today, can economically postpone the need for new capacities, some measures could be introduced even in the short to mid- term period in electricity production. The co-firing of biomass is one such measure.

The sharing of transport modes and a shift from road to river and rail transport would improve energy efficiency and would contribute to GHG mitigation efforts. This shift is possible and is actually a pre-requisite and constitutional activity for the change of the development paradigm. Additionally, a non-motorized mode of urban mobility has significant potential for increase. Survey results indicate a high proportion of the population willing to switch to this type of commuting should certain conditions related to safety and accessibility be met. Currently, transport contributes to 11.82% of total GHG emissions in Serbia in 2013 (Vlada Republike Srbije, 2017).

8. Constituting country risk premium.

Belgrade

PERSPECTIVES FOR GREEN GROWTH

CURRENT STATUS

Overall, there are four key elements that provide the economic rationale for applying green growth strategies to the energy sector (OECD, 2011):

- Economic costs of environmental damage and poorly managed natural resources: Failing to address environmental concerns and not managing natural resources effectively pose risks to long-term economic growth, for example, via the increasing scarcity and rising price costs of increased environmental damage of conventional fossil fuels and to well-being through the impairment of human health caused by pollution, for example.

- Innovation to achieve environmental and economic objectives: Innovation is fundamental to the objectives of green growth in that it can help to decouple environmental damage from economic growth. It is also at the core of economic objectives such as productivity growth and job creation. Innovation is particularly important in the energy industry, as we search for forms of energy that impose fewer environmental costs and for ways of improving efficiency in use as prices rise.

- Synergies between environmental and productivity growth objectives: Improved resource productivity and energy efficiency, through innovation or deployment of energy technology or processes, supports decoupling between economic growth, environmental damage and resource degradation.

- Opportunities for new markets and industries: Shifting toward green growth in the energy sector will require new technologies, fuel sources, processes and services that can spur new markets and new industries. Firms that are proactive in the face of these changes will be well-positioned to both contribute to and benefit from them.

Serbia's economy could be considered to be a brown economy at the moment. The energy sector, shaped in 1970 and designed to utilize domestic resources for electricity production passing it on to an industry that conducted the primary process of mining products; selling it to the world market in a time of oil crisis, still operates almost unchanged. 40 years later this system primarily supplies households and the remaining sections of industry, almost unchanged from that time, which are frequently unable to pay for the electricity.

High discount rates that all investors, public and private alike, faced were the result of various processes and circumstances and prevented significant productive investments. As explained, these facilitated a trade-off between capital and operational costs. This implies that the current framework will most likely perpetuate inefficiency in energy and resource use preventing large scale employment and generating a rent-seeking economy in numerous forms.[9] Such a form of economy in turn may result in low employment rates and poor governance. Recent changes in industry structure have been accompanied by large state subsidies and low taxes. The effectiveness and sustainability of such support will be tested in the coming years.

A government sovereign guarantee of any kind was a main prerequisite for major investments. At a time when other sources of foreign currency are shrinking, the government might be inclined to guarantee any investment arrangement since this provides for an influx of foreign currency needed to continue the policy of a pegged exchange rate. This policy is seen as the only anchor of an anti-inflation policy. The productivity of investment can, in such a framework, play only a secondary role and the results of such investments in terms of technological improvements or employment

8. Natural resource rent, regulatory rent, environment rent, even rent on geographical position-transit rent.

generation potential, are random variables. The rate at which the country borrows at the financial markets seems to be the most critical factor for economic prosperity at this moment. In the last two years, the fiscal deficit has been put under control through some increase in tax collection and a reduction in public expenditure. Austerity measures certainly hampered aggregate demand, which used to be the key driver of growth in Serbia.

No industrial sector at the moment shows a contribution to energy efficiency in a systematic, sustainable manner. A recent analysis of determinants of Serbian export and an analysis for increase prospects (Gagović, 2016) shows a dominance of resource based industries in terms of competitiveness. This analysis also reveals that export competitiveness is rarely driven by quality, but by resource available at a price not covering costs or by labour intensity. An interesting finding is that the share of non-profitable industry in the overall export of the sector has increased.

Figure 21. Shares in total sector export by companies in manufacturing industries from Serbia based on their profits in 2002 and in 2013 (Gagović, 2016).

Restricted competition, a state of antimonopoly regulation, low capacity for innovation, a low level of deployment of knowledge and poor labour protection describe a situation in which innovation and technological development can hardly be expected. Some selected indicators from The Global Competitiveness Report 2017-2018, correlate well with the analysis provided. It is worthwhile mentioning that Serbia is slowly progressing on this list. Nevertheless, the value of some key indicators that are a prerequisite for efficiency gains and green growth are still very low.

Table 5. Selected competitiveness indicators for Serbia (World Economic Forum, 2017)

Indicator	**Rank (out of 137)**
Property rights	124
Judicial independence	118
Favoritism in decisions of government officials	104
Efficiency of government spending	44
Efficiency of legal framework in settling disputes	117
Protection of minority shareholders' interests	132
Intensity of local competition	115
Extent of market dominance	112
Effectiveness of anti-monopoly policy	114
Cooperation in labor-employer relations	105
Reliance on professional management	128
Country capacity to retain talent	134
Country capacity to attract talent	132
Venture capital availability	95
Availability of latest technologies	87
Firm-level technology absorption	117
Capacity for innovation	117
Company spending on R&D	107

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Heat pumps penetration could be an interesting indicator to monitor the absorption of new energy related technologies. This technology has proved accessible and delivers heat with very competitive levelized costs, but seems to face barriers to entry in Serbia. Their current share in Serbia, although growing, is extremely low and cannot even be identified by the surveys. Non-inverter air condition devices, for example, are still allowed in trade in the Serbian market.

Another proxy that may indicate possibilities for green growth is the use of solar technologies, for both hot water preparation and electricity production, with or without financial support from the state. Current diffusion is extremely low. The removal of barriers for the use of both mentioned technologies would appear to be a no regret policy measure, but is still absent.

The economic costs of poor environmental management are very large. The total annual monetized benefits of environmental approximation have been estimated in the range of 973 to 3 620million euros annually (Vlada Republike Srbije, 2011), the vast majority of which stem from pollution reduction from large combustion power plants. The envisaged costs of this approximation total up to 10.584 billion euros with a far smaller share of costs assigned to compliance for power plants. While this presents a clear case for environmental investments, it is worthwhile noting that alternatives that could possibly achieve the same and even expanded benefits have not even been considered in the analysis.[10]

Residents create a constituency capable of effectively demanding synergies between productivity growth and environmental objectives. A survey conducted for the Ministry of Mining, Environment and Spatial Planning in 2012, revealed that more than two thirds of respondents stated that environmental and industrial growth objectives could be pursued simultaneously, with almost 45% strongly agreeing with this statement and an additional 22% agreeing with it. This is capital that should be seriously taken into account when creating new policies.

MAIN BARRIERS

"…to those who will not have the benefit of two billion years' accumulated energy reserves…"

"…if everyone does a little, we'll achieve only a little." (MacKay, 2009)

The main barriers to the development of a low carbon economy and for green growth emergence are not of an economic nature. The political and decision-making framework is not yielding projects or programmes that lead to a low carbon economy.

Serbia lacks a Development Policy. Serbia effectively lacks an Energy Policy[11] and does not have a Climate Change Policy. The concept of public goods is unclear, and accounting of public goods is absent.There is no framework in which trade-offs can be assessed nor an indicator against which effectiveness of certain public policies could be benchmarked. Moreover, public goods are defined as state owned and, consequently, different agents[12] deal with particular shares of the public goods, unable to see the whole picture. The lack of horizontal coordination and public participation in policy making, implementation, monitoring and evaluation is a critical obstacle.

Information shortage and inconsistent statistics also prevent evidence-based policy making.

The state is, to a certain extent and for varying reasons, trapped by the energy utilities. EPS however, is not in a position to occupy a dominant position or to establish corporate governance. Regulated price still does not allow for full cost recovery of basic costs, not to mention huge

10. For example deployment of Flue gas desulphurization was proposed for powerplants. This technology reduces plant output. Replacement of existing boilers with fluidized bed technology has not beenconsidered at all.

11. Serbian energy development strategy was adopted in December 2015. Two years on, the Action Plan for its operationalization has not yet been adopted.

12. Ministries, Local governments, Regulators and so on.

external costs. There is also an obligation to set aside a share of the profits and channel it into the budget. In a weak accounting framework, profits can be made as a result of reduced investments in maintenance or even in core business. Resource inefficiency and energy inefficiency will continue in this framework as barriers to entry remain high.

Financial barriers are always an issue, but some recent analyses show low utilization of available funding. In the last two years availability of public financing for energy efficiency and renewable energy has increased. Seemingly, the low quality of projects seems to be at the core of the issue of poor utilization of available funds.

Such financing instruments could have a critical role in leveraging additional financing and the effects on green growth and low carbon development could be substantial. Change in the institutional set up is needed and a significant opening up of the decision-making arena may be instrumental in pursuing green growth options.

DIRECTION FOR CONSIDERATION

"Aligning the energy sector with a green growth framework requires a clear understanding of national priorities. While fostering greener growth will require international co-operation, it is largely a national matter and the policy mix will therefore differ across countries, according to local environmental and economic conditions, institutional settings and stages of development." (OECD, 2011)

Serbia does not have many options for growth that are not green. A landlocked country poorly supplied by good quality energy resources with negative demographic trends cannot count on energy intensive growth.

The wood industry and biomass energy could play a significant role in green, low carbon development in Serbia. A detailed analysis of this option could be explored as a follow up to this study. It is possible to increase the productivity of forestry resource utilization across the value chain, in Serbia.

At the same time, forests are an economic, rural and environmental resource. Employment intensity in the higher, value-adding wood processing phases (such as furniture production or deployment of cross-laminated timber technologies) is very high.[13] In terms of regional economic health, the job intensity of forest-based industries is more significant if compared with other industry types. Overall, the relative job intensity of forest-based industries is greater than many other industry types, suggesting that investments in forest-based industry are effective in generating employment (Theophile, 1996).

While wood biomass will remain the main source of heating for households in Serbia, it is possible to reduce specific wood consumption for heating in households leaving more resource for processes adding more value and facilitating employment.

Large lignite burning energy facilities made up the backbone of economic development when they were first launched, but are now becoming more and more of an economic burden given their now out-dated technology and practically prohibitive environmental operational costs from the perspective of both local and global environment.[14] Usage of wood and agricultural biomass in these facilities is not only possible without any detrimental land use change but may actually provide additional resources for agricultural and forest producers at the same time, securing a stable, competitive, environmentally acceptable fuel supply. The Forestry and Wood industry sectors are the only ones that may effectively absorb a possible redundant work force from the power industry in the case of energy transition driven by either competitiveness or harmonization with EU policies. Without forestry developments, the prospects for a just transition in the energy sector remain weak.

13. More than one employee per tonne of processed wood annually.

14 Serbian power sector and other large combustion plants must comply with the requirements of the Large Combustion Power Plants Directive in 2018, and with the requirements of the Industrial Emissions Directive by 2026. The first deadline will certainly not be met constituting another risk for the prospects of Serbia's accession to the EU.

All the actors, which directly or indirectly utilize this resource, need to be empowered to optimize their position, at the same time improving the quality and the quantity of the public/common goods and services that forests provide. The Directorate of Forests which undertook a more ambitious course in improving the quality of forests and forestry needs more resources to achieve its goals. Private forest owners are numerous and dispersed, sometimes even unaware of the resource. The largest private forest owners (churches and the Faculty of Forestry) could be supported to become a nucleus for the development of private forests. Forestry needs to become more prominent in development policies as more public resources are needed for improvement in the sector. Better recognition and evaluation of non-timber forest products as well as the ecosystem services that forests provide is required for informed policy making.

Forests, as a resource in Serbia, are used in a weak governance mechanism and based on obsolete technologies. Current technologies and governance concepts enable an increased supply of the resource for an increased and more productive demand including the demand for an environmental service.[15] Taking into account the present low quality of forests in Serbia, it is possible to increase the use of the resource and increase its quality in the midterm.

At the current level of sector development, it is possible to significantly increase social benefits derived from the sector in a manner that allows the majority of stakeholders to build a competitive strategy in an improved environment. Cross border cooperation is a mandatory tool in achieving this goal, given the nature of the resource, current usage patterns and volumes, and extremely low utilization of resources and equipment which is particularly true for small and medium enterprises.

It is essential that the use of forest resources is based on stakeholder participation in the management of the sector. Data bases must be accurate to enable informed business and policy decisions. Only in such a manner will it be possible to prevent overuse of the resource and enable production of both private and public goods in large quantities and in high quality.

15. Conventional theories applied to forest resources presumed that forest users themselves were incapable of organizing themselves in overcoming the temptations to overharvest. Extensive empirical research, however, has challenged this theory and illustrated the many ways that forest users themselves have devised rules that regulate harvesting patterns so as to ensure the sustainability of forest resources over time. (Ostrom 1999)

Belgrade

THE ROLE OF POLITIC AND SOCIETY

Poor governance lies at the nexus of these processes and allows existing rules to perpetuate indefinitely into the future. These trends will increase poverty and deprive future generations of opportunities, and result in a lower quality of natural resources and a smaller capital stock. (UNDP, 2004)

The state is a multifaceted being. Traditionally, we think of it as having three branches: legislative, executive and judicial. We can add to this two additional faces relevant to the topic of low carbon development and green growth: the regulator and the entrepreneur. Seldom are these roles coherent and frequently the state in one of the roles does not recognize the state in the other.

If we look at environmental legislation we can say that the state is actively pursuing environmental objectives. On the other hand, the EU progress report for 2016 states: "Serbia has achieved some level of preparation in this area." which is a poor mark for such a report. Some state-owned enterprises are major polluters such as power plants.

The lack of an informed climate change policy does not confirm the active attitude of the state towards low carbon development.

Serbia ranks the 35th most energy intensive country in the world and the 15th most carbon intensive country in the world. It is 28% import dependent regarding energy, with more than 60% of domestic production coming from lignite. It is a landlocked country on the end of a gas pipeline with a single gas supplier and a single supply route, and its port infrastructure on the Danube River is ruinous. Some of the main export product groups still with a low volume of exports are energy intensive goods. Until the country strategic documents address these issues as a main development issue we cannot say that the state is playing an active role in green growth strategies.

Serbia is a member of the Energy Community Treaty. This has triggered many legislative and individual developments that create room for change. The Energy Community Treaty provides for a tremendous opportunity to integrate Serbia into pan-European energy markets and to implement modern legislative, institutional and governance frameworks in energy, the environment and competition, keeping a close watch on the social consequences of these developments.

Additional political regulation alone will not improve the perspectives of green growth. As we have seen, the largest obstacles lie at the heart of the technological processes in energy production, transport/transmission and consumption. Technology changes are required. Strong, financial support by the state which was seen, for example, in the case of the German Energiewende is not an option in a country like Serbia. Therefore, the increased quality of the overall governance framework and the scrutinized care of public goods are required.

The missing link is the increased and empowered demand for the rule of law and good governance. Public participation in decision -making in the energy sector needs to emerge, as well as a stronger demand for the monitoring and evaluation of policies and policy-making frameworks.

Only the increased demand for public participation from an empowered public will create an environment in which barriers to entry to this sector will fall enabling decreased discount rates and facilitating investments in a more energy efficient and low carbon energy sector. This alone will not be enough since the current industrial structure will also need to be changed as a result of the active policies pursued. This change must also be on a green growth path and require and facilitate major shifts in transport as well. Once these conditions are met, energy and resource efficiency options can compete against each other in a new framework.

The local level is suitable for the initiation of change. The civil society and local governments should strive to deploy the SECAP[16] model planning and to join the Covenant of the Mayoral Network of the European-wide network of local self-governments pursuing green growth.

Citizens of Serbia agree that it is possible to pursue environmental objectives and industrial growth simultaneously and need to be supported in this quest.

The eradication of energy poverty on a large scale through the improvement of the energy efficiency of heating devices and buildings is needed. This step in itself may create green jobs but the savings and better public health could be the most sustainable generator of future growth. Aggregation of individual projects can be carried out by the civil society in partnership with local self-governments.

The immediate and direct support of technologies such as heat pumps and small scale solar power and hot water equipment is one no regret option. The removal of administrative barriers (grid codes, licensing procedure and so on) and financial barriers is possible. Successful schemes can be created.

Further support to the decarbonisation of district heating, sustainable use of biomass, waste heat utilization and utilization of other low-grade heat is another no regret set of measures already recognized by the government. The development of biomass based district heating systems or biomass based large scale electricity production should be accompanied by a significant efficiency increase in domestic biomass use. Thus, pressure on the natural resource can be maintained.

Stringent compliance with the most modern environmental standards and internalization of externalities is necessary. Only in such a manner will the proper signal be distributed across society inspiring innovations that may lead to green growth, enabling a just transition from the carbon trap.

16. Sustainable energy and climate action plan.

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