Western Balkans: Directions for the Energy Sector

Final Report

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Contents

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Acronyms

bcm	billion cubic meters
CHP	combined heat and power
EC	European Commission
EE	energy efficiency
ESA	energy service agreement
ESCO	energy service company
EU	European Union
EIA	environmental impact assessment
EnC	Energy Community
EPC	energy performance contracting
FiT	feed-in tariff
IFI	international financial institution
GDP	gross domestic product
GW	gigawatt
HOA	homeowners' association
HPP	hydropower plant
ktoe	kilotonne of energy equivalent
LCOE	levelized cost of electricity
LNG	liquefied natural gas
MWh	megawatt-hour
NEEAP	National Energy Efficiency Action Plan
NREAP	National Renewable Energy Action Plan
RE	renewable energy
PECI	Project of Energy Community Interest
RISE	Readiness for Investment in Sustainable Energy (index)
TFEC	total final energy consumption
toe	tonne of energy equivalent
TPEC	total primary energy consumption
TPES	total primary energy supply
TPP	thermal power plant
WB6	Western Balkan countries*

* The WB6 countries are Albania, Bosnia and Herzegovina, the Former Yugoslav Republic (FYR) of Macedonia, Kosovo, Montenegro, and Serbia.

Executive Summary

This report summarizes emerging issues and constraints in the energy sector related to the goal of securing an affordable, reliable, and sustainable energy supply in the Western Balkan (WB6) region, comprising Albania, Bosnia and Herzegovina, Former Yugoslav Republic (FYR) of Macedonia, Kosovo, Montenegro, and Serbia.

Regional Challenges

The individual Western Balkan countries and the region are at a turning point. To be able to keep up with an energy demand growth estimated at around two percent on average by 2030, policy makers will need to make policy and investment decisions to address the following key challenges for the region:

- *The large backlog of investments.* Estimated at €15 billion, these investments are needed to modernize national and regional energy infrastructure to ensure adequate levels of security of supply due to aging and inefficient facilities, particularly in the power and district heating sectors.
- *Limited energy supply mix diversification.* Coal accounts for 50 percent of the primary energy production and there is limited access to natural gas, which is only imported from Russia through a single route. The potential for renewable energy (RE) applications for heating purposes and for power generation also remain largely untapped, despite significant decreases in prices and improved energy storage solutions.
- *The high environmental and social impact of energy sector activities.* The region's low efficiency in energy transformation and high dependency on lignite-fired power generation produce significant amounts of carbon dioxide (CO2), sulphur dioxide (SO_2), nitrogen oxides (NO_x) and dust or particulate matter (PM). Also, coal mining faces increasing social and environmental challenges related to waste disposal and resettlement.
- *Wasteful energy consumption.* There is significant potential for scaling up energy efficiency to decrease the region's heavy reliance on fossil fuels, improve the competitiveness of firms, help improve local air quality, and contribute to sustainable reduction of energy expenditures by the poor.
- *Delays in the establishment of a truly integrated and competitive regional energy market, particularly in the power sector.* Despite progress over the past few years and the WB6 countries' renewed individual commitments to implement European Union (EU) energy directives, there are still implementation gaps. Significant opportunities remain untapped with regard to i) exploiting the diversity of energy resource endowments, ii) improving security of supply, and iii) reducing system costs.
- *Lack of progress in addressing long-standing challenges in domestic markets.* Below-cost pricing, lack of payment discipline, and high grid losses result in a revenue gap, particularly in the power and heating sectors, which threaten the financial viability of energy sector companies. At the same time, affordability is a concern in the whole region. Finally, State Owned Enterprises (SOEs) commonly face problems of overemployment, illiquidity and political interference, which calls for governance reform to improve their performance.

The energy outlook

Countries have made a conscious move to favor coal (lignite) as a primary energy fuel in their national energy strategies due to affordability and security-of-supply concerns. It is available domestically and it is perceived to be cheaper than imported gas, oil, or renewable energy since environmental and social costs are usually not considered.

While lignite will undoubtedly continue to play an important role in the energy mix, the question facing policy makers is how to avoid over-reliance and "locking-in" to a long-lasting high-carbon infrastructure and environmentally unsustainable technology to meet their immediate power needs and fulfill export aspirations.

The alternative is to move towards a more sustainable energy path. Doing so would help countries develop untapped low-cost indigenous resources and realize the benefits of regional cooperation. To this end, WB6 countries may consider pursuing active policies focused around four pillars: (i) implement reforms in domestic markets to facilitate investments (either public or private) in sustainable energy solutions, (ii) implement supply-mix diversification policies by increasing the use of lower-carbon-content fuels such as renewable energy and natural gas, (iii) deepen regional cooperation and electricity-market integration, and (iv) scale up energy efficiency investments.

Pillar I: Reinvigorate the reform agenda in domestic energy markets

The stalled reform agenda in WB6's domestic energy markets is standing in the path of a sustainable energy market

While much of the effort has been directed at getting large infrastructure projects off the ground, attention to solving long-standing issues in the WB6's domestic energy markets lagged behind. State-owned electricity companies have allowed to keep prices below-cost and to implement social policies (e.g. indirect support to strategic domestic industries and employment). This model has reached its limits as countries implement competitive energy markets in line with their national and EU commitments. State-owned utilities will find it increasingly difficult to finance large investment programs to ensure the desired level of security of supply while remaining competitive in the open market (locally and regionally) and subsidizing a large share of their domestic markets (e.g. residential consumers). Sector reforms are also important for creating the regulatory environment to foster private sector investments, which will be increasingly important to bridge the investment gap in energy infrastructure.

Loss-reduction programs, improved revenue collections, and tariff reforms coupled with social assistance programs are needed to reduce the revenue gap

It is estimated that the quasi-fiscal deficits range from less than 1 percent to 6 percent of each country's respective GDP (in 20014 dollars). Below-cost-recovery tariffs account for approximately 70 percent of the financial gap in the sector, while the remainder stems from technical and commercial losses. Increasing tariffs will have an immediate impact in improving the financial standing of utilities, but network and collection losses represent a large hidden cost and are less politically sensitive to address than underpricing. Addressing these could be an important area for policy focus to reduce the financial gap.

Households in the region spend between 7 and 12 percent of their disposable income on energy. Electricity consumption constitutes the single largest source of energy expenditure and expenditure patterns are regressive: the wealthier the households, the less they spend on energy and the more they rely on electricity for heating. Evidence suggests that increasing tariffs would result in welfare losses, so assistance need to be targeted at the poor and most vulnerable. Countries are in the process of or have already put in place energy benefit programs that often build on existing social programs. However, coverage of vulnerable consumers tends to be low and suffers from implementation challenges, and sometimes does not reach those in need.

Cross-sectoral evidence and data analyses can help better inform policy choices when setting up such social protection schemes.

SOE's governance and efficiency needs to be improved if they are to be kept under state ownership

SOEs play a critical role in the energy sector across all countries. Many of them face problems of overemployment, illiquidity, and political interference. A study on the political economy of reform in the power sector carried out for this report suggests that the presence of white-collar corruption, rent-seeking, and clientelist relationships among state-owned enterprises, ruling political parties and industrial lobbies is standing in the path of reforms. These challenges have diverted them from fulfilling SOE's growth potential. Increased competition (stemming from regional integration and the liberalisation of energy markets) presents an opportunity to reinvigorate the reform agenda. Critical areas that would need to be tackled include: improving performance evaluation and monitoring, advancing the corporatization agenda, and strengthening institutions and developing capacity for improved oversight.

Pillar II: Implement supply mix diversification towards lower-carbon-content fuels

Public support to develop gas infrastructure can catalyze private investments for increased gas use

Natural gas consumption has been limited (2 billion cubic meters, or bcm) due to the high dependency on a single supplier and a single import source, limited gas infrastructure, and low competitiveness vis-à-vis lignite in power generation. However, the prospects of relatively low gas prices and access to diversified gas supply sources through the Trans-Adriatic Pipeline (TAP) provide an opportunity to promote gas use in the region. Demand potential is high (reaching up to 8 bcm by 2030) across all sectors and most countries, but its development will remain slow unless financing is provided for new infrastructure to increase access. Public support for gas transit and transport infrastructure will therefore be needed to serve as a catalyst and enable commercially driven investments in gas-fired power generation, for industrial uses, and for residential heating purposes. Making judicious use of scarce public and concessional resources will require governments to focus on making gas available where demand potential is the highest (such as in Serbia, FYR Macedonia, and Albania) and where investments have the highest impact (such as interconnectors and transport pipelines that would facilitate the gasification of the region and integration with EU gas markets).

Accelerate the development of least-cost RE

WB6 countries have committed to binding targets to increase the use of RE by 2020 and they have all subscribed to feed-in tariff (FIT) policies as the main financial support mechanism. RE-based generation for heating (mainly solid biomass and a smaller portion of ground heat pumps) is among the lowest-cost options (with an LCOE of €40-50 / MWh) for meeting RE targets in the region, followed by hydropower (of different sizes). Despite the cost-effective potential for RE in the heating sector, it has received limited attention and support from policy makers and investors, who have focused on getting off the ground larger RE projects for electricity generation. To promote cost-effective RE in line with the new EU guidelines, WB6 countries also need to move towards the implementation of market-based support mechanisms, such as competitive bidding schemes which tend to be more cost-effective to mobilize private sector financing for RE in the power sector.

Pillar III: Deepen regional cooperation and market integration

From transposition of EU law to the implementation of an integrated market

WB6 countries have made significant progress in harmonizing their legal and regulatory frameworks with the EU law for the creation of a competitive and integrated energy market. However, the pace of implementation has been limited by the diversity of national markets and the countries' ability to address key challenges in their domestic markets. Domestic challenges include market structures which may not be suitable for competition (e.g. high vertical and horizontal concentration by state-owned enterprises), limited access to guaranteed primary energy supplies, inadequate domestic and interconnection infrastructure, and below-cost pricing policies.

Organized power markets can accelerate integration but a clear vision on market coupling is needed

The creation of organized electricity markets (spot) are a precondition to regional market integration in line with the EU target model for electricity. Serbia has already established a Day Ahead Market. Other countries have all announced their intentions to set up power exchanges and are at different stages of development. Although these are positive steps, only through market coupling will the small and highly concentrated national markets be able to integrate regionally and create a credible reference price. To do this, it is imperative that the various power-exchange projects do not chose incompatible solutions that would pose a barrier to market integration in the medium-to-long term.

Pillar IV: Scale-up energy efficiency investments

EE programs need to be sustainable, targeted to unserved segments, and be implemented at a national scale

Important progress has been achieved in improving the efficiency of energy use over the past two decades (as demonstrated by the steady decrease in energy intensity). Countries will now face the challenge of tapping into the savings potential of market segments that are more difficult to reach, such as buildings. Targeted action by governments to design and roll-out viable financing models and delivery mechanisms is critical to develop large-scale markets and catalyze increased levels of private sector participation and commercial financing.

Such programs would (i) require all public funds to revolve, which will allow programs to sustain themselves across individual project periods and expand as the market develops; (ii) prioritize public funds to make EE measures accessible to unserved markets (such as less-creditworthy public entities or low-income residential homeowners); and (iii) increase the pace of retrofits and the creation of EE markets through the implementation of national programs. Based on these considerations, the financing options that appear most viable in the near team for the region include EE revolving funds (for both public and residential sectors), public energy service companies (ESCOs), and commercial bank financing with incentives/subsidies for homeowners.

Introduction

This report attempts to identify emerging energy issues and constraints requiring country-specific and regionally-coordinated policy and investment interventions to position and guide the World Bank's policy dialogue, technical assistance, and financing support in the Western Balkans (WB6) countries.[1]

The report builds on the WB6 countries' common vision for the development and liberalization of the energy sector in line with their commitments to implement European Union (EU) energy law. The diagnostic is based on the extensive body of knowledge and analytical work carried out by the World Bank, the Energy Community, and other international financial institutions (IFIs) and donors. Selected analysis was also undertaken by the task team to fill key gaps in the literature.

Based on the diagnostic, the report identifies main constraints and opportunities for achieving the goal of securing an affordable, reliable, and sustainable energy supply. More specifically, the report focuses on areas and interventions where the Bank can best add value and catalyze support by building on its working partnership with governments, the private sector, EU institutions, and regional IFIs.

This summary report is structured in such a way as to help the reader understand the key energy challenges facing the region. Five regional themes are discussed:

- The outlook for energy demand and key energy challenges;
- Reinvigorating the reform agenda for secure, reliable, and affordable energy supply;
- Natural gas and renewable energy: shifting to lower-carbon fuels and energy diversification;
- The outlook for electricity supplies: investment needs and regional integration; and
- The potential demand response: tapping into the vast energy savings potential.

I. The Outlook for Energy Demand and Key Energy Challenges

I.1 The Energy Landscape

The economic performance of the WB6 countries has been closely reflected in the region's energy sector. Total primary energy consumption (TPEC) recovered after a sharp decline in the 1990s caused by the conflicts and again in 2008 following the global economic and financial crisis. In both cases, with the economic recovery came increased energy consumption. However, given improvements in the level of energy intensity and the slow growth rates during 2009-2015, TPEC was at only 86 percent of 1990 levels in 2015. Per capita energy consumption (about 1.6 toe per capita) is still less than half that of the EU countries.

The transition to a market economy over the past two decades has also had important effects in the sectoral composition of energy demand. Energy consumption has shifted away from energy-intensive industries to the services and residential sectors. By 2015, the share of industrial energy consumption was only 20 percent, compared to 40 percent in 1990. In turn, the residential and service sectors increased their share from 21 and 1 percent to 36 and 8 percent, respectively, during the same period. While these changes helped improve the region's energy intensity[2] from 0.46 in 2000 to 0.35 by 2015, it is still almost

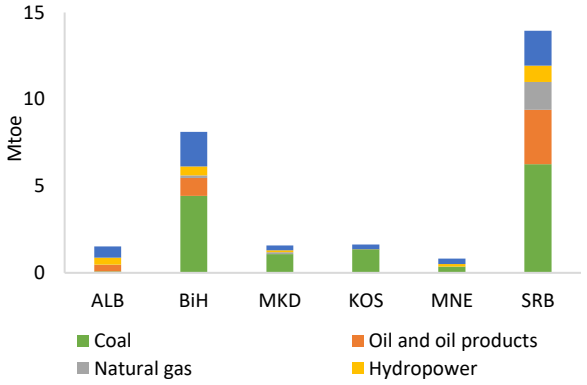
[1] In this report, the WB6 countries are Albania, Bosnia and Herzegovina, the former Yugoslav Republic of (FYR) Macedonia, Kosovo, Montenegro, and Serbia.

[2] Defined as the total primary energy supply (in Ktoe) divided by GDP (in millions of 2015 dollars).

three times higher than that of the EU (0.10 in 2015). Even when GDP is adjusted to power purchase parity, energy intensity is still higher by a factor of 2.5.

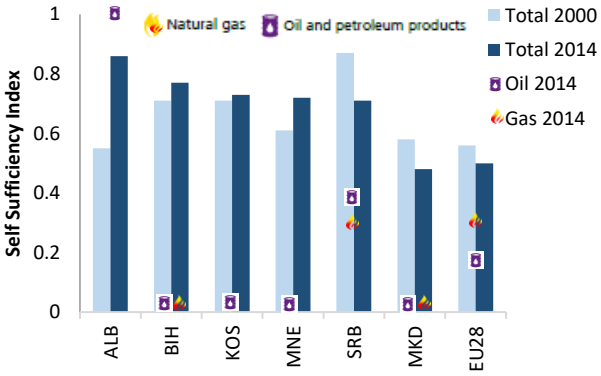
A common feature of the Western Balkan region is the high share of fossil fuels in the supply mix (coal in particular) and the high import dependency on oil, petroleum products, and natural gas. In 2014, coal (mostly domestic lignite) accounted for 47 percent of total primary energy supply (TPES), followed by oil (25 percent), natural gas (12 percent), hydro (7 percent) and other renewables (8 percent) (see figure 1.1). In the electricity sector, coal counts for 97 percent of total power generation in Kosovo, 72 percent in Serbia and 58 percent in Bosnia and Herzegovina. The latter two countries represent the lion's share (about 75 percent) of electricity generation in the region. The share of oil and petroleum products in final energy consumption has also been growing rapidly since the early 2000s due to increased demand in the transport sector, while the domestic availability of these resources is fairly limited. Only Albania and Serbia have a sizeable production of indigenous oil and gas relative to their domestic markets. Serbia is the largest consumer of natural gas and there are small markets in Bosnia and Herzegovina and FYR Macedonia, whereas Albania, Kosovo, and Montenegro have no access to gas. As a result, the overall import dependency in WB6 countries is lower than that of the EU. However, it is relatively high for oil, oil products, and natural gas (see figure 1.2).

Figure 1.1 Total Primary Energy Supply, 2014



Source: International Energy Agency, World Energy Balances, 2016.

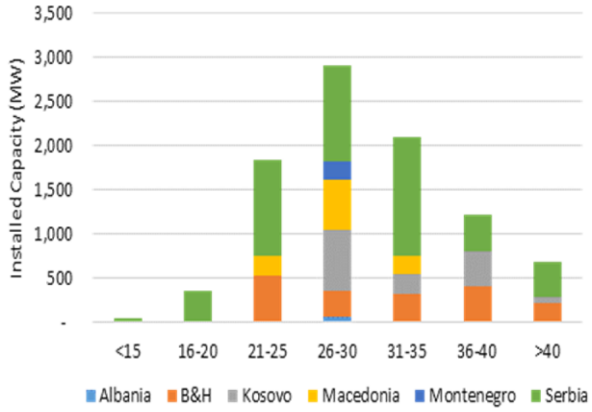
Figure 1.2 Energy Self-Sufficiency, 2000-2014



Source: International Energy Agency, World Energy Indicators, 2016
Index is the share of production over TPES (less than 1 means the country is not self-sufficient and depends on imports)

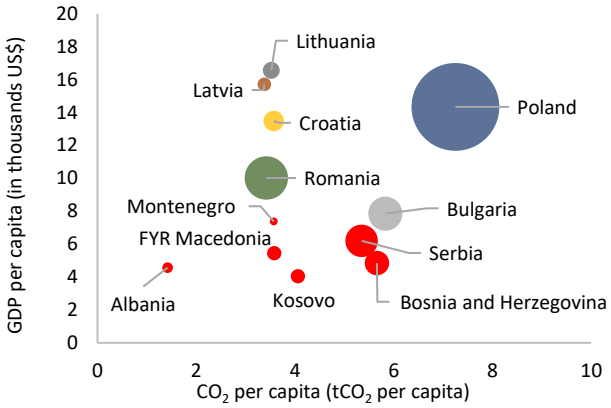
The deteriorated infrastructure stock threatens security of supply. At the beginning of the transition, the region was endowed with a well-developed energy infrastructure. Electricity access was almost 100 percent and cross border infrastructure (oil pipelines, electricity transmission lines) were allowed to provide reliable energy supplies to heavily interdependent systems. However, the maintenance and upgrading of what came to appear to be an oversized infrastructure stock, particularly in the first decade of transition, was significantly below the required level. The consequence was a steady deterioration in the stock of assets. There have been no significant new capacity additions or development of major energy infrastructure since the 1990s; as a result, more than half of the installed generation capacity is more than 31 years old as it can be seen in figure 1.3. The impact was initially limited, but the deterioration in the asset base and the associated loss of both capacity and efficiency are now a serious concern for the security and reliability of energy supply in the region. Some of the existing capacities are already significantly de-rated. For example, available capacity in the Kosovo A thermal power plant is only about 345 MW out of its 800 MW nominal capacity. In Kosovo, the lack of investments led to suppressed demand (load shedding) due to unreliable lignite-fired plants, inefficient distribution grid, and lack of reserve capacity.

Figure 1.3: Age of generation assets, 2015



Source: Energy Information Administration. Database, 2016.

Figure 1.4: CO_2 emissions from fuel combustion 2015



Source: International Energy Agency. CO_2 emissions from fuel combustion, 2016. Size of the bubble indicates total emissions.

The impact of energy generation and consumption on the environment is also an important factor influencing energy choices in the region, particularly as many countries aspire EU accession. Carbon intensity in the region is high, ranging from 1.22 kg of CO_2 per dollar of GDP (in 2010 dollars) in Serbia to 0.32 in Albania, compared to 0.18 on average in the EU. As it can be seen in figure 1.4, per capita CO_2 emissions in the region are lower compared to other EU countries, although they are not too far from the EU average of 6.2 tCO2 per capita for countries such as Serbia and Bosnia and Herzegovina. High carbon intensity is explained by the region's low efficiency in energy transformation and high dependency on lignite-fired power generation. Electricity generation from thermal power plants (mostly lignite-fired) produces significant amounts of sulphur dioxide (SO_2), nitrogen oxides (NO_x), and dust or particulate matter (PM). Lignite power plants in FYR Macedonia, Bosnia and Serbia are major sources of SO_2 in the country, while high concentrations of dust (particulate matter) are attributed to plants in Serbia, Kosovo and FYR Macedonia. These inefficient plants running on lignite are also the largest contributors of greenhouse gases in these countries, emitting between 1.2 and 1.6 grams of CO_2 per kWh.

Environmental and social impacts of coal mining are also well known in the region. Lack of financing and overall inadequate environmental practices in mining operations resulted in important legacy issues including hazardous sites such as tailings ponds and hazardous waste dumps. The lack of mine development planning led to continuous delays in the resettlement process with adverse impacts on people living in the proximity of mines. In 2004, for example, part of Hade village in Kosovo had to be evacuated on an emergency basis following threats of a possible landslide in the area caused by the expansion of mining activities. At the end of 2017, KEK resettled Shipitulle village to allow the lignite mining to resume because existing power plants could no longer operate given lack of coal. To address the social and environmental issues related to mining in sustainable manner, the Government of Kosovo is currently preparing Lignite Mining Development Plan, which, among other things, will clearly specify the mining expansion contours to allow for sufficiently advance planning of resettlement process without disrupting the livelihoods of residents or relevant areas and/or supply of lignite to power plants.

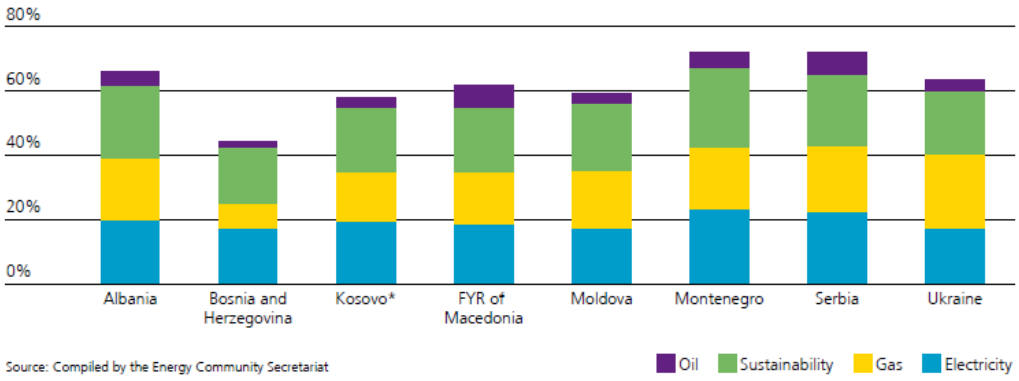
WB6 countries have agreed to comply with EU-mandated climate and energy goals by 2020 in the context of their commitments towards the Energy Community. The emphasis is on accelerating the introduction of renewable energy sources and energy efficiency, which are two of the largest untapped energy resources in the region. These commitments thus call for a careful analysis of new coal-fired thermal generation, taking into account higher emissions standards, the potential participation of these

plants in the EU Trading Scheme, and compliance with mandatory requirements for industrial emissions (these issues are discussed later in this report).

Recognizing the benefits of regional connectivity, the WB6 countries have committed to implementing far-reaching reforms to accelerate the pace of integration within the region, and eventually with the EU's internal energy market. At the beginning of the transition period, the energy sectors of the various countries were heavily interdependent. During the first decade of transition, the focus switched to an emphasis on greater self-sufficiency at the individual country level. Notwithstanding this, and recognizing the benefits of regional energy integration, in 2005 the WB6 countries and the EU signed the Energy Community Treaty[3] by which the Contracting Parties[4] commit to implementing key EU energy laws, developing an adequate regulatory framework, and liberalizing their energy markets, with the objective of extending the EU's internal energy market to southeast Europe and beyond.

Although all the WB6 countries have made significant progress in harmonizing their legal and regulatory frameworks, the bar and expectations for the creation of a truly integrated market are rising. By the end of 2016, all the WB6 countries (except for Bosnia and Herzegovina and FYR Macedonia) had transposed the EU's Third Energy Package, demonstrating the region's clear commitment to working together to create an integrated market. In 2018, FYR Macedonia is in the process of adopting a new Energy Law that is expected to transpose the Third Energy Package. This is itself a significant accomplishment, especially considering that the region was immersed in conflict. However, the bar is rising and, while it is recognized that transposition is an important and necessary condition to achieve regional integration, it has also become evident that it is not sufficient. Implementation of the provisions in the laws and regulations has fallen behind even for frontrunners such as Serbia and Montenegro, as illustrated in figure 1.5.

Figure 1.5 Overview of Implementation Performance in the Energy Community



Source: Energy Community 2017 Implementation Report.

Challenges in the countries' domestic markets have also been a bottleneck to achieve market integration. Below-cost pricing particularly for residential consumers due to social considerations has

[3] The objectives of the Treaty are to establish a stable regulatory and market framework capable of attracting investment in power generation and networks; create an integrated energy market allowing for cross-border energy trade and integration with the EU market; enhance the security of supply to ensure stable and continuous energy supply that is essential for economic development and social stability; improve the environmental situation with regard to energy supply in the region and foster the use of renewable energy and energy efficiency; and develop competition at the regional level and exploit economies of scale.

[4] The contracting parties are Albania, Bosnia and Herzegovina, Kosovo, FYR Macedonia, Moldova, Montenegro, Serbia and Ukraine. Armenia, Georgia, Norway and Turkey are observers.

limited competition in the domestic markets. Together with relatively high losses and low collections, underpricing resulted in significant revenue gaps, particularly in some SOEs in the power, gas, and district heating sectors. Affordability concerns have often been cited as an impediment for tariff adjustments. The share of energy expenditures across WB6 countries is between 7 to 12 percent. Yet, countries in the region are lagging behind to put in place social protection mechanisms for vulnerable consumers. Finally, SOEs also face problems of overstaffing and political interference, which call for reform in their corporate governance to improve their performance.

This institutional framework provides a strong basis for continuing to analyze the energy outlook for the region, while recognizing that countries face unique challenges in their domestic markets. The following section presents an assessment of future energy demand to better understand the patterns in future consumption, assess investment needs, and identify policy interventions needed to close the gap between supply and demand.

I.2 The Energy Outlook

Two factors dominate the energy outlook for the region: the level of energy intensity and the economic outlook.

Convergence in energy intensity levels between WB6 countries and the EU is expected to increase – although a gap will remain. As mentioned above, energy intensity in WB6 countries remains substantially higher (three times higher) than in EU countries. Bosnia and Herzegovina has the highest energy intensity (0.4) and Albania the lowest (0.2). The energy intensity gap has been declining over the past two decades, as can be seen in figure 1.6. Going forward, the consolidation of structural changes in energy demand (e.g. away from energy intensive industries) and increased efficiency are expected to further decrease energy intensity, although a gap will remain. It is projected that by 2030, the region's energy intensity will still be more than twice that of the EU and the energy intensity of Bosnia and Herzegovina, the most energy intensive country in the region, will still be three times higher. Further decline in energy intensity is possible but it will require governments to act on their commitments to implement energy savings technologies in production processes, transportation, and for private consumption. Lithuania and Slovakia, for example, decreased their energy intensity by about 40 percent between 2005 and 2015.

Figure 1.6: Actual and projected energy intensity, 2000-2030

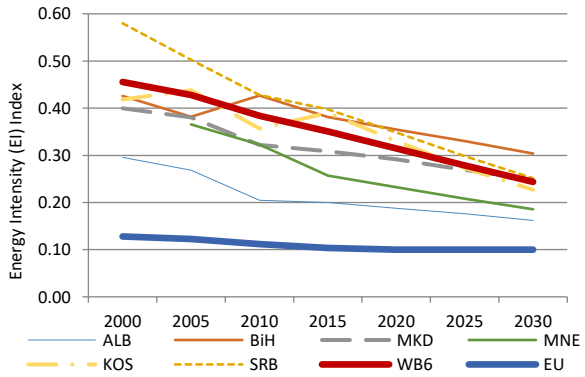
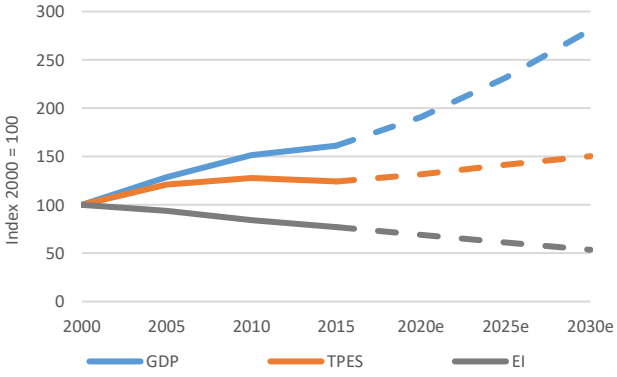


Figure 1.7: Economic growth and energy consumption



Source: Data for 2000-2010 are from IEA; data for 2015-2030 are World Bank staff projections.
Note: The Energy Intensity Index is the total primary energy supply (in Ktoe) divided by GDP (in millions of 2015 dollars).

The economic outlook for the region is positive but will depend on countries' ability to rebalance towards a more sustainable growth model. Following the sharp economic decline during the 2008 global

crisis, economic growth has recovered, albeit at a slower pace than initially expected. Output expanded by about five percent a year on average during 2000-2008, compared to an average of just 0.9 percent during 2009-2015. The economic outlook for the region is positive: GDP is projected to grow 2.8 percent in 2016 and to converge slowly to an average rate of 4 percent after 2022.[5] The average growth rate during 2015-2030 is expected to be 3.7 percent for the region as a whole. The growth outlook remains vulnerable to risks, however, and success hinges on whether countries can rebalance toward a more sustainable growth model. Specifically, sustaining fiscal consolidation and deepening structural reforms are needed to facilitate a rebound in private consumption and investment.

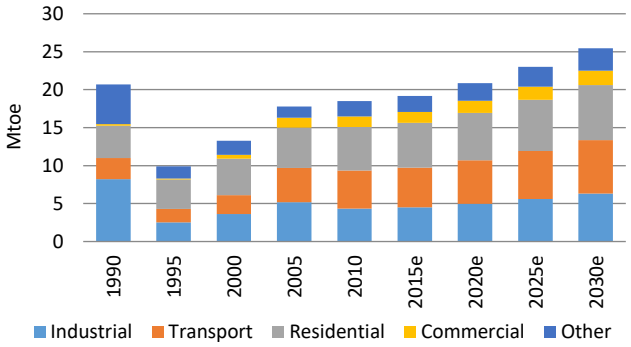
Energy demand is expected to grow at a moderate rate, driven by the transport, residential and services sectors. Based on a sector model developed for the purposes of this report,[6] the assumption of an average growth rate for the region of 3.7 percent for the period 2015-2030 results in a projected annual increase in electricity consumption on the order of 2.2 percent – that is, a 1.4-fold increase by 2030 and an annual increase of primary fuel consumption on the order of 1.9 percent (see table 1.1). This implies that energy demand should keep growing at a moderate rate, driven by the increase in energy consumption in the transport, residential and service sectors (see figure 1.8).

Table 1.1: Average annual growth projections, 2015-30 (percent)

GDP	3.6%
Electricity Consumption	2.2%
Primary Fuel Consumption	1.9%

Source: World Bank staff projections.

Figure 1.8: Historical and projected final energy consumption, 1990-2030



Source: IEA World Energy Balances (1990-2010) and World Bank staff Projections (2015-2030).

I.3 Key Energy Challenges

Will the region's energy supply be able to keep up with the energy demand projections to facilitate growth and convergence with EU income levels? The answer is probably – in the short-to-medium term. But after 2020, the outlook changes significantly, as production stagnates and supply is no longer able to keep up with demand. This is due mainly to declining reliability and retirement of obsolete infrastructure in the electricity sector. The decommissioning of the Kosovo A power plant will create a supply gap and require additional capacity to meet the projected electricity demand.

[5] IMF World Economic Outlook (WEO), January 2017.

[6] The sector model developed by the World Bank comprises detailed energy balances for all WB6 countries based on IEA data from 2000 to 2010. Energy demand is forecast on the basis of the IMF's latest projections for GDP growth in its *World Economic Outlook* (2017). The energy efficiency of new power generation capacity is expected to increase throughout the forecasting period. Future CO_2 emissions associated with energy use are estimated on the basis of technical coefficients derived from detailed IEA data (*Emissions from Fuel Combustion*, 2017).

Both the individual WB6 countries and the region are at a turning point, confronted with an energy outlook fraught with considerable challenges that can be summarized as follows:

- *The large backlog of investments.* Estimated at €15 billion, these investments are needed to modernize national and regional energy infrastructure to ensure adequate levels of security of supply due to aging and inefficient facilities, particularly in the power sector.
- *Limited energy supply mix diversification.* Coal accounts for 50 percent of the primary energy production and there is limited access to natural gas, which is only imported from Russia through a single route. The potential for renewable energy (RE) for power generation as well as RE applications for heating purposes also remain largely untapped.
- *The high environmental and social impact of energy sector activities.* The region's low efficiency in energy transformation and high dependency on lignite-fired power generation produce significant amounts of Carbon dioxide (CO2), Sulphur dioxide (SO_2), Nitrogen oxides (NO_x) and dust or particulate matter (PM). Also, coal mining faces increasing social and environmental challenges related to waste disposal and resettlement.
- *Wasteful energy consumption.* There is significant potential for scaling up energy efficiency to decrease the region's heavy reliance on fossil fuels, improve the competitiveness of firms, help improve local air quality, and contribute to sustainable reduction of energy expenditures by the poor.
- *Delays in the establishment of a truly integrated and competitive regional energy market, particularly in the power sector.* Despite progress over the past few years and the WB6 countries' renewed individual commitments to implement European Union (EU) energy directives, there are still implementation gaps. Significant opportunities remain untapped with regard to i) exploiting the diversity of energy resource endowments, ii) improving security of supply, and iii) reducing system costs.
- *Lack of progress in addressing long-standing challenges in domestic markets.* Below-cost pricing, lack of payment discipline, and high grid losses result in a revenue gap, particularly in the power and heating sectors, which threaten the financial viability of energy sector companies. At the same time, affordability is a concern in the whole region. Finally, State Owned Enterprises (SOEs) commonly face problems of overemployment, illiquidity and political interference, which calls for governance reform to improve their performance.

To address these challenges, policy makers will have to make decisions that will have long-term implications and would affect the economic outlook at both the country and regional levels. Investment decisions made now are going to determine the energy mix that the region will have over the next 30 years and beyond. The following sections provide (a) an overview of key considerations and tradeoffs among many of the strategic objectives and challenges and (b) a series of recommendations to address these.

II. The Case for Reinvigorating the Reform Agenda

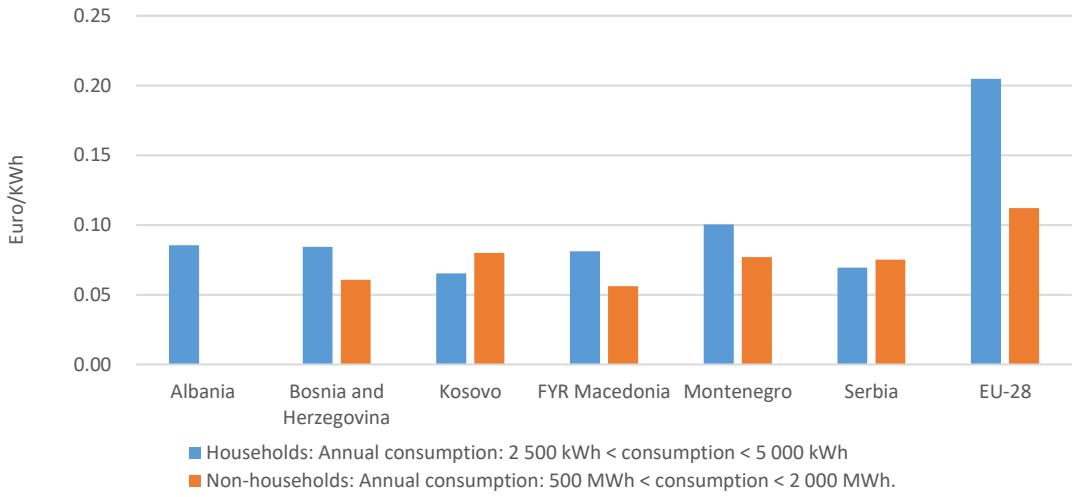
As discussed later in the report, countries in the region have significant opportunities to diversify and transition to a lower emission energy mix but would need significant levels of investment to ensure infrastructure adequacy in the electricity sector and the benefits that would bring about the inevitable move towards market integration in the region.

In order to successfully pursue these strategic objectives and actions, governments will need to reinvigorate the reform agenda to address the long-standing issues in their domestic markets: energy pricing reform, target support for vulnerable consumers, and reform of state-owned enterprises.

II.1 Electricity Pricing

Electricity pricing is the key determinant in the overall financial condition of the countries' power sector and thus of their ability to finance the large investments required going forward. Tariffs in the region have long been below their cost-recovery levels. Overall, electricity prices for residential consumers are below prices for industrial consumers (except in Bosnia and Herzegovina and Montenegro), which may imply a cross-subsidy from industrial to residential consumers, and they are also well below EU levels – although the costs are also expected to be lower due to differences in the generation mix and capital costs (see figure 2.1).

Figure 2.1: Electricity tariffs in the WB6 countries, 2017



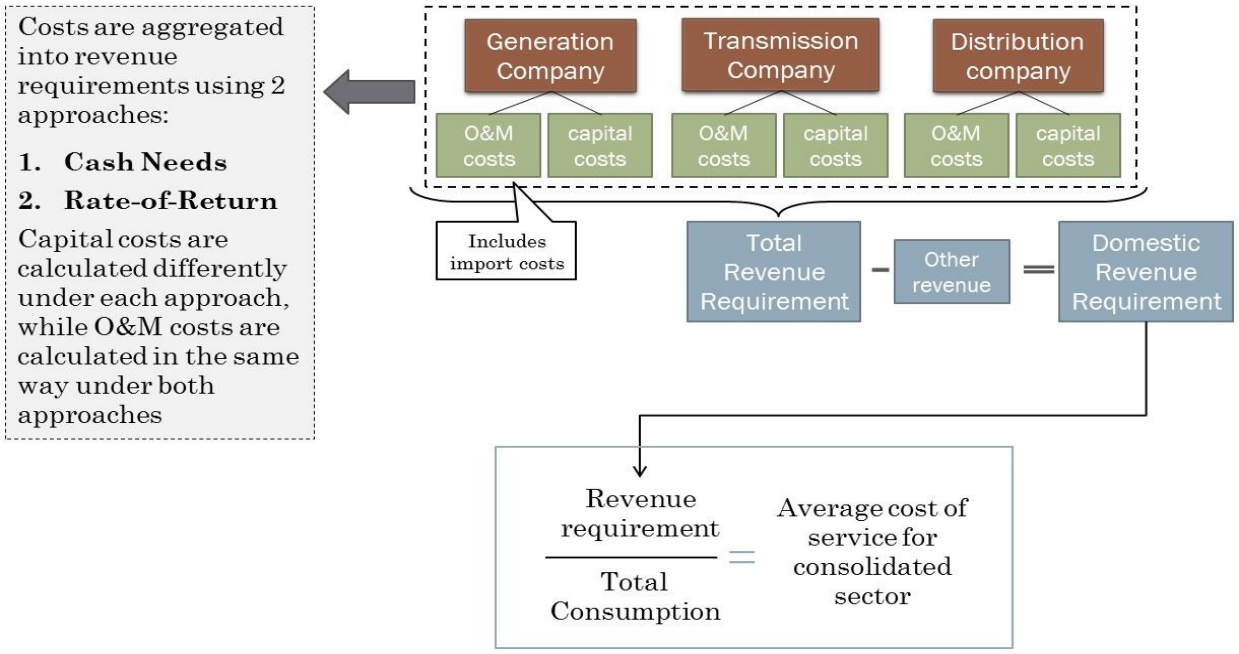
Source: Eurostat

In order to gain insight into the adequacy of electricity tariffs, a financial analysis of the cost of service incurred by the primary electricity service providers was undertaken for all WB6 countries from 2011 to 2014 for the purpose of this report**.** The cost of service for each target country was estimated using the most recent historical data available in financial statements,[7] regulators' reports, or models developed by the World Bank. The costs were aggregated for each company using two approaches, which are similar to those used by utility regulators in estimating a revenue requirement: the cash needs approach and the rate-of-return approach (see Box 1 for a discussion of the methodology applied).

Box 1. Cost-of-service approach for assessing the adequacy of electricity tariffs

The general approach to calculating the cost of service for each target country was to estimate the total amount of revenue required to recover a utility's costs, or the revenue requirement (R) for each company; combine the revenue requirements of all major companies active in a given country; and divide R by the number of kilowatt-hours (kWh) of electricity sold to end users in that country. The following figure illustrates the general approach to calculating the cost of service:

[7] When the analysis was conducted, the latest audited financial statements for all electricity utilities were available were from 2014.



Under the cash-needs approach, a utility's costs of service are assumed to include operation and maintenance (O&M) expenses, debt service requirements (where debt service means principal plus interest payments required on any loan), dividends paid, and the direct cost of any capital expenditures not financed by debt (i.e., those paid for by the utility from its revenues).

Under the rate-of-return approach, which is also referred to as the utility approach, a utility's costs of service are assumed to include cash O&M expenses, depreciation expenses, and an allowed rate of return on invested capital. Invested capital is often referred to as the "rate base" or "regulatory asset base" (RAB), and is calculated as the depreciated asset value, net of assets financed by grants, plus an approved level of working capital.

The rate-of-return approach is considered to be more aligned with the regulatory framework in the region. However, the cash needs approach was also calculated as a reference of what is the minimum tariff that would be required to close the revenue gap.

Using the cash-needs approach, the average cost of service among the target countries was estimated to be $0.114 per kilowatt-hour (kWh). The relatively high cost of service in Albania was driven primarily by debt service costs on borrowings from banks. Debt service costs doubled for KESH, Albania's generation company, between 2011 and 2014. Costs of service estimated using the rate-of-return approach were on average $0.131 per kWh, or 15 percent higher, in the target countries than costs estimated using the cash-needs-approach, with the difference between the two approaches ranging from as little as 17 percent in Kosovo to as much as 88 percent in Montenegro.

As illustrated in figure 2.2, from 2011 to 2014, under both the rate-of-return approach and the cash-needs approach, the average cost of service remained largely constant in Bosnia and Herzegovina and FYR Macedonia. It decreased in Montenegro under the cash needs approach but stayed relatively constant, with a slight oscillation, under the rate-of-return approach. In Kosovo both approaches showed a decrease from 2011 to 2013, with an increase in 2014. Albania shows a sharp increase from 2011 to 2012, followed by a decrease in 2013 and 2014 under each approach. Albania's results are difficult to compare across years because of a mix of data availability during the period: no financial data were available for OSHEE (Albania's state-owned distribution company) in 2011-2012 or for CEZ Albania in 2013-2014.

Figure 2.2: Evolution of the cost of service for WB6 countries, 2011-2014

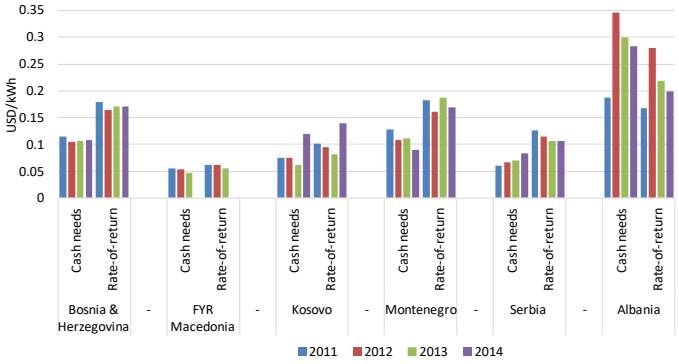
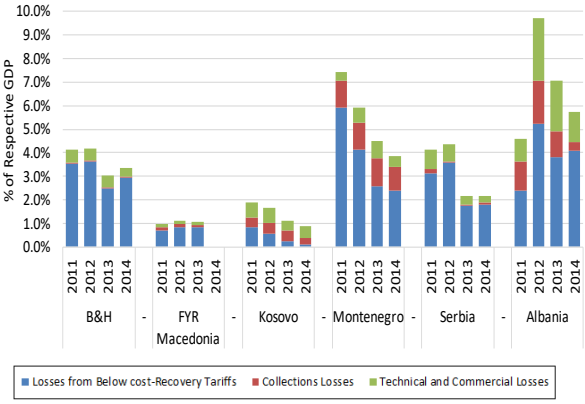


Figure 2.3: Revenue shortfall in the power sector, 2011-2014 (% of GDP)



Source: World Bank staff.

Since the goal of the analysis was to evaluate the overall financial condition of each power sector, an assessment of the revenue shortfall, or quasi-fiscal deficits, was also undertaken. Below-cost-recovery tariffs are often the principal driver of revenue shortfalls, but there two other, important reasons why utility revenues may fall short of costs of service: losses (commercial and technical) and under-collections. The sum of the revenue shortfall attributable to (i) below-cost tariffs, (ii) technical and non-technical losses, and (iii) under-collections therefore more accurately reflects the revenue shortfall to utilities. For government-owned utility companies, the revenue shortfall indicates the total amount of implicit and explicit subsidies. In the public sector context, the shortfall is sometimes referred to as the "quasi-fiscal deficit".

The quasi-fiscal deficits ranged from less than 1 percent to 6 percent of each country's respective GDP in 2014. Albania had the largest revenue shortfall in 2012-2014 at 6 percent of GDP in 2014. This shortfall was driven by below-cost-recovery tariffs, which accounted for approximately 71 percent of the deficit in 2014. Montenegro had the largest shortfall in 2011 and the second largest revenue shortfall in 2012-2014, decreasing from 7 percent of GDP in 2011 to 4 percent in 2014. As in the case of Albania, the largest component of the shortfall in Montenegro was below-cost-recovery tariffs. Figure 2.3 shows the revenue shortfall by country for 2011 through 2014, broken down by contribution to the shortfall by below-cost-recovery tariffs, technical and commercial losses, and losses from collections below 100 percent.

The analysis above calls for comprehensive approaches to reducing the financial gap in the sector, consisting of implementing loss-reduction programs, increasing the efficiency of revenue collections, and increasing end-user tariffs/prices.[8] Much of discussion on power sector viability focuses on increasing end-user tariffs. Below-cost tariffs indeed represent a large share of the revenue gap (about 70 percent) and increasing tariffs have an immediate impact in improving the financial standing of utilities. However, because network and collection losses represent a larger hidden cost and are less politically sensitive to address than underpricing, they could be an important area for policy focus to reduce quasi-fiscal deficits. As shown in table 2.1, in the region, distribution losses (commercial and technical) range from about 10 percent in Bosnia and Herzegovina to above 31 percent in Albania and Kosovo. There is also some room for improvement in bill collections, particularly in Montenegro, Serbia, and Albania. Achieving loss reductions and improvements in collections would require time, investment, and government support to

[8] Despite modest improvements in end-user tariffs, losses, and collections in some countries over 2015-2016, the findings of the analysis are believed not to have changed significantly given the large gap in the revenue requirement in the WB6 countries.

enforce disconnection policies. International experience[9] shows, however, that loss reduction can be achieved sustainably through relatively simple short- and medium-term investments in such areas as T&D network upgrades, smart meters, improved client management, and customer services.

Table 2.1 Selected indicators in the electricity sector, 2015

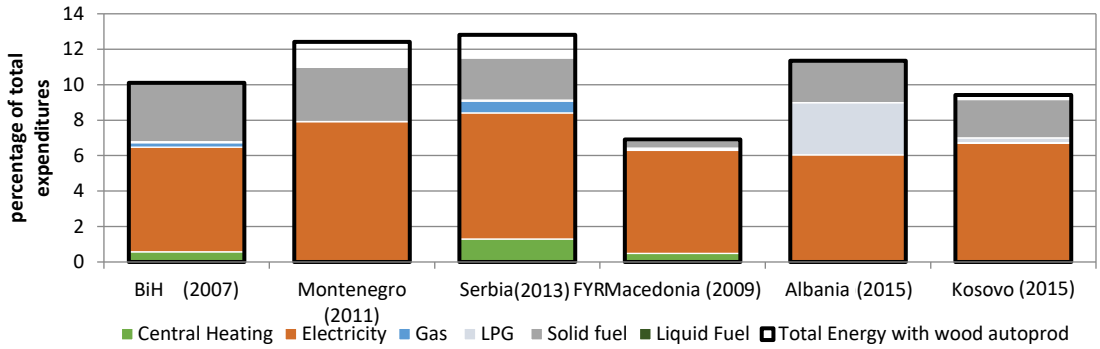
Country	Transmission losses (%)	Distribution losses (%)	Cash Collections* (%)
ALB	2.0	31.3	93
BIH	2.0	10.4	99
KOS	1.3	31.8	96
MKD	1.7	14.8	97
MNE	3.8	17.6	87
SRB	2.2	14.1	93

* Data on cash collections is from 2014 except for SRB and ALB.
Source: World Bank staff.

II.2 Targeted Protection for Vulnerable Consumers

Affordability considerations are often cited as the key barrier to increasing tariffs to reach cost-recovery. It is estimated that households in WB6 countries spend between 7 and 12 percent of their disposable income on energy. Electricity consumption constitutes the single largest source of energy expenditure (including central heating, coal, firewood, natural gas, and other), ranging from 6 percent of total expenditures in Bosnia Herzegovina and FYR Macedonia to 8 percent in Montenegro (see figure 2.4). When spending on energy exceeds a certain threshold, it is difficult for households to adjust, and spending on other necessities is likely to be affected. "Energy poverty" is a common measure of vulnerability to energy price shocks. A household is considered "energy poor" if it allocates more than 10 percent of its budget to energy expenditure. Similarly, a household is "electricity poor" if electricity expenditure exceeds 10 percent of the household budget.

Figure 2.4 Energy expenditures as a share of total budgets by fuel use



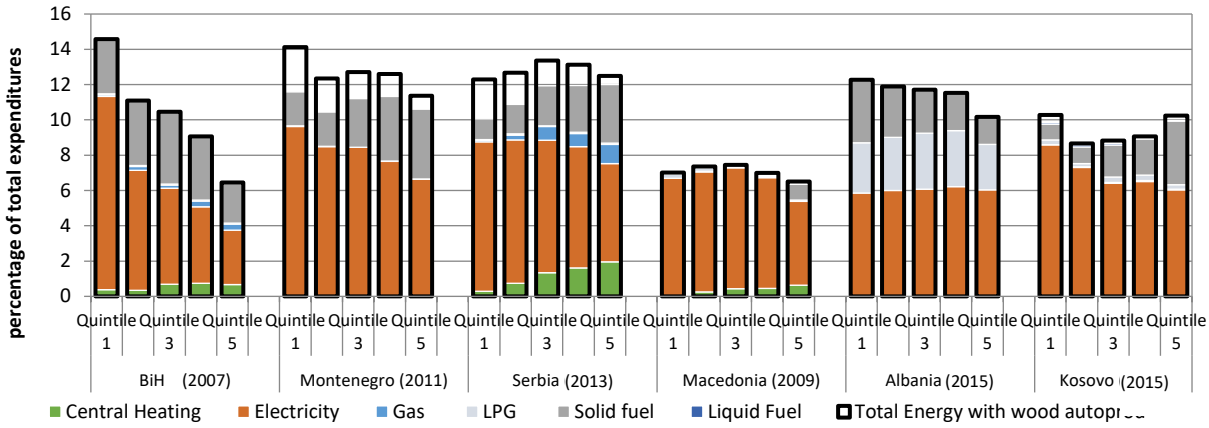
While energy expenditures across the region are relatively high, they are regressive: the wealthier the households, the less they spend on energy and the more they rely on electricity for heating. Households rely mostly on firewood for heating in all Balkan countries,[10] particularly in rural areas: from 76 percent of

[9] Pedro Antman. 2009. "Reducing Technical and Non-Technical Losses in the Power Sector." Background paper for the World Bank Group Energy Sector Strategy.

[10] In all countries but Kosovo, the source of heating is reported

rural households in Albania to about 100 percent in rural Bosnia & Herzegovina and FYR Macedonia. Electricity remains the main source of heating for a significant proportion of urban households and the wealth pattern is strong: the wealthier the household, the more they rely on electricity, district heating, and gas (when available) to satisfy their heating needs. The same pattern applies to energy expenditures: in all countries but FYR Macedonia, electricity expenditures as a share of total expenditures decrease with wealth (see figure 2.5). In Bosnia Herzegovina, the poorest spend up to 11 percent of their total expenditures on electricity only, versus 3 percent for the wealthiest. In the other countries, this share amounts to about 8 to 10 percent for the poorest versus about 5 to 7 percent for the wealthiest. Only in Albania is the electricity share stable across the population, at about 6 percent of total expenditures.[11]

Figure 2.5 Energy expenditures by income quintiles and by fuel use



There is also evidence that in addition to the households in the bottom quintile, other groups are also exposed to electricity tariff shocks. A recent World Bank cross-country assessment in Albania, Kosovo, and Serbia[12] found that single elderly households, while often not among the poorest in terms of income, also tend to be more at risk since they spend a large portion of income on electricity (7.7 percent in Albania, 6.9 percent in Kosovo, and 8.6 percent in Serbia). Their incidence of electricity poverty is 23 percent in Albania and Kosovo, and 32 percent in Serbia. In addition, in Albania, people living in households that are recipients of unemployment benefits, households with children and a single parent, or households with a female household head, also have a budget share of electricity expenditure that is above the national average. This is the case also for recipients of minimum pensions and households with a female household head in Serbia.

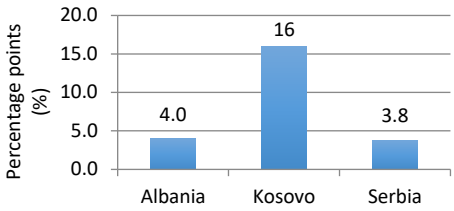
Box 2. What is the impact of the tariff reform on households? - Examples in Albania, Kosovo, and Serbia

The governments of Albania, Kosovo, and Serbia are pursuing reforms to improve the financial standing of their electricity sector. As a result, a rise in electricity tariffs toward cost-recovery is expected in the near term if such reforms are to be implemented. While households may reduce their electricity consumption to offset some of the effects of the price rise, these will affect their budgets. When electricity is used as the primary heating method, households cannot easily switch to other energy sources (e.g. gas or firewood), especially in the short run.

[11] This may be the result of non-payment in one side and progressive tariff on the other side.

[12] World Bank, *Supporting Energy Subsidy Reforms in the Western Balkans*. Technical Assistance project.

Change in electricity poverty rate



Simulations of increases of 15.7 percent in Albania, 26 percent in Kosovo, and 16.3 percent in Serbia (considered to be at the lower-end of necessary tariff increases) show that the budget share of electricity expenditure is expected to rise, on average, by 0.6 and 0.5 percentage points in Albania and Serbia, but by 2.1 points in Kosovo. As a result, the proportion of the population spending more than 10 percent of their budget for electricity, or "electricity poor," rises by 4.0 and 3.8 percent in Albania and Serbia, and by a staggering 16 percent in Kosovo.

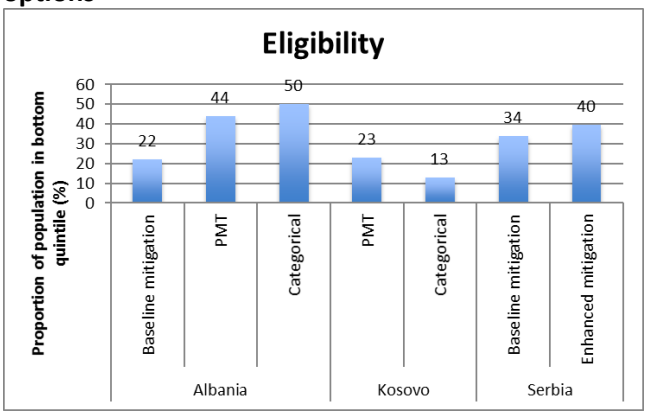
The effect on the overall poverty rate is modest in Albania and Serbia, and higher in Kosovo. The proportion of the population living below the poverty line in Albania is expected to rise by 0.5 percent in the baseline scenario and by 0.76 percent in the most extreme case. The expected rise in the poverty rate is 1 percent in Serbia and 2 percent in Kosovo.

Source: *Knowledge Brief: Impacts of Electricity Tariff Reforms on Energy Affordability in the Western Balkans*, May 2017.

Cost-reflective tariffs would need to be implemented alongside targeted assistance programs to support the most vulnerable groups. Continuing to provide a blanket subsidy to all households is not an option if countries are to improve the financial viability of their power sectors. However, welfare losses for the vulnerable resulting from tariff increases need to be mitigated by adequate support programs. Box 8 presents an estimation of welfare losses for households resulting from tariff increases in Albania, Kosovo, and Serbia. All countries, with the exception of Bosnia and Herzegovina, are in the process of or have already have put in place programs designed to protect the vulnerable. Most of them build on existing social programs for the identification of vulnerable consumers and funds are provided by the State budget, as is the case in Albania, Serbia, and FYR Macedonia. While these are positive developments, there is still a long way to go in having effective mechanisms to protect the vulnerable. Currently, the World Bank is updating the distributional and poverty impacts of expected tariff increased taking into account the investments planned under the Republic of Kosovo Energy Sector Strategy 2017-2026. The ongoing analytical work would also provide specific recommendations to the Government of Kosovo related to mechanisms for protecting the socially vulnerable consumers.

Existing programs tend to be have low coverage, sometimes do not reach those in need, and suffer from implementation challenges. In Albania, for instance, only 16 percent of the current energy benefit accrues to households in the bottom quintile, and only 22 percent of them are eligible for this benefit. Serbia's energy benefit program is well targeted but it had limited coverage (only 8.3 percent of the bottom quintile were actually receiving the benefit in 2015) before the government increased the budget allocation in 2016. Improving the effectiveness of such programs can be achieved by using a proxy means test (PMT) and categorical approaches to identify beneficiaries (see figure 2.6). This also underscores the necessity of putting in place implementation mechanisms to ensure adequate take-up of these programs.

Figure 2.6: Share of bottom quintile eligible for energy benefit, baseline and alternative mitigation options



Source: Knowledge Brief: Impacts of Electricity Tariff Reforms on Energy Affordability in the Western Balkans, May 2017.

Cross-sectoral evidence and data analyses are needed to better inform policy choices when setting up social protection schemes. In the short term, governments can alleviate the impact of rising electricity tariffs through energy-related social assistance programs. Quantitative and qualitative analysis can help understand not only the potential impact of a tariff increase, but also the effectiveness and fiscal implications of proposed programs. In the medium-to-long term, it is recommended to protect vulnerable consumers under the broader social protection system, rather than through specific energy programs. Finally, as discussed earlier, providing low-income households with financing support for the implementation of energy efficiency measures can help reduce the burden of energy expenditures in a sustainable way.

II.3 Improving the Performance of State-Owned Enterprises

Reform of state-owned enterprises (SOEs) is critical to ensure the financial viability of the electricity sector and to close the implementation gap for the creation of a competitive regional market. State-owned enterprises play a critical role in the region's energy sector. Although private participation in power generation/mining, distribution and trade/sales is increasing, the state still controls the largest electricity and gas utilities and coal mines in the region. However, many of these SOEs face problems of overemployment, illiquidity, and political interference. In Albania and Serbia, for instance, the financial difficulties of electricity and gas SOEs have required significant government support to cover their financial gap (see box 3). Improving their performance and ensuring that they operate on a commercial basis is therefore critical to reduce fiscal risks, put the overall sector in a financial viable path and ensure the implementation of a competitive and integrated energy market.

The ongoing market liberalization and regional integration process does not seem to have fundamentally disrupted the "institutional topology" of the SOEs in the electricity sector. SOEs usually have a dominant position in their respective market and, despite recent unbundling efforts, still operate as de facto monopolies in generation, supply and distribution in Serbia, Bosnia and Herzegovina, and Montenegro. "Soft" budget constraints and government support, in the form of either direct subsidies or guaranteed loans, are also a common characteristic, as discussed earlier. On the other hand, there is evidence that SOEs suffer from pervasive government interference, even in the day-to-day management of some companies, thus demonstrating that the corporate governance principles of separation between ownership, policy making, and oversight are not applied in reality.

Box 3. Energy SOEs can be a major source of fiscal imbalances: the case of Albania and Serbia

Albania's electricity sector has long been a major source of fiscal imbalances that threaten Albania's fiscal stability. The national electric utility, KESh, has required repeated budgetary support in the form of power-import guarantees and liquidity injections. By 2013, KESh had a guaranteed overdraft of US$274 million, or about 2.5 percent of GDP. Low rates of collection from households, businesses, and public institutions exacerbated the financial distress of the state-owned distribution company (OShEE); its unfunded deficit widened to US$550 million in 2014.

To address the problem, the government has pursued a program to reduce supply costs and distribution losses, raise tariffs to cost-recovery levels, and open the Albanian electricity market to regional competition. These measures have helped improve the financial standing of the sector. However, in order to complete the reform and liberalization, new or amended acts addressing virtually all segments of the electricity sector are needed, progress on which has been slow. The country needs to accelerate the establishment of an organized electricity and power-exchange market, advance reforms to deregulate prices, and strengthen corporate governance in the sector.

Serbia's gas company, JP Srbijagas, has also been a significant drain to public finances despite its relatively small size (it supplies only 1.6 bcm of natural gas). Srbijagas generates significant losses each year; in 2014 they amounted to €392 million (1.2 percent of GDP). Past losses have accumulated to such an extent that they exceed the company's own capital, creating a situation of negative equity (net asset value). To cover its losses, the company has borrowed. Total liabilities stood at €1.63 billion by the end the 2015.

Because the company was not able to service its debt, the government made transfers to the company for it to be able to settle due debt installments (estimated at €476 million). The main reasons for the financial distress were (i) below-cost tariffs, (ii) low receivables collection and an increasing amount of bad debt, (iii) substantive annual investment programs generating low to no returns, (iv) increasing indebtedness requiring additional cash flow, and (v) acquisition of non-core assets through debt-to-equity swaps.

The government adopted a financial consolidation plan comprising a series of measures designed to increase revenues by increasing collections and introducing an extraordinary transport fee, reducing costs by addressing the unsustainable debt burden, and improving the corporate governance of the company. While the company's financial situation has improved recently, increased efforts are needed to enforce payment discipline, improve financial management, and rationalizing the investment strategy.

Source: World Bank staff.

Progress in this area has been particularly slow due to strong vested interest and lack of capacity/willingness to implement reform. A study on the political economy of reform in the power sector carried out for the purpose of this report suggests that the presence of corruption, rent-seeking, and clientelist relationships among state-owned enterprises, ruling political parties and industrial lobbies is standing in the path of reforms. Interviews with stakeholders revealed that there is a tight connection between utilities and ruling political parties and that strong industrial lobbies – coal in particular, and to a lesser extent electricity trading – and unions continue to exert important influence in the sector. Finally, civil society organizations representing residential consumers or environmental groups appear to be the only ones voicing concerns over the path of restructuring and reforms, and are demonstrating an increasing ability to influence public opinion. In addition to offering a very different set of views on the path to follow, they are united in their frustration with the lack of transparency, accountability and inability (or unwillingness) of governments to change the status quo.

Although the challenges described here have prevented SOEs from fulfilling their growth potential, increased competition provides a unique opportunity to reinvigorate the reform agenda. In deciding to keep energy utilities under state ownership, governments in the region need to give serious consideration to the need to reform SOEs' internal and external governance and operations. This will become a critical factor if companies are to successfully transition to the emerging domestic and regional competitive

market. International experience[13] identifies three key policy recommendations that could be considered in improving their governance and performance:

- **Setting clear strategic objectives and improving performance evaluation and monitoring.** One reason it is difficult to evaluate SOEs' performance is that their strategic goals are difficult to define. This is due to the presence of multiple and sometimes conflicting objectives, such as keeping prices low due to affordability concerns, investing in strategic fuels or assets, providing employment, ensuring quality of service, and so on. Governments should clarify the strategic objectives for the SOEs and put in place robust performance criteria. Without this, delegation of autonomy and accountability is extremely difficult, if not impossible.
- **Corporatization.** The experience of developed countries suggests that while corporatization alone – meaning conversion into an independent commercial company – does not completely insulate public enterprises from political pressures, it can improve information about enterprise performance. Internally, corporatization can also support the modernization of SOE governance systems and may increase efficiency by improving monitoring of managers and enhancing information-sharing channels, among other things.
- **Strengthening institutions and developing capacity for improved oversight.** Capacity at the government level needs to be strengthened to ensure adequate monitoring of SOE performance. Ministries are currently focused on matters of legislation and policy and lack the staffing and administrative capacity to perform performance monitoring. Regulatory authorities also need to play a more proactive role in overseeing the activities of regulated utilities, including investment appraisal and asset valuation. Finally, improving independent critical capacity by building the capacity of citizen organizations can open new spaces for debate and can also facilitate the implementation of SOE reforms.

III. The Potential Supply Response

The region is endowed with significant indigenous energy resources – primarily lignite, but also hydropower and other renewable energy resources – that are geographically spread across the WB6 countries. The underlying resource base has the capacity to meet most of the projected increase in primary energy demand, provided adequate funds are directed to the upstream and midstream sectors. As mentioned previously, demand for primary energy is expected to increase on average by 1.9 percent per year, or about 20 percent above 2015 levels by 2030.

Coal will continue to be part of the region's energy mix, although its share is expected to decline. The share of coal in the energy mix is expected to decline from 50 percent today to about 45 percent by 2030, chiefly as a result of an increase in oil and oil products due to increased consumption in the transport sector; there is also some increase in natural gas and renewable energy according to the sector model developed for the purpose of this report[14]. The continuation of an energy mix with significant share of

[13] World Bank, "Governance Arrangements for State Owned Enterprises" (Policy Research Working Paper, World Bank, 2008).

[14] The sector model developed by the World Bank comprises detailed energy balances for all WB6 countries based on IEA data from 2000 to 2010. Energy demand is forecast on the basis of the IMF's latest projections for GDP growth in its *World Economic Outlook* (2017). The energy efficiency of new power generation capacity is expected to increase throughout the forecasting period. Future CO_2 emissions associated with energy use are estimated on the basis of technical coefficients derived from detailed IEA data (*Emissions from Fuel Combustion*, 2017).

coal in the business as usual scenario reflects two factors. First, lignite is perceived as a cheaper electricity source than imported gas, oil, or most of the renewable energy generation[15] (if costs of local and global environmental externalities are not taken into account), and because of its abundance it is subject to less price uncertainty. However, recent rapid cost decline of renewable energy technologies such as wind and solar, as well as battery storage, may provide lower cost alternative in certain cases. Second, energy security is an important factor for all countries in the region. With gas being imported and coming mostly from Russia, the perception that gas has been used for political leverage has prompted countries to make a conscious move to favor domestically produced coal in their national strategies.

There is a risk, however, that countries will develop their domestic coal resources and use environmentally unfriendly technology to meet their immediate needs and/or fulfill their export aspirations. The challenge that WB6 countries will face going forward is to secure additional energy supplies quickly and at a minimum cost while acting in an environmentally responsible way and limiting the growth of greenhouse emissions, in line with their EU aspirations and commitments. The alternative is to pursue active policies for supply mix diversification and increase the use of lower-carbon-content fuels. Such policies could increase the use of natural gas and renewable energy (including hydropower) in the region.

III.1 Shifting to Lower-carbon-content Fuels and Diversified Sources of Energy Supply

Natural Gas

At 2.8 billion cubic meters (bcm) per year and with 12 percent of the region's primary supply in 2015, gas use is low and concentrated in Bosnia and Herzegovina (0.4 bcm), FYR Macedonia (0.2 bcm), and Serbia (2.2 bcm). Albania, Kosovo, and Montenegro do not consume gas. Demand is evenly distributed between industrial consumers, and commercial and residential (mostly district heating) consumers with 1.4 bcm each. Of note is the extremely limited gas-fired power generation compared with other countries in the region and in Europe. Only in Serbia and FYR Macedonia there are small combined heat and power (CHP) plants used for peaking purposes and district heating, thus resulting in low offtake volumes.

The region's high dependency on a single supplier and a single import source, its lack of access to gas infrastructure, and its low competitiveness vis-à-vis lignite in power generation explain the lack of gas penetration. All imported gas is from Russia, through a single pipeline route in Serbia (from Hungary), Bosnia and Herzegovina (from Serbia) and FYR Macedonia (from Bulgaria). Serbia has some domestic gas production, which allows it to cover about 20 percent of its annual energy demand, and there is uncertainty surrounding the development of domestic resources in the future.[16] Recent gas supply interruptions from gas transiting by Ukraine have exposed the WB6 countries' vulnerability and increased concerns regarding the security of supply. The limited availability of gas infrastructure in the region is also a barrier to the potential for demand growth. There is only one storage facility in Serbia, only one regional pipeline connects Serbia to FYR Macedonia, and domestic and transport and distribution networks are undeveloped. Lack of transit and transport infrastructure to potential load centers means that many potential customers simply do not have access to gas, thus limiting potential for increased gas demand.

[15] Assuming renewable energy projects are combined in a way to have the same operating profile as lignite plants.

[16] Albania and Montenegro have recently issued licenses for onshore and offshore oil and gas exploration and development.

In power generation, gas demand has been limited due to high gas prices relative to lignite prices, making gas uncompetitive for baseload power. In 2015, a study commissioned by the World Bank[17] found that gas-fired power generation had not been financially attractive versus lignite in Europe over the previous five years. It also remains significantly more expensive than lignite – although falling gas prices over the past few years mean that gas has become increasingly competitive. Back in 2015, the European variable cost of lignite[18] was estimated at €23/MWh and for gas was €41/MWh, as can be seen in figure 3.1. In WB6 countries, low lignite prices in most countries (due to domestic production) and higher gas prices (due to markup on West Europe prices as a result of small offtake volumes) confirms the findings from the general analysis above and shows the less-attractive commercial proposition for gas. Existing gas plants in the region have operated at low load factors as peaking plants – as high gas prices limit their competitiveness against lignite plants for baseload power.

Figure 3.1: European clean variable costs of gas and lignite

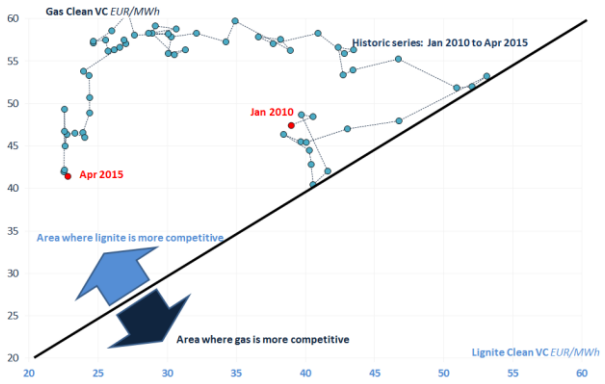
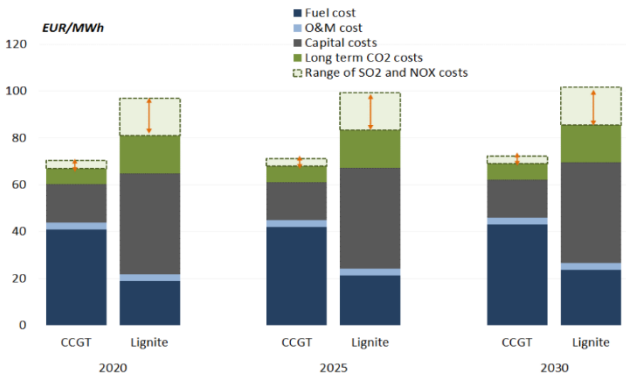


Figure 3.2: Levelized electricity generation costs



Source: South East Europe Gas Power Consortium by Economic Consulting Associates. Interim Report, June 2015

In economic terms, gas can be more competitive than coal in the long run but there are significant uncertainties around the evolution of fuel prices and environmental costs. The comparison of the levelized cost of electricity (LCOE) generation, which is more appropriate when comparing new-build gas with new-build coal, shows that gas is the preferred option when taking into account the environmental costs of lignite-fired generation (including CO_2, NO_x and SO_2), as seen in figure 3.2. Although there are uncertainties around the level and whether such environmental costs would materialize in the future, they should be taken more into account given WB6 countries' EU accession aspirations. Recent increases in oil prices to level of about $75/barrel compared to $50/barrel about two years ago also increase uncertainties about its competitiveness. The comparative analysis shown in figure 3.2 presents a general case which cannot be generalized at the country nor project levels. For specific countries and projects, the analysis would depend on key considerations such as i) cost of indigenous lignite, ii) cost of natural gas infrastructure, and iii) ability to secure a favorable gas supply contract.

In the future, gas demand is expected to grow to about 4 bcm in the base case scenario and could reach potentially up to 8 bcm by 2030 if policies to increase gas offtake are implemented (see figure 3.3). While Serbia will continue to account for the majority of demand, the rate of growth in the other countries could be faster – although from a very low base. It is expected that industrial, commercial and residential users will continue to be the major gas off-takers and will drive demand growth. Power and heat generation could increase the demand for gas in Serbia, FYR Macedonia, and potentially Bosnia and

[17] Economic Consulting Associates, "South East Europe Gas Power Consortium" (interim report, June 2015).
[18] Variable costs of lignite-fired power generation, including CO_2 emissions costs.

Herzegovina. Although only constituting a small share of total regional demand, gas for power generation will prove important for gas infrastructure development as it provides the centralized anchor loads needed to underpin the financing of new infrastructure. Gas demand projections by sector and country are shown in figure 3.4.

Alternative gas demand forecasts[19] confirm that there is potential for gas demand growth–although estimates are more conservative than the 8 bcm forecast for 2030. A recent analysis by Ernest and Young for Serbia projects that demand in Serbia (which is the largest market) could reach 3.1 BCM by 2030. Demand growth is driven by the industry (petrochemical, fertilizer, and steel) and by the residential sector, mainly for heating purposes if electricity prices are to increase to reach market levels. Some marginal demand growth is also expected in the power sector for CHPs (Novi Sad). The analysis also projects that demand could reach 0.9 bcm in Bosnia and Herzegovina by 2030 driven by heat generation (Zenica) and possibly residential demand (if the city of Mostar is gasified).

Figure 3.3: Actual and projected regional gas demand, 2020-30

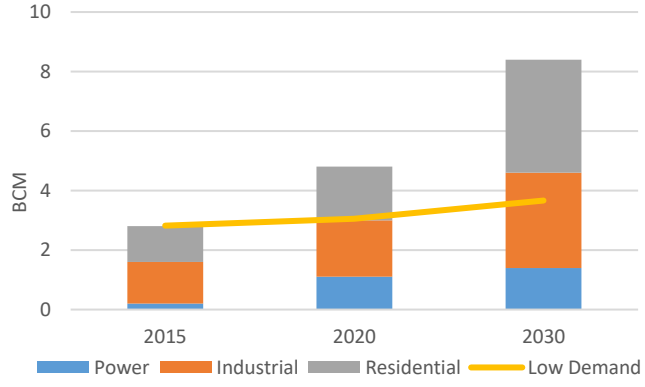
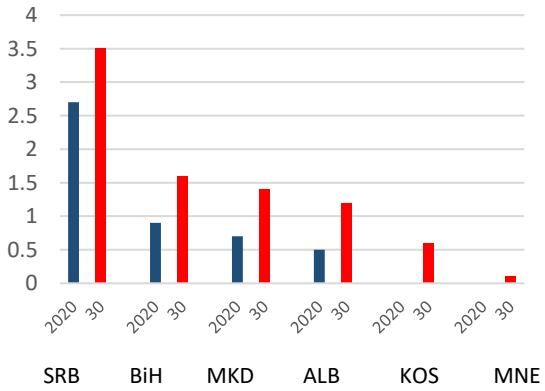


Figure 3.4: Potential gas demand growth by country, 2020-30



*Source: "*South East Europe Gas Power Consortium" Study and World Bank staff projections for the low demand scenario.

The region's potential access to new gas-supply sources provides an opportunity to diversify sources of energy supplies. The selection of the Trans Adriatic Pipeline (TAP) as the main export route for Azeri gas from the Shah Deniz II Caspian gas development provides an opportunity for the West Balkan region to obtain access to Caspian gas sources. Although most of the planned throughput volumes have already been committed to Italian offtakers, residual volumes are likely to be sufficient to enable a gradual opening of the gas market in the WB6 region. Also, the Croatia Liquefied Natural Gas (LNG) regasification project has been given recent impetus with the European Commission's (EC) decision to allocate over €100 million for the development of an LNG terminal. The project, currently slated for completion by 2019, could enhance the gas supply in the northern part of the WB6 region. While the gas prices are unlikely to be substantially different from those specified in existing European gas contracts, additional supply routes through TAP and Croatia present an opportunity for complementing traditional supply sources with non-Russian gas supply.

Gas can also play a useful role in providing ancillary services and participate in competitive markets (spot sales) in the local and export markets. Gas is well suited to be used as a mid-to-peaking fuel. Natural gas can complement variable RE generation and help integrate more efficiency large-scale deployment of RE. Gas can also be competitive in organized markets (spot) during hours of high demand when electricity prices are higher both in domestic markets (provided that these markets develop in WB6 countries) and

[19] Ernest and Young: Serbia natural gas sector: prospects, market structure, and strategy, 2016.

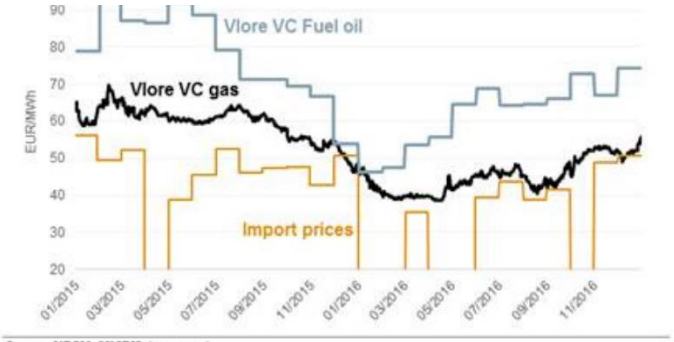
export markets (such as Italy and Greece). In addition, providing heat supply to local district heating systems for combined heat and power (CHP) plants will increase the financial viability of gas-fired power plants. Box 4 provides a concrete example on the potential to introduce non-Russian gas to Albania through the operation of the Vlore power plant.

Box 4. Creating Anchor Demand for Natural Gas – the Case of the Vlore Thermal Power Plant in Albania

The Vlore thermal power plant (TPP) in Albania has an installed capacity of 97 MW and is fueled by low-sulphur diesel and natural gas. It was initially commissioned in 2011 but has been inactive since early 2012 due to two successive failures of the seawater cooling system. Located only 30 kilometers away from the tie-in point of the Trans Adriatic Pipeline (TAP) at Fier, Vlore could, if found to be commercially viable, provide the initial anchor demand to kick-start the gas market development in Albania, given the forthcoming flow of Azeri gas through TAP.

Gas-fired power plants can play an important role in providing ancillary services, spot market sales in the local market, and exports to higher value markets (Italy, Greece etc.). Switching from fuel oil to natural gas improves the competitiveness of the plant, albeit not sufficiently to compete with import prices. The analysis indicates that the most optimal commercial strategy for the TPP Vlore is a mixed-contract strategy combining a power purchase agreement (PPA), spot market sales, and provision of balancing services (capacity and energy). Such a strategy would allow Vlore to overcome the Vlore plant's operational limitations (i.e. the minimum load is needed to provide quick response) while enabling short term opportunities to be realized.

Figure B-1: Albania's import vs Vlore's variable costs



Source: KESH, HUPX data portal

Source: Economic Consulting Associates, South East Europe Gas Power Consortium – Phase II, Vlore assessment, 2017.

Policy makers' renewed interest in facilitating gas development is providing an additional push for gas. Gas-to-power projects are included in the WB6 countries' national power sector development plans, and all countries currently have plans to expand and develop their national and regional gas pipelines. This provides an indication of efforts made by the governments in the region to promote gas and act as a good starting point. Recently, a number of pipeline and LNG projects have been identified as priority projects, or Projects of Energy Community Interest (PECI) by the Energy Community. The most notable are (i) the Ionian-Adriatic Pipeline (IAP), which connects Croatia (Split), Montenegro, Bosnia and Herzegovina, and Albania; (ii) the Serbia–Bulgaria gas interconnector (capacity 1.8 bcm per year), which will expand Serbia's import capacity and enable Bulgaria to diversify its supply sources; (iii) the Serbia–Croatia interconnection, which should help give Serbia access to supply from Hungary and LNG once the project is developed, although it is at a very early stage; and (iv) the Bosnia–Croatia interconnection.

Diversification towards lower-carbon-intensive fuels and access to alternative sources of energy supplies call for increased public support for gas transit and transport infrastructure. While demand potential is significant across all sectors and most countries, development will remain slow unless financing is provided for new infrastructure to increase access. Private sector interest in relatively high-risk projects – due to the prospects of low returns, uncertain offtake, and uncertain gas price developments – will be limited. Therefore, public support for gas transit and transport infrastructure will be needed to serve as a catalyst for commercially-driven investments in gas-fired power generation, industrial uses, and for residential heating purposes.

Making judicious use of scarce public and concessional resources will require a focus on making gas available where demand potential is highest and investment projects have the most impact. Demand assessments have in fact shown that there are significant differences among countries, including maturity, size, and institutional and regulatory barriers to gas development. Serbia was identified as the most promising market, given its existing gas transmission infrastructure, relatively stable regulatory regime, potential industrial and residential demand, security-of-supply policy objectives, and credible gas-fired power station plans. FYR Macedonia is also a high-potential market due to the need to replace its ageing lignite power plants, recent moves for electricity price increases, secured financing for one transmission pipeline from the Russian government, and existing import pipeline. Albania, despite its low off-taker creditworthiness and lack of a gas market, is considered a high-priority market due to its strategic importance as a potential TAP offtaker. In these countries, the development of gas infrastructure is expected to make a significant impact by enhancing the security and diversity of supply or helping establish domestic gas markets. An overview of the international gas project and potential supply entry points for the region is presented in figure 3.5.

Gas infrastructure investments will also have to be supportive of regional and EU integration. The Energy Community Gas Ring ('Gas Ring'[20]) was developed in 2009 and subsequently revised in 2015[21] to support the gasification of the region. The revised strategy shown in figure 3.6 is compatible with the original Gas Ring concept –albeit with an emphasis on a smaller number of projects and closer integration with the EU gas market. Specifically, the Serbia-Croatia and Serbia-Bulgaria interconnections are identified as priority projects in the short-term to help the country and the region integrate with the EU market, and LNG once the import terminal is developed. By developing the FYR Macedonia-Greece interconnection and the Ionnian Adriatic Pipeline, connecting Albania-Montenegro-Croatia, could also open access to Caspian gas acting as a link to TAP. Overall investments are estimated at €4.4 billion, which is made up of power generation (€1.7 billion), pipelines (€1.5 billion) and LNG terminals (€1.2 billion). The costs exclude TAP.

[20] The Gas Ring was originally proposed by in 2008 and elaborated in 2009. The Gas Ring aimed at connecting WB6 countries with each other and with the main European and international gas pipelines, and gasify the region as a whole. The concept proposed the development of coordinated and parallel investments in gas-fired power stations to come on-line within the same timeframe in order to underpin the financing of transmission infrastructure. Once the transmission infrastructure would be in place, distribution investment could follow, building the smaller loads on top of the power generation anchor loads.

[21] South East Europe Gas Power Consortium by Economic Consulting Associates. Interim Report, June 2015

Figure 3.5: International gas supply project proposals and future supply entry points

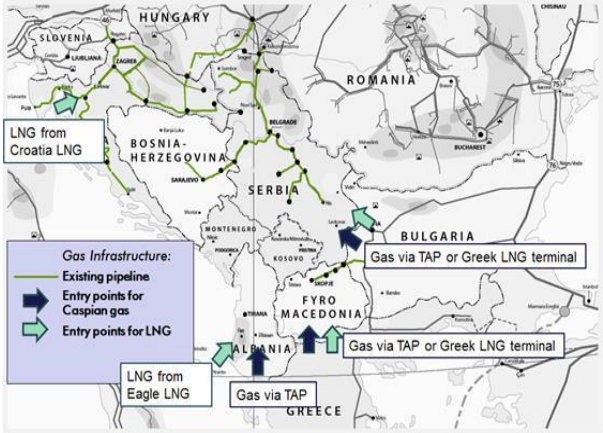
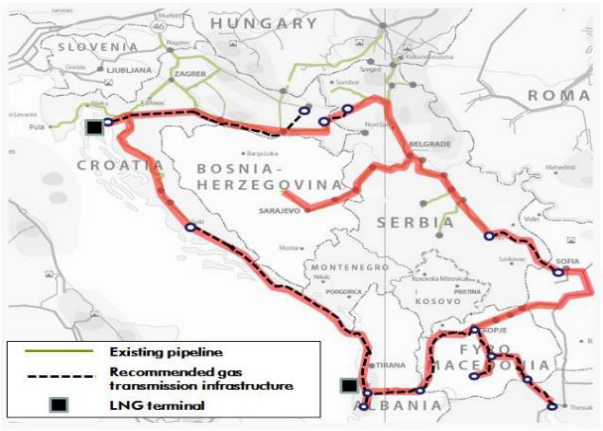


Figure 3.6: Regional gas development strategy – revised Gas Ring



Source: South East Europe Gas Power Consortium by Economic Consulting Associates. Interim Report, June 2015

Finally, successful implementation of gas infrastructure development will also require an adequate legal and regulatory framework to facilitate investments and gas trade. A good starting point is to assess whether gas market reforms are being implemented in line with the EU's Third Energy Package in countries where there are active gas markets:

- In Bosnia and Herzegovina, the gas sector is regulated at the level of the entities (the Federation of Bosnia and Herzegovina and the Republika Srpska). Both entities have failed to transpose any major principle of the Third Energy Package, including provisions on third-party access to networks (including setting up transmission and distribution tariffs), sector unbundling, and market opening. There is also uncertainly as to which legal and regulatory changes will be implemented and when.
- In FYR Macedonia, the Transmission Grid Code and the Gas Market Rules transpose the requirements for third-party access services, capacity allocation and transparency, but are not compliant with the requirements in regard to cross-border issues and assessing market demand for new investments. A new Energy Law that is expected to be adopted soon will transpose the Third Energy Package for both electricity and natural gas sectors.
- In Serbia, the transposition of the Third Energy Package was fulfilled with the adoption of the 2014 Energy Law. However, there is a significant gap between transposition and implementation. The most notable example is the strong opposition to unbundling of the state-owned Srbijagas and privately-owned Yogorosgaz, thus limiting the space for new entrants. There has also been a considerable lack of progress in the construction of the interconnector between Serbia and Bulgaria. Finally, tolerance of non-payment and mismanagement of Srbijagas' capital investment plan has put the company in financial distress.

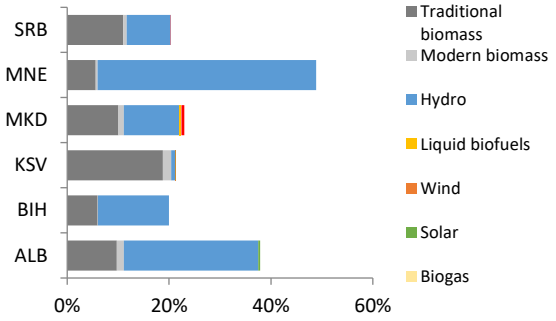
To stimulate the development of gas-fired power generation projects, countries will also have to advance the reform agenda in the electricity sector. A detailed discussion on what is needed in this area is presented in the following sections.

Renewable Energy

Energy from renewable resources accounts for approximately 25 percent of total final energy consumption (TFEC) in the WB6 countries, well above the 5.5 percent average in the EU. As it can be seen in figure 3.7, most renewable energy (RE) is generated from hydro and traditional biomass resources,

with a smaller role for modern biomass and very little development of other renewable resources. Across the Western Balkans there is some variation in RE penetration and resource mix. Renewables account for about 20 percent of TFEC in Bosnia and Herzegovina, Kosovo, FYR Macedonia and Serbia, 40 percent in Albania, and 50 percent in Montenegro. Kosovo stands out as the only country in which nearly all RE consumed is in the form of traditional biomass; Montenegro, on the other hand, derives most of its RE from hydropower. In absolute terms, Serbia is the largest consumer of RE, with consumption reaching almost 1,910 Mtoe in 2014. Consumption in the other economies is substantially lower, ranging from approximately 238 Mtoe in Montenegro to 717 Mtoe in Albania.

Figure 3.7: RE Consumption as a share in TFEC, 2014



Source: International Energy Agency, Renewable Energy Information, 2016.

Table 3.1: NREAPs Targets and Achievements, 2015

RES share (%)	**Baseline 2009**	1st Interim Target 2011-2012		2nd Interim Target 2013-2014		2015	**Target 2020**
		Achieved	Target	Achieved	Target		
ALB	**31.2**	31.5	32.6	31.1	33.2	34.6	**38**
BiH	**34.0**	17.9	35.2	n.a.	35.8	na	**40**
KOS	**18.9**	18.3	20.1	18.8	20.7	19.1	**25**
MKD	**21.9**	15.4	23.1	17.1	23.7	19.9	**28**
MNE	**26.3**	41.4	27.6	36.9	41.8	31.7	**33**
SRB	**21.2**	19.3	22.4	21.1	19.8	21.0	**27**

Source: First Report of the EC Secretariat on the Progress in the promotion *of Renewable Energy* (16 Oct 2015) and countries second progress reports.

A significant potential for RE remains untapped particularly in hydroelectricity and biomass. If materialized, it could bring about significant benefits in terms of energy supply diversification and transition to a lower-carbon-energy mix. The WB6 countries possess a vast technical potential for RE that is estimated at 100 GW mostly for electricity generation. Wind has the largest technical potential (60 GW), followed by Hydro (19GW) and solar (15GW). Estimates for the use of RE in the heating sector are scare. The economically and financially viable potential of the development of RE for power generation, however, is expected to be much lower.[22]

Solar and Wind projects are becoming increasingly competitive in terms of costs given recent significant declines in the capital costs of those technologies. The countries in the region have already embarked on expansion of the Solar and Wind generation potential. This is partly due to the steep reduction of capital costs of those technologies since 2014. Specifically, the capital cost of Solar PV and Wind reduced by about 30% and 20% respectively.[23] It is also noteworthy that the cost of energy storage systems have reduced by over 50% since 2014, and those, in combination with new variable RE generation, could be deployed in economically and financially viable manner to help meet daily peak demand.

Hydropower

It is one of the most abundant and economically viable technology in the region given the abundant resources and experience. It is estimated that there are currently 256 hydro power plants (HPP) in operation, with total installed capacity of 8,423 MW, of which 7,994 MW in large HPPs (larger than 10

[22] IRENA, *Cost-Competitive Renewable Power Generation: Potential Across South East Europe*, 2017 estimated that less about 15 GW of the technical potential could be implemented in a cost-competitive way today based on the LCOE calculation for RE and gas. However, the LCOE framework may not be adequate to assess the cost-competitiveness of new-built RE versus new-built gas because RE technology is not suitable for baseload power.
[23] IRENA, 2017.

MW)[24]. The vast majority, as much as 92%, of the existing HPPs were constructed in the period 1955-1990. This demonstrates that the sector has been considerably underdeveloped in the last 25 years, despite having significant potential, considerable know-how, and relevant industrial capacity available in the region. The average age of hydropower plants, also point out to the need to refurbish and revitalize the existing facilities, which can be regarded as "no-regret or win-win" investment projects. The development of hydropower in the region has been changing over the past few years, with the development over the past 3-5 years of hydropower plants in Albania, FYR Macedonia and Bosnia and Herzegovina. Countries in the region, with support by the European Commission are developing a regional strategy for the development of hydropower in order to assess on individual river basins the ecological potential for hydropower and identify specific projects to be developed. The strategy is expected to ensure a regional approach to investments, mitigating the impact on the food-water-transport-ecosystem nexus. In fact, a significant share of the hydropower potential and projects are located inside or close to protected areas at both the national and international levels. This poses important challenges related to environmental issues and benefit-sharing frameworks in transboundary projects. (See box 5 for a discussion of the environmental challenges surrounding the development of hydropower in the region).

Box 5. Environmental Issues Around Hydropower Development in the Western Balkans

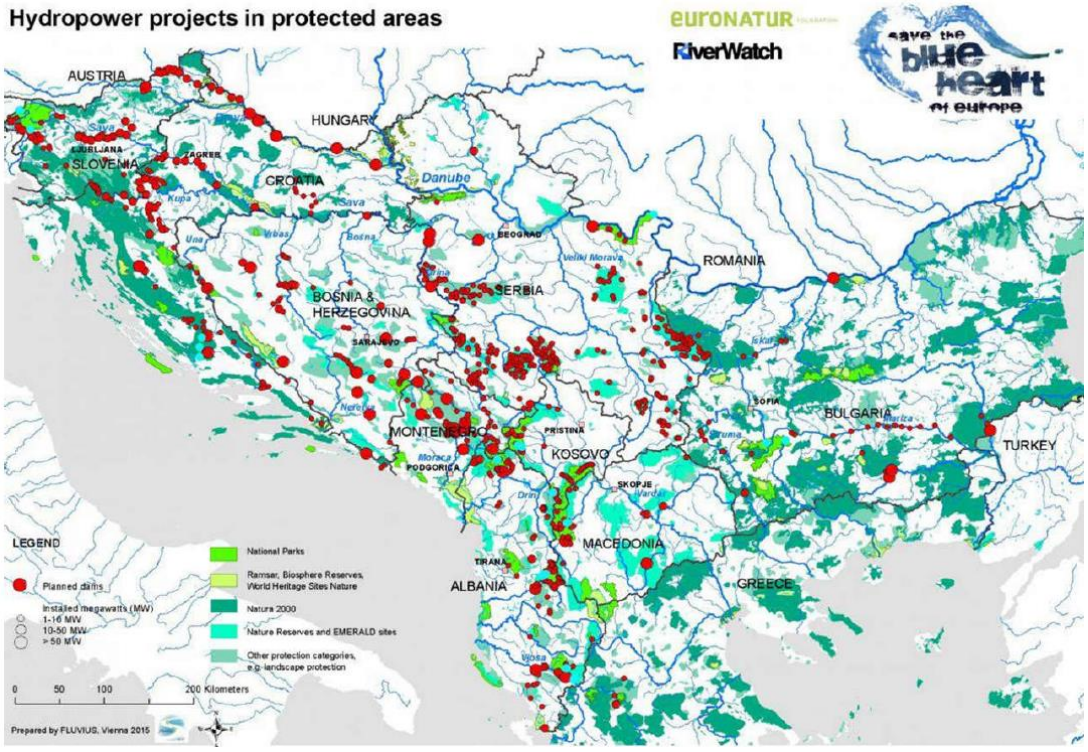
Recent analyses have shown that river ecosystems in the Western Balkans are predominantly in good health (in good or very good condition), with high levels of biodiversity for species and habitats. On the other hand, the rivers in the region face a high number of planned hydropower projects – for which the environmental risk must be assessed, managed and mitigated.

Hydropower plants (HPPs) are planned across the region, and a number of them (approximately 49 percent) are located inside or close to valuable biodiversity sites in the region, including designated protected areas (national parks, reserves, etc.) at both the national and international levels, as can be seen in the map below.

However, the procedures for strategic environmental assessments (which are particularly relevant for assessing the cumulative impacts of small-hydropower development in river basins) and environmental impact assessments (EIAs) are variable in the WB6 countries and are believed not to be sufficiently thorough. Few feasibility studies take into account EIAs at an earlier stage, baseline surveys tend not to contain relevant information on the target HPP project area, and hydrological data is usually old (e.g. more than 20 years old) and does not take account of climate change.

The sustainable development of the region's hydropower potential will therefore hinge on the countries' ability to strengthen their systems to adequately address the environmental and social challenges associated with the construction, physical footprint and operation of hydropower schemes.

[24] Regional Strategy for Sustainable Hydropower in The Western Balkans, Western Balkans Investment Framework, Final Report, November 2017.



Source: Hydropower Projects in Protected Areas on the Balkans, EuroNatur and RiverWatch, May 2015.

Biomass

Biomass plays an important role in the heating sector in the Western Balkans. Understated in national statistics, it is estimated that biomass (firewood in the residential sector) meets about 42 percent of annual heat demand in the Western Balkans. Unfortunately, a significant share of it is used inefficiently due to outdated equipment and lack of drying before use. The resulting particulate emissions also contribute significantly to poor air quality in cities such as Skopje, Pristina, Sarajevo, Belgrade, and Uzice.

Sustainably increasing the use of biomass by improving the efficiency of heating appliances and further developing biomass-based district heating can contribute to meeting WB6 countries' RE targets in a cost-effective way by exploiting local energy resources. It is estimated that the sustainable potential available for additional heating amounts to 1 Mtoe (about 21 percent of current use for heating). Biomass for heating purposes is assessed to be economically viable compared to electricity, heavy/light fuel oil and, to a lesser extent, coal. From the end-user's perspective, replacing an existing electric heating system with biomass-based technology can reduce costs by 45 to 70 percent

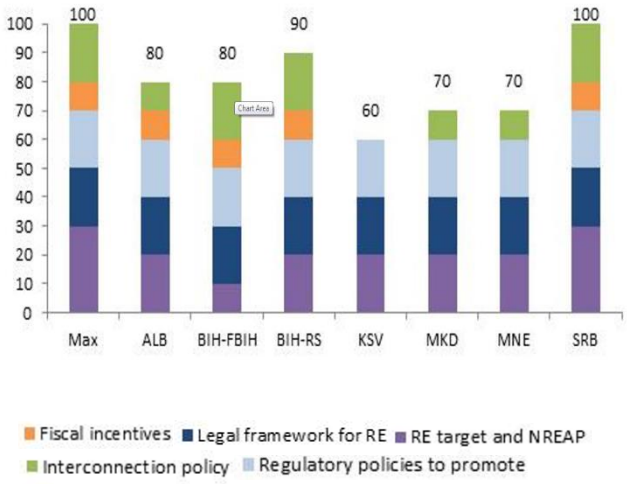
RE targets

The WB6 countries have committed to binding targets and approved National Renewable Energy Action Plans (NREAPs) as well as financial support schemes for RE development. In 2009, all WB6 countries adopted binding targets to increase RE use in the electricity, heating and cooling, and transport sectors by 2020. The targets are ambitious – especially those in BIH and Albania, which must reach 40 and 38 percent of total gross energy consumption by 2020, respectively (table 2.1). By 2016, all NREAPs were approved, setting out individual renewable-energy targets for each sector, the planned mix of different RE technologies, and policy measures to achieve their targets. Finally, all countries have subscribed to feed-in tariff (FiT) policies as the main financial support mechanisms for RE. The FiTs are primarily differentiated by resource and have a duration of between 10 (Kosovo) and 15 years (Albania).

Despite the adoption of binding targets and incentive support schemes, RE development has lagged behind expectations. Apart from Montenegro, no WB6 country met its first interim targets (2011-2012). They also fell short of meeting their second interim target (2013-2014), nor was significant progress registered in 2015 (table 2.1). Finally, as of February 2017, based on the countries' second progress report, they are generally not on track to meet their 2020 targets. This suggest that there are other barriers limiting the development of RE in the region. Commonly cited challenges are high administrative barriers and the lack of sufficiently attractive and consistent support systems – including the lack of standard power purchase agreements, grid limitations, and insufficient experience of grid integration with variable generation. The following assessment of the RE framework aims to provide better insight into the design of policies and practices to support RE development in the region.

In order to assess the RE support framework with reference to current best practice, the RISE[25] methodology was applied. For the purposes of this report, the RISE framework was adapted to assess policy and regulation,[26] including a formal benchmarking of price incentives as well as an assessment of the affordability of RE subsidies. The results of the analysis (see figure 3.8) show that all countries score relatively well on the comprehensiveness of their legal frameworks and policy baskets given the adoption of RE legislation, NREAPs, and FiTs. Serbia in particular has introduced a complete set of measures to support RE development. Countries like Kosovo, FYR Macedonia and Montenegro can still complement them with other fiscal and fiscal incentives, such as tax credits or exemptions. The introduction of connection-cost policies that are less burdensome on RE initiatives should be explored in Bosnia and Herzegovina, Albania, and Kosovo. In all countries, the implementation of the systems of Guarantees of Origin and cooperation mechanisms between WB6 countries are also lacking (except for FYR Macedonia).

Figure 3.8: Legal framework and policy basket – score summary



Source: World Bank staff.

Figure 3.9: Resource potential and remuneration level relative to LCOE

Country	Wind	Solar	Hydro	Biomass	Geo-thermal
ALB	n/a	n/a	↑↑	n/a	n/a
BIH-FBIH	↓↓	✓	↑	↓	n/a
BIH-RS	↓	↓	↑↑	↓	n/a
KOS	↓	n/a	↑↑	↓	n/a
MKD	↑	↓	↑	↑	n/a
MNE	↑	↓	↑↑	↓	n/a
SRB	↑	✓	↑↑	↓	↓

Legend:

Resource availability: High | Medium | Med/Low | Low

Remuneration level relative to LCOE: ↑↑: Above range; ↑: Above benchmark, within range; ✓: Around benchmark; ↓: Below benchmark, within range; ↓↓: Below range

[25] The Readiness for Investment in Sustainable Energy (RISE) index was developed by the World Bank to assess the quality of the business environment for private sector investment in sustainable energy. A set of indicators structured around four dimensions (planning, policy and regulation, utility viability and administrative efficiency) is scored against an internationally agreed – although dynamic – best-practice benchmark or frontier.

[26] The assessment presented in this report is based primarily on a desk review of (i) the comprehensiveness of the legal framework and policy basket and (ii) the alignment of the design of regulatory incentives with best practice.

However, the assessment of the design and economic performance of the support schemes indicates that there is room for improvement. The remuneration of FiTs – which depends on the FIT level and period of support – was assessed in a benchmarking analysis using regional ranges as proxies of the levelized cost of energy (LCOE). Overall, the FiTs are within the range of those offered in EU countries, except in the case of small hydropower, where FiTs are relatively high despite the large resource availability in the WB6 region (see figure 3.9). FiTs for biomass are also below the regional LCOE benchmark – except in FYR Macedonia, which offers relatively high levels of remuneration. Another important dimension of economic performance and sustainability is whether the FiTs are affordable, that is, whether consumers are able to afford the incremental cost associated with RE development over time. For example, countries such as Spain, Germany, and Bulgaria have substantially increased the level of RE penetration in their power mix, to the point that subsidies have had a noticeable impact on residential bills. In medium- and lower-medium-income WB6 countries, the efficiency of the subsidies is even more important, especially since all incremental costs associated with FiTs are expected to be fully passed on to consumers. The analysis shows that although the impact of the subsidy on residential bills is currently low, the attainment of the 2020 targets established in the NREAPs may increase the burden on consumers electricity bills (especially in Montenegro and Bosnia and Herzegovina) if the current level of support remains unchanged (see figure 3.11).[27]

Figure 3.10: Impact on household income and the residential bill – total volume, 2014

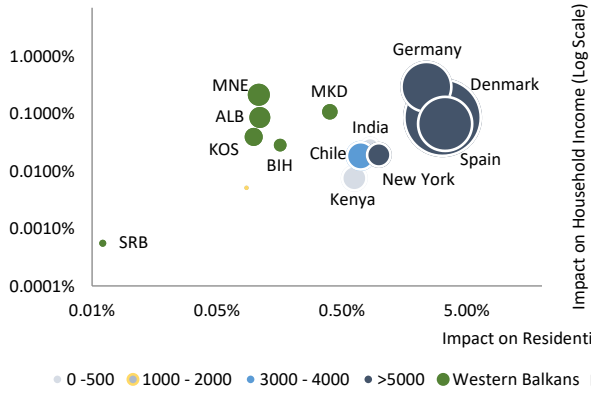
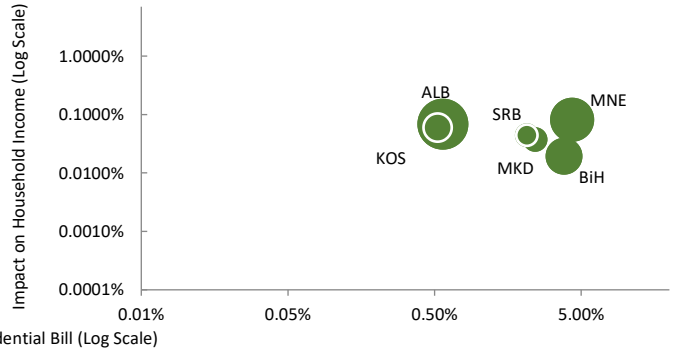


Figure 3.11: Impact on household income and the residential bill in 2020 – committed RE scale-up



Source: World Bank staff.

To achieve their RE targets at least cost, WB6 countries would need to harness the potential of RE-based generation for heating. An economic analysis of various RE technologies was performed for each country and regionally with the objective of providing insights on the least-cost options to meet RE targets. The analysis was based on the calculation of LCOE for each of the RE options and the construction of supply curves[28] was based on the trajectories of RE expansion established in the NREAPs. RE-based generation for heating (mainly solid biomass and a smaller portion of ground heat pumps) is among the lowest-cost options for meeting RE targets in the region, within an LCOE range of €40-50/MWh, and a potential

[27] It is important to note that the analysis of the impact of RE subsidies on affordability presented in this document considers only the cost of the FIT regime, but not the benefits. In most countries RE contributes to enhance energy security –through technology diversification, lower dependence on fossil fuels and hedging against fuel price volatility, increased reliability– in addition to the benefits associated with global and local environmental issues, or other such as industrial development. Also, the magnitude of RE subsidies needs to be compared with other energy subsidies, especially with those being channeled to fossil fuels across all segments of the supply chain.

[28] Data on project costs is taken from IRENA's costing alliance initiative; IRENA's regional cost ranges are used for countries where project cost-level data is scarce or unavailable. The discount rate is assumed to be 10 percent.

contribution of up to 48 percent to meet the RE targets. Hydropower (of different sizes) ranks second among the least-cost options, with a potential contribution of 35 percent to the RE target.

As mentioned above, despite the cost-effective potential for RE in the heating sector, it has received limited attention and support from policy makers and investors, who have focused instead on establishing incentives for and launching larger RE projects for electricity generation. Findings from a recent World Bank study of options and policy measures to increase the use of biomass for heating in the region in a sustainable manner are discussed in this report below.

The overall cost for meeting RE targets for countries can be significantly reduced if the WB6 countries establish coordination mechanisms. RE potential in the heating and electricity sectors is spread among countries. Albania (mostly hydro), Bosnia and Herzegovina (biomass for heating), and Serbia (biomass for heating and Hydro) can add up to 75 percent of the total volume of RE generation over the 2014-2020 period. The EU RE Directive provides the opportunity to establish cooperation mechanisms that allow countries with less-cost-effective renewable-energy sources to meet their targets at a lower cost through statistical transfers, joint projects with other WB6 countries, and joint projects with EU member states. However, none of the WB6 countries has yet taken advantage of these opportunities and cooperation mechanisms are yet to be established and implemented.

From FIT towards market-based instruments

The Feed-In Tariff (FIT) have been traditionally the preferred instrument to support renewable energy generation. A FIT guarantees a fixed price for renewable energy which is fed in to the grid. However, in recent years many countries have started to implement a blend of different policies, allowing them to profit from the benefits offered by a range of different policies. Renewable energy Auctions (sometimes also called tenders) are an example. In auctions both the price and the quantity are determined through a price bidding process, before the project start. This allows auctions to provide a "stable revenue guarantee for the project developers (similar to the FIT mechanism), while at the same time ensuring that the renewable generation target will be met precisely.

WB6 countries also need to move towards the implementation of market-based support mechanisms, in particular auction schemes, to promote cost-effective RE in line with the new EU guidelines. EU countries initially relied heavily in FiTs as the main mechanism for increasing the use of RE. These support schemes have greatly contributed to this goal, although they have resulted in increasingly high costs for consumers and introduced distortions in the electricity market.[29] In 2014, the EU issued new guidelines on state aid[30] aimed at progressively replacing FiTs by competitive bidding processes (auctions, tenders, etc.) and market premiums (top-ups on the market price or certificates) as support instruments. The case for introducing competitive bidding processes in the region is strong in view of global experience (see box 6 for global experience with auctions) and the need to move towards more-cost-effective support mechanism. The introduction of market premiums, in contrast, may not be straightforward since competitive electricity markets are not yet well developed in all WB6 countries – although this option is

[29] The FiTs have sheltered RE generators from price signals and have led to market distortions. Renewables installations have generated electricity irrespective of actual demand and they have out-competed other electricity generation which has had to rely solely on market prices to operate economically. As technologies mature and their production reaches a substantial share of the market, it is now believed that renewable energy production can and should react to market signals, and aid amounts should respond to falling production costs.

[30] European Commission, *Communication from the Commission: Guidelines on State aid for environmental protection and energy 2014-2020*. EU countries are allowed to take into account their national circumstances, and small generators (i.e. those below 3 MW or three generation units for wind or 500 kW for other sources) are exempted from the new rules.

likely to become relevant in the medium term with the development and subsequent integration of organized markets (spot) in the region.

In the last few years auctions emerged as a preferred approach to competitively procure power-generation capacity for solar PV. Several countries around the world used competitive bidding for solar PV projects, which led to impressively low tariffs. In 2017, solar PV bids came at $37 MWh in India, $55 MWh in Israel and $70 MWh Turkey. In 2018, solar PV prices further declined yielding bids of $41.9 MWh in Armenia, $43 MWh in Senegal and $35 MWh in Brazil. In 2018, prices of battery storage also declined significantly, which further reduces the cost of integrating variable renewable energy such as solar and wind. Western Balkan countries could scale up the utilization of wind and solar resources through a competitive bidding process to take advantage of the rapidly declining prices in these renewable technologies.

Box 6. Global Experience with Auctions for RE

Auctions have gained popularity recently given their inherent advantage in increasing cost efficiency and avoiding windfall profits or underpayments, as demonstrated in the EU and developing countries. The number of countries adopting RE auctions increased from six in 2005 to at least 67 by mid-2016 (mostly in developing countries) and recently included less-mature RE technologies such as offshore wind in Denmark and the Netherlands, biogas in Argentina and Peru, and solar thermal power in the United Arab Emirates.

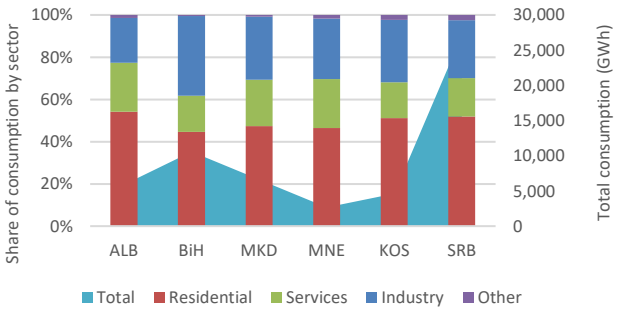
The potential to achieve low prices has been acclaimed as one of the most important strengths of auctions and has been a major motivation for their rapid dissemination worldwide. This can be attributed to their ability to promote competition among potential developers and lead to accurate price discovery in a robust and transparent manner. In 2010, solar energy was contracted at a global average price of almost $250/MWh, compared with the average price of $50/MWh in 2016. Wind prices have also fallen at a slower pace, as the technology was already fairly mature in 2010, making investment costs more stable – but a decreasing trend can still be seen, especially after 2014.

Experience also shows that the design of adequate auction mechanisms is a critical factor in ensuring their effectiveness. Contracts need to be solid and supported by regulatory stability, transparency and fairness. Penalties should also be credible and enforceable to avoid delays and risks of underbuilding. The same best practices would also minimize the adoption of overly aggressive bidding strategies (or overoptimistic behavior) by suppliers. However, stringent compliance rules may deter the participation of small and/or new players, which is another well-known weakness of auctions, given the relatively high associated transaction costs for both the bidders and the auctioneer.

III.2 The Outlook for Electricity: The Risk of "Locking-into" a Carbon-Intensive Fuel Mix

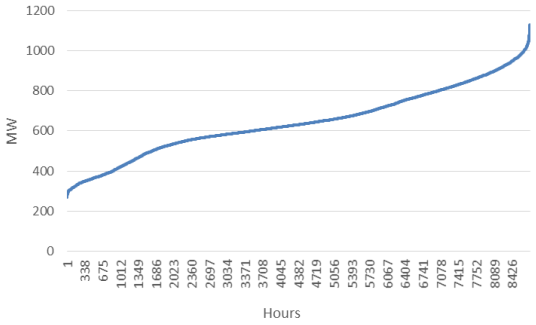
The residential sector accounts for a large share of demand, mainly to the inefficient use of electricity for heating. The region consumed about 57,480 GWh in 2015. The residential sector accounted for about 50 percent of consumption, followed by industry (30 percent), and the commercial and public sectors (15 percent). A breakdown of electricity demand by country and by sector is presented in figure 3.12. The large share of electricity consumption for residential purposes is due mostly to widespread and inefficient use of electricity for heating purposes and it is substantially higher compared to EU countries (the share of electricity consumption for households is on average of 30 percent). High electricity consumption for heating also puts pressure on demand during winter months, requiring additional peak capacity to be installed in the system to ensure adequate levels of security of supply. Peak capacity does not have high levels of utilization, thus increasing total system costs. One example of this, shown in figure 3.13, is hourly demand in Kosovo in 2016. Peak demand is just over 1,100 MW and observes strong daily and seasonal characteristics, with the lowest hourly demand closer to 270 MW, i.e., four times less than annual peak.

Figure 3.12. Electricity demand by country and sector, 2015



Source: International Energy Agency, Electricity Information, 2016

Figure 3.13 load demand curve for Kosovo, 2016



Source: Kosovo Transmission System Operator

Lignite power generation accounts for the lion's share of electricity generation in the region, although the power mix varies among countries. Lignite accounted for over 45 percent of total generation, one-third was from hydro, and the rest was from petroleum products and other renewable resources. The electricity mix varies considerably among countries, with Albania relying entirely on hydro generation while lignite represents approximately 98 percent in Kosovo and around 60 percent in Bosnia and Herzegovina and FYR Macedonia (see figure 3.14). Other countries have a combination of both thermal and hydro generation. Total installed capacity in the region is about 17.4 GW. The largest share of the region's generation capacity is in Serbia (40 percent or 7.1 GW), followed by Bosnia and Herzegovina (23 percent or 3.9 GW), and Albania and FYR Macedonia (11 percent, or about 1.9 GW, each).

Most of the existing capacity was built about four decades ago and investment in power infrastructure has been low. As much as 92 percent of the existing HPPs were built between 1955 and 1990. Many of the thermal power plants are operating beyond their intended lifespan and suffer from lack of maintenance, and are as a result significantly de-rated. For example, as noted earlier, available capacity in the Kosovo A thermal power plant is only about 345 MW out of the 800 MW nominal capacity. Over the past 15 years, only 1 GW of new capacity has been added, compared to 10.7 GW between 1980 and 1990.

Private investment has also remained relatively low, although there has been renewed interest in financing of generation facilities over the past few years. Private sector investments in the region amount to only about $3.9 billion between 2002 and 2015,[31] with about 30 percent going to Albania. About two-thirds ($2.4 billion) of the investments focused on greenfield generation projects while the remaining one-third was invested in divestitures in the distribution sector (mostly in the early 2000s). Hydropower attracted most of the investments by the private sector. In Albania, for example, the Ashta HPP (53 MW, investment of EUR 166 million) was commissioned in 2012 under a build, own, operate, and transfer framework (BOOT) with a 15-year off-take agreement with the concessionaire. The Devoll River cascade (consisting of two HPPs with and installed capacity of 256 MW and an investment cost of EUR 535 million) is being developed under a BOOT framework. There has also been important investments in other RE (wind) in Serbia and Montenegro in 2014-15 (over 700 million). The only private investment in coal mining was in Bosnia and Herzegovina in the Stanari coal complex.

[31] World Bank, Private Participation Database.

Figure 3.14: Electricity generation by country, 2015

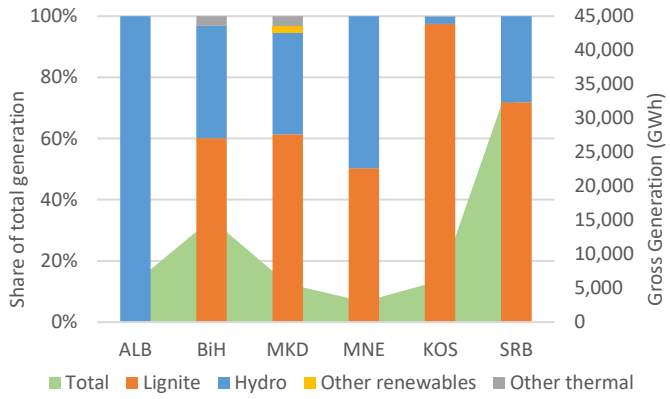
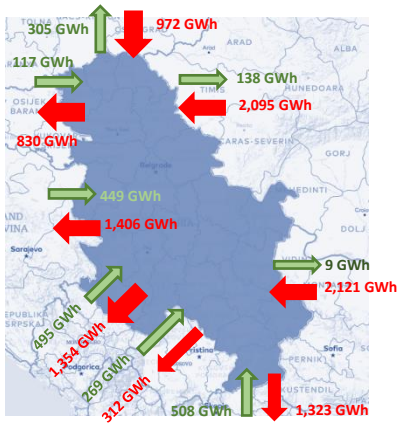


Figure 3.15: Serbia cross-border flows, 2017



Source: Entso-e, 2017, Power flows statistics

Originally designed as a single as a single system, the region's power systems are relatively well interconnected and there is a substantial amount of power trade. Traditionally, Bosnia and Herzegovina has been the region's larger net exporter (2.1 TWh, or 20 percent of final consumption in 2015) while FYR Macedonia and Albania are the largest net importers with 2.5 TWh (or 34 percent of final consumption) and 1.4 TWh in 2015 (or 24 percent of final consumption), respectively. Electricity trade follows an East to West Pattern (from Romania and Bulgaria) to WB6 importers and North to South (from Bosnia and Herzegovina and Greece). Serbia is the largest transit country, with about 12.7 TWh of cross border power flows in 2017 (figure 3.15).

The outlook for electricity in the region is of concern given the significant backlog of investments to adequately meet demand. Under a status quo scenario, electricity demand in the region is expected to grow on average by about 2.2 percent over the 2015-2035 period. While the demand growth is moderate, the deteriorated stock of infrastructure means that important efforts will be required to meet the region's projected electricity needs while ensuring adequate reserve margins and reliability. In Kosovo for instance, unreliable lignite-fired plants, inefficient distribution, and lack of back-up generation capacity (replacement reserves) have resulted in suppressed demand (load shedding) over the past five years, which has however reduced to 2% of consumption in the past few years. Estimates of the generating capacity needed to meet the region's projected electricity needs must take into account three key considerations:

(i) the mix of fuels to generate electricity, reflecting the implementation of policies for energy diversity and carbon emissions,

(ii) the substantial portion of today's capacity that should be either retired or undergo major rehabilitation to extend its working life and fulfill environmental standards in line with the country's commitments towards the EC, and

(iii) the expected change or continuation in the region's power system load factors if electrical residential heating continues to grow with the increase of living standards.

Assuming a business as usual scenario, estimating the requirement for future capacity starts by compiling the generating capacity in place (using 2010 as a starting point) and then estimate capacity retirements, rehabilitations, and additions through 2035. Additions and rehabilitations are expected to reach nearly 7 GW in 2016-2035. Retirement of thermal capacity will reach about 3 GW by 2035.

Total investment needed in generation before 2035 amounts to about $10 billion (in 2010 dollars). Thermal generating capacity amounts to 65 percent of the investment, with 25 percent for hydropower, and 10 percent for other renewable energy. Serbia accounts for about 35 percent of the total. Upgrading capacity also means improving transmission and distribution facilities. If investment needs follow the global patters, generation will account for 65 percent of total investments in supply; transmission and distribution will account for 35 percent. These projections imply total supply costs out to 2035 of about $15 billion.

According to estimates based on national strategies and project announcements, it is expected that coal will continue to dominate the electricity mix in the region in the medium- term – although some development of gas and RE generation is expected. Based on the estimates which are compatible with national strategies, it is expected that generation from coal will remain constant in volume terms while generation from hydroelectricity is expected to increase 1.2 times by 2035. Generation using other renewable resources and natural gas is expected to grow more rapidly, although from a very low base.

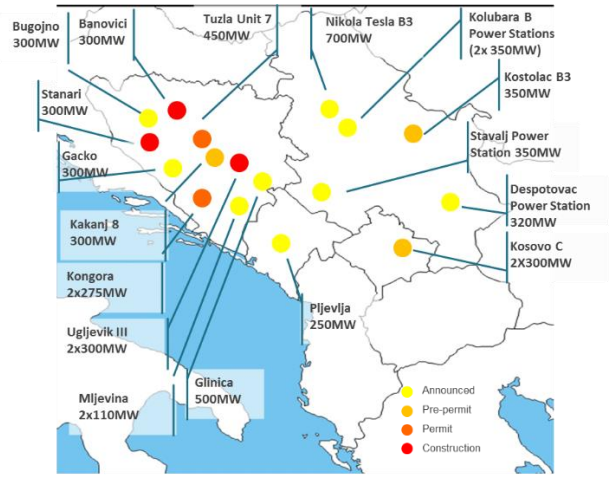
New lignite plants are planned across WB6 countries to replace outdated lignite plants, meet the projected growth in demand, and fulfill export aspirations. Nearly 4000MW of new capacity is already under construction or significantly progressed to materialize in the next few years across Western Balkans. The Stanari Power Plant (300MW) started operation in September 2016 and additional 950MW is currently under construction mainly in Bosnia (Ugljevik III, 600MW) and Serbia (Kostolac B3, 350MW). Another 750MW have been contracted in Bosnia (Tuzla 7 450MW and Banovici 300MW), while additional plants are undergoing bidding processes in Serbia (Kostolac B2 700MW), Bosnia (Kakanj 8 300MW) and Montenegro (Pljevlja II 250MW). Kosovo is currently pursuing construction of a 450 MW coal plant with a private developer.

The rush in coal-fired investments calls for a careful review of the country's investment programs to avoid stranded assets. It would be important to ensure that individual project plans being developed integrate into coherent strategic plans to address generation investment requirements based on least-cost criteria and broader policy objectives (e.g. goals to reduce emissions, RE/EE goals). For example, analytical work undertaken by the Bank for Bosnia and Herzegovina points out to significant risks and costs to the country (up to €1 billion) associated with overinvestments in thermal projects in the context of an export-oriented strategy (see box 7 for more details).

Box 7. Least-cost planning in Bosnia and Herzegovina

A least-cost planning analysis of the BiH power sector was undertaken by the Bank with the objective of getting insights into the development of the new generation capacity over the next two decades (2016-2030). The analysis found that Bosnia and Herzegovina (BiH) power sector holds significant investment opportunities (at least €3 billion) to develop relatively low-cost generation resources including lignite, hydro and other renewables.

Coal-fired power plants planed and under construction in the WB6 region



There are, however, significant risks associated with an export-oriented strategy. If investments in the country's Indicative Plan are realized, an overinvestment in thermal projects may cost BiH €1 billion, although excess uneconomic generation boosts exports. If the carbon and other emissions are mandated, some of the thermal projects may be rendered uneconomic and export will drop sharply. As a result, the timing of new thermal power plants require closer scrutiny as the least-cost plan (even without any policy constraint) delays most of the planned projects by five to 15 years. If policies around carbon are implemented, two or three projects ca be eliminated.

To offset the risks associated with a carbon/emission constrained scenario, BiH should re-focus on hydro and RE development over the coming two decades. The hydro capacity requirements in fact exceed that of new coal under carbon/emission constrained scenarios.

These outcomes underscore the need for a solid decision making framework that integrates the individual project plans – primarily from the state-owned power companies – and the policy objectives to form a coherent national energy plan.

Source: Bosnia and Herzegovina Power Sector Note: Least-cost Power Development Plan, the World Bank 2017 forthcoming

Investment programs to update and replace power infrastructure need to balance affordability, security of supply, and environmental sustainability. The problem with a significant move in the region to pursue aggressive export strategies based on new lignite-fired generation is that these are not sustainable from an environmental point of view**.** As mentioned above, in addition to significant GHG emissions, local emissions of SO_2, NOx and dust from lignite-fired power plants are already have high externality costs[32]. The track record of addressing these issues is also not ideal. None of the WB6 countries has managed to modernize the plants to be compliant with the limit values for pollutants set out in the Industrial Emissions Directive (IED). It is estimated that investments in the amount of €1.5 billion will be needed to bring these power plants to comply with the IED. Going forward, the WB6 countries should also take into account increasingly stringent limits on emissions as outlined in the '*Best Available Techniques Reference Document for Large Combustion Plants'*[33]*,* which would apply to coal-fired power plants. These developments call for a review of investment plans for the retrofit of existing plants and a review of the

[32] According to the Energy Community's *Study on the Need for Modernization of Large Combustion Plants in the Energy Community* (2013), the environmental costs are estimated to be as high as EUR 26.7 cents/kWh in Montenegro with an average cost of EUR 11.3 cents/kWh.

[33] http://eippcb.jrc.ec.europa.eu/reference/lcp.html

technologies for new coal-fired generation plants in order to avoid excessive costs in the medium-to-long term.

III.3 Space Heating

Almost two-thirds of annual heat demand in the Western Balkans is met using firewood (42%) and electricity (21%), while other fuels account the remaining 37%. Total annual heat demand in the region is estimated to be 6.4 Mtoe (74 TWh). The residential sector accounts for the largest share with about 70 percent, followed by commercial (20 percent) and public sector (10 percent). Firewood is commonly used in the residential sector, with a share of ranging from 76 percent in Bosnia and Herzegovina to 60 percent in Serbia. Only in Albania, electricity is the prevalent heating method as it can be seen in Figure 3.16. Electricity for heating is mostly used by households in urban areas (multifamily and stand-alone buildings) as the main heating source or to complement wood stoves in rural areas.

The use of decentralized heating systems is widespread in the region. Approximately 88% of the 7.3 million buildings in the region use decentralized heating systems—small heat-only boilers (HOBs), stoves and electric devices—whereas only 12 percent use district heating (DH). Small heat only boilers (HOBs) are the most common individual heating systems (47 percent), followed by electric appliances (21 percent) and stoves (19 percent). Stoves are used in more than half of stand-alone buildings. Figure 3.17 shows the distribution between DH and decentralized systems (HoBs, stoves, electric appliances) for all WB6 countries.

Figure 3.16: Heat demand by Fuel

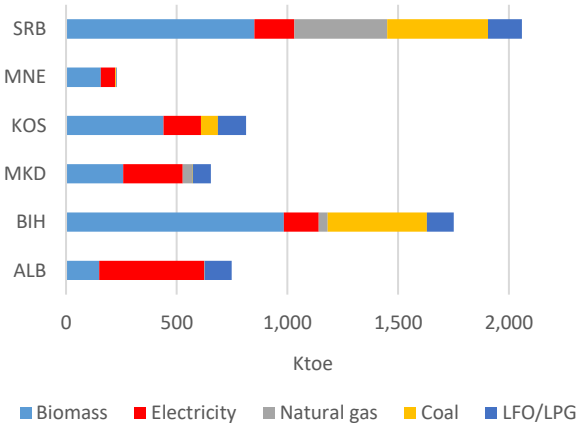
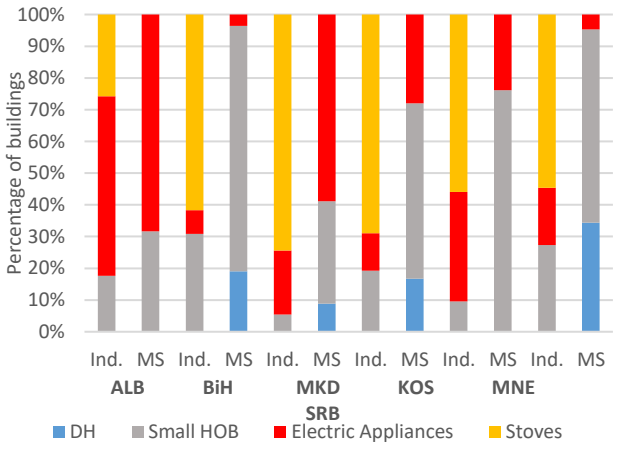


Figure 3.17: Heating systems by type of buildings



Source: Sector Study on Biomass-Based Heating in the Western Balkans, 2017. Legend: Ind. means Individual buildings and MS means multi-family buildings

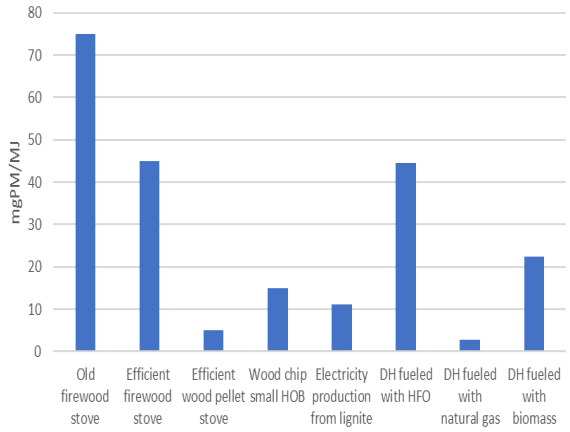
The overall efficiency and quality of decentralized heating services is low and result in the high indoor emissions. Despite that they are widely used for heating and cooking, firewood stoves are inefficient and produce high levels of smoke and indoor pollution.[34] Stoves are produced domestically in Bosnia and Herzegovina, FYR Macedonia, and Serbia and generally do not comply with EU certification standards. The widespread use of firewood (which is harvested in the months preceding winter) with little or no drying also results in the loss of 40 to 50% of the energy content. Emissions of particle matter (PM) from leaky and inefficient firewood stoves are high when compared with efficient stoves (see figure 3.18). This results in negative health consequences for households and contribute to air pollution in urban areas. Poor air

[34] http://www.who.int/mediacentre/factsheets/fs292/en/

quality is already and important concern in urban areas across the region, for example in cities such as Belgrade, Pristina, Sarajevo, Skopje, and Uzice.

DH is an important heating source in urban areas. There are about 100 District Heating companies throughout the region, with an installed capacity of about 9,200 MWth. As mentioned above, DH accounts for about 12 percent of heat demand but there are significant differences among countries. The market share of DH in Serbia is close to 20 percent while it is only 3 percent on Kosovo. There are no DH systems in Albania and only one small DH system in Montenegro. The sector is also characterized by a high degree of consolidation; the two largest DH systems in Bosnia and Herzegovina and the four largest DH systems in Serbia account for 75 percent and 60 percent of installed capacity, respectively. An overview of the DH companies in the region is provided in table 3.2.

Figure 3.18: Annual emissions of particulate Matter (PM) from heating appliances and fuels



Source: Sector Study on Biomass-Based Heating in the Western Balkans, 2017.

Table 3.2: Overview of District Heating systems

	BiH	KOS	SRB	MKD
# of DH companies	22	3	58	5 (all in Skopje)
Capacity (MWth)	1,000	200	6,000	630
Main fuel	Gas, heavy oil, coal, biomass	Heavy oil	Heavy oil, gas, coal	Gas, heavy oil
Ownership	Local government	Local government	Local government	Private
Tariff approval	Local government	Local government	Local government	Regulator
Average tariff*	4.7	5.7	7.0	4.1
Investment needs	220	40	270	n.a.

Source: Unlocking the Potential for Private Sector Participation in District Heating. IFC, 2015. Others

* Prices for metered households in capital U.S. cents/kWh, variable element only)

The technical condition of DH systems is overall poor –although investments to modernize some systems have been implemented in larger systems such as Sarajevo, Belgrade, and Skopje. Most systems, however, are characterized by high fuel, heat, electricity, and water losses. For example, water refilling rates for boilers are well above ten for almost all DH companies, compared to close to 1 in Finland and Sweden. Premature deterioration of the equipment (pipelines, heat exchangers, etc.) due to low quality water is also prevalent across the region. The use of Combined Heat and Power (CHPs) plants, which can produce electricity and heat at high efficiency, is underdeveloped. Most DH companies operate heat only boilers fuel by heavy oil, coal, and natural gas (in Serbia and Bosnia and Herzegovina). There are only very few CHPs in operation in Serbia (Novi Sad), Kosovo (Pristina) and FYR Macedonia (Skopje). Another concern is the lack of consumption based billing and the deteriorated infrastructure inside buildings. Billing is based on heat area and not on actual consumption (with the exception of some cities in Serbia). Even when meters are installed at the building level, there has been resistance by consumers and authorities to adopt consumption based-billing due to social concerns.

Below-cost tariffs, low collections, and high operation costs lead to low financial performance of DH companies and result in lack of investments to modernize the systems. Municipalities own DH Companies and they are responsible for their operation. There is one exception is FYR Macedonia where

the company in Skopje has been privatized. Although tariff-setting methodologies are broadly in line with cost of service or rate of return approaches, tariffs are set below cost levels due to affordability considerations and also due to heat market competition considerations. If DH tariffs increase significantly, consumers will be encouraged to switch from DH systems to electricity for heating or other alternatives. Payment discipline is not enforced. In Serbia for instance, it was estimated in 2015 that 55 percent of DH companies had collection rates below 80 percent, thus significantly increasing their revenue gap. High operation costs for DH are explained by their reliance on imported fuels (oil derivatives or gas) with fluctuating prices (incl. due to exchange rate changes) without corresponding adjustments in domestic tariffs. High operating costs are also due to the poor technical conditions of the equipment and networks as discussed earlier. In practice, it is common that municipalities provide subsidies to DH companies – although this has been increasingly perceived as unfair by local governments to subsidize DH consumers only.

Investment needs were estimated at over EUR 500 million according to a study by the IFC on DH systems in 2015[35]. Investments in the sector have been very slow in materializing, financed by municipalities mostly with concessional loans from IFIs. There has also been very little private sector participation in the sector. While the overall institutional and regulatory environment is assessed to be in accordance with international best for Private Public Partnership (PPPs), the IFC report points out to sector specific barriers which limit their development. These include: below-cost tariffs set by municipal authorities, lack of adequate programs to address affordability concerns for low-income population, lack of a track record of PPPs in municipal services, and complex administrative structures (particularly in Bosnia and Herzegovina).

There is a critical need for governments in the region (both central and local) to take a strategic view at heating sector and put in place adequate policies to help citizens enjoy affordable and quality heating services. The heating sector has not been at the forefront of countries' priorities in the energy sector despite its importance in terms of affordability and linkages with electricity demand and investment needs. The challenge facing governments, both at the national and local levels, is to design policies and promote investments that enable all people to access clean and affordable heating. Such policies should consider the advantages of centralized (DH) and de-centralized (HOBs, stoves) heating systems according to specific market conditions. In areas with high heat demand and high population density, DH can be environmentally friendly and cost-effective. Decentralized systems in the other hand, may be more attractive in areas with low heat demand and low population density.

There is vast experience, regionally and globally, in designing policies and interventions to help achieve the above-mentioned objectives. Experience in Eastern Europe (Poland, the Baltics) shows that DH can be modernized –approaching efficiency, costs, and service levels experiences in other West European countries. Recent programs implemented by KfW in Serbia have also achieved important results in terms of improving the operational efficiency of DH systems. In terms of de-centralized solutions (HOBs, stoves), it is imperative to promote the use of efficient appliances to ensure that these systems perform in an environmental sustainable way. Government-led programs to support the introduction of clean and efficient stoves in China and Central Asia demonstrated that indoor pollution can be significantly reduced while improving indoor comfort levels. Increasing the use of biomass through efficient heating appliances also represents an opportunity to reduce the dependency on imported fuels, reduce air pollution, and help WB6 countries meet their renewable energy targets in a cost-effective way (see Box 9).

[35] Unlocking the Potential for Private Sector Participation in District Heating. IFC, 2015

Box 9. Biomass- increasing cost-effective RE use and reducing local pollution

As mentioned above, biomass (particularly in the residential sector) plays an important role in heating in the Western Balkans – it is estimated that 42 percent of annual heat demand in the Western Balkans is met using firewood. Unfortunately, a significant share of it is used inefficiently due to outdated equipment and lack of drying before use. The resulting particulate emissions also contribute significantly to poor air quality in cities such as Skopje, Pristina, Sarajevo, Belgrade, and Uzice.

Heating option	Coal	HFO/LFO	NG	Electricity	Heat Pumps	Firewood Inefficient Stove
New DH HOBs						
Wood chips	🔴	🟢	🟢			
Straw	🔴	🟢	🟢			
New CHPs*						
Wood chips			🔴			
Straw			🔴			
Retrofitting DH HOBs (Fuel Conversion)						
Wood Chips	🔴	🟢	🟢			
Straw	🟡	🟢	🟢			
New Small HOBs						
Wood chips	🟢	🟢	🟢	🟢		
Pellets	🔴	🟢	🟢	🟢		
Retrofitting Small HOBs						
Wood chips	🟢	🟢	🟢			
Pellets	🔴	🟢	🔴			
New Individual Heating						
Firewood (Efficient Stove)	🟢		🟢	🟢	🟢	🟢
Pellet stove	🔴		🟢	🟢	🟡	🟢

LEGEND: 🟢 Biomass heating more cost-effective than conventional; 🔴 Biomass heating less cost-effective than conventional; 🟡 Biomass heating similarly cost-effective as conventional

* The analysis of CHP options considered only environmentally superior solutions to currently existing heating options. Thus, only natural gas is taken into consideration, whereas coal and HFO CHP are not.

Biomass heating has not received adequate attention from policy makers at the national level – except from municipal initiatives that have not resulted in significant investments. The high transaction costs associated with many end-use sectors, the wide range of technologies, and the lack of comprehensive data may explain this situation. Yet, a recent analysis show that biomass can be competitive for a wide range of heating applications (see table)

Increasing biomass-based heating in the WB6 countries would require a combination of the following measures:

- Further increase the volume of sustainable biomass supply by facilitating logistics (roads) and improving forest management.

- Promote switching to efficient biomass heating technologies through the introduction of incentive schemes to facilitate refurbishments/conversion of DH systems and heat-only boilers and promote local manufacturing and energy labelling of efficiency firewood stoves.

- Support the development of value chains for bio-based heat by gathering statistics/information, organizing capacity building in municipalities, and improving the quality of laboratories testing stoves, heat-only boilers, and bio-based fuels.

Source: World Bank, "Sector Study on Biomass-based heating in the Western Balkans" (World Bank, forthcoming).

III.3 Regional Integration and Trade

The WB6 countries have strong economic incentives to cooperate and trade. Enhancing energy supply security and reliability by exploiting diversity in energy resource endowments across WB6 countries is a major driver of regional integration. As discussed earlier, indigenous energy resources (primarily lignite and hydropower) are geographically spread across the region. Economic forces can therefore drive cooperation where fuel costs for generating power are lower (or resource availability is higher) in one country than in an adjoining one. Furthermore, an integrated energy market would lower the system capital costs by lowering reserve margins for a given level of system reliability. All WB6 countries have significant potential to attract investments in regionally optimal energy projects which would help drive down the long-run marginal cost of energy supply across the region. In particular, scaling up investments

in renewable energy, including hydropower, would significantly support regional economic integration – which helps reduce market risks and, therefore, enables cheaper financing.

All WB6 countries made significant progress in harmonizing their legal and regulatory environment with the EU Internal Energy Market following the signing and ratification of the Energy Community Treaty in 2006 and establishment of the regional Energy Community (EnC). In the electricity sector specifically, it consists namely in unbundling of the transmission and distribution network operators, third party access, eligibility of consumers to choose their supplier, market opening and progressive price deregulation, implementation of balancing rules, and consumer protection. Under this strong framework, the WB6 countries have made significant progress over the past decade towards putting in place a competitive and integrated electricity market. According the EC's latest implementation report,[36] the rate of transposition with the EU's Third Energy Package is high across all WB6 countries (ranging between 80 and 100 percent), although significant work is still needed – particularly in Bosnia and Herzegovina and FYR Macedonia.

These results contrast, however, with the low scores (30-60 percent for all WB6 countries) in terms of the implementation and enforcement of the provisions set forth in the legislative and regulatory framework as well as with the capacity of institutions for managing the transition. Implementation challenges in regional markets have in fact been faced by many regional integration initiatives, including the EU. As in many other regional initiatives, the pace of implementation in the Western Balkans will be limited by the diversity of national markets and their ability to address key challenges in their domestic markets, including market structures that may not be suitable for competition (e.g. high vertical and horizontal concentration by state-owned enterprises), limited access to guaranteed primary energy supplies, lack of adequacy of the domestic and interconnection infrastructure, differences in investment strategies/priorities, and below-cost pricing policies. In addition to these limitations, political tensions in bilateral relations which have emerged in the past have also limited to some extent progress in advancing at the desired speed in regional energy cooperation.

There is a renewed impetus to accelerate the integration process following the Berlin process. In 2014, WB6 countries, represented by heads of state, and the European Commission signed the WB6 Initiative (Berlin process). The initiative sets out concrete steps for developing the regional electricity market by facilitating investments and market development. High-priority regional infrastructure projects are identified ("Projects of Energy Community Interest") to receive investment support (grant and loans) from the EC and from IFIs such as KfW and EBRD. At the same time, the WB6 countries commit to implementing a series of "soft" measures – that is, preconditions of a regional electricity market: (i) establishing power exchanges, (ii) establishing a regional balancing market, and (iii) making use of the Coordinated Auction Office in Southeast Europe for regional allocation of interconnection capacity (see figure 3.19).

[36] Energy Community Secretariat, *Annual Implementation Report* (2017).

Figure 3.19. Overview of measures under the WB6 Electricity Initiative

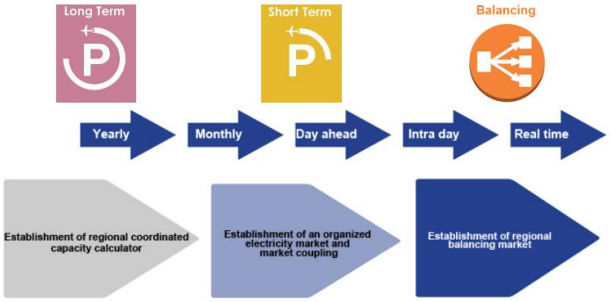
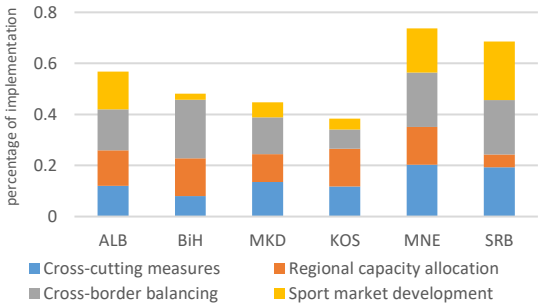


Figure 3.20: Implementation status of 'soft' measures under the WB6 Electricity Initiative



Source: Energy Community Secretariat, *WB6 Electricity Monitoring Report* (March 2018).

Upgrading the transmission infrastructure will be critical to support increased trade market integration. Ongoing analysis by the European Network of Transmission System Operators for Electricity[37] (ENTSO-E) for the elaboration of the 10-year network development plan (TYNDP) for the Continental South East (CSE) region for 2017, identified the increase of transfer capacities (both cross-border and internal) as one of the pre-requisites for market integration. The study points out to fact that the grid in the CSE region is rather sparse compared to the grid in continental Europe. Load flow calculations for 2030 showed that the network in CSE would be heavily loaded, even in base case, with overloads occurring 27% of the time. In order to address this issue, a series of projects are being analyzed to strengthen the East to West and North to South corridors. Increase of transfer capacity through the boundary at the West borders of Bulgaria and Romania and the North borders of Greece, will allow the increase of exports to West Europe and, through the Balkan, to Italy both from thermal low-cost generation in Bulgaria and Romania and from RES installed in Bulgaria, Romania and Greece.

One of the areas that has received most attention is the set-up of power exchanges across WB6 countries, but a clear vision on market coupling is needed. Serbia was the first country to set up a power exchange (SEEPEX) and the Day-Ahead Market (DAM) was launched early 2016 (see figure 3.20). Montenegro, FYR Macedonia, Bosnia and Herzegovina, and Albania have all announced their intentions to set up power exchanges and they are at different stages of development. Only Kosovo is working with Albania on a framework for integration including a single power exchange serving the two markets. The establishment of organized power markets is an important step in transitioning to a competitive wholesale market from the current situation, which is characterized by bilateral deals with no reliable price signals. However, given the small size of domestic markets and the large concentration by incumbents in the supply and generation segments[38] in all countries, it is critical that a vision and concrete activities towards market coupling of DAMs between WB6 countries and with EU markets are pursued in parallel. Only through market coupling would countries be able to integrate regionally and create a credible reference price for efficient contracting. To do so, it is imperative that the different power exchange projects do not choose incompatible solutions that would pose a barrier to market integration in the medium-to-long term.

[37] https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/4708404/50F6702D4CC37453E053C92FA8C0B306.pdf

[38] According to data from Eurostat, in 2015, the market share of the largest generator in the electricity market (as a percentage of total generation) is 99.2 percent in Serbia, 98.6 percent in Montenegro, 90.2 in FYR Macedonia, and 48 percent in Bosnia.

In addition, continued efforts are needed to develop and implement market-based balancing mechanisms and support and consolidate the use of regional mechanisms for capacity allocation. Market-based balancing models have been introduced in most countries (with the exception of Kosovo and FYR Macedonia), although the incumbent suppliers are still the major/only providers of balancing services in their domestic markets. In terms of regional mechanisms for capacity allocation, the creation in 2014 of the South-East Europe Coordinated Auction Office (SEE CAO) to harmonize congestion management and optimize cross border capacity allocation is a great example of regional coordination between transmission system operators (TSOs). By March 2018, all countries in the region, with the exception of Serbia, auction cross-border capacities through the SEE CAO. Serbia auctions transmission capacities through the Joint Allocation Office only on the border with Croatia.

Strong progress in regional integration has created irreversibility of reform: the WB6 countries now need to address difficult challenges in their domestic markets to realize the benefits of increased security, reliability and lower costs. Appetite for reform in the domestic electricity markets of the WB6 countries has been relatively limited, especially over the past few years as policy makers have continued to rely on and believe in a market structure dominated by the incumbent electricity companies, often state-owned; this market structure has allowed them to keep regulated prices low and has been used a tool for the implementation of broader economic and sector policies (e.g. provide employment, support for industry through special tariffs/tolerance of nonpayment, and development of indigenous resources such as lignite). However, competitive pressures from the ongoing deregulation of domestic wholesale markets and from the creation of organized power markets, together with the need to update infrastructure, mean that the *status quo* is no longer an option.

State-owned utilities will find it difficult to finance increasingly large investment programs while remaining competitive in the free market (locally and regionally) and subsidizing a large share of their domestic markets (e.g. residential consumers). Government decisions to address these long-standing challenges are key if the WB6 countries are to realize the benefits of market integration (see the following section IV for an in-depth discussion of these issues).

IV. The Potential Demand Response

Energy efficiency (EE) is increasingly seen as a key pillar in national energy strategies, helping to enhance energy security, contribute to economic growth, and ensure environmental sustainability. This is for several reasons. EE can reduce the region's heavy reliance on expensive imports estimated roughly at over €3 billion,[39] provide long-term economic growth benefits,[40] and reduce the climate impact. EE can also bring about important social benefits, helping to improve local air quality (mitigating related adverse health impacts) and improve indoor comfort levels through improved heating. In fact, in many WB6 cities, the overwhelming source of emissions of particulate matter is from residential heating, due to the inefficient use of coal and firewood as discussed earlier. Finally, EE is seen as a critical tool in reducing energy expenditure for the poor, thus helping to mitigate the effects of necessary and planned tariff reforms. A 2013 World Bank report argues that energy subsidies can be eliminated without hurting the poor through consolidated social assistance reforms and EE measures.[41]

[39] Singh, Jas, Dilip Limaye, and Kathrin Hofer (2013), *Scaling Up Energy Efficiency in Buildings in the Western Balkans* (World Bank).

[40] Ashigh Rajbhandari and Fan Zhang (forthcoming), "Does Energy Efficiency Promote Economic Growth: Evidence from multi-country and multi-sectoral panel dataset".

[41] Larderchi et al. (2013), *Balancing Act: Cutting Energy Subsidies while Protecting Affordability* (World Bank).

While important progress has been achieved in improving efficiency in energy use over the past two decades (as demonstrated by the steady decrease in energy intensity), the WB6 countries now face the challenge of tapping into the savings potential of market segments that are more difficult to reach, such as buildings. They will have to shift from broad policies and small-scale programs to scaled-up financing and implementation. There is therefore an urgent need to develop viable financing models in all sectors – as well as suitable delivery mechanisms, information systems, and necessary secondary legislation.

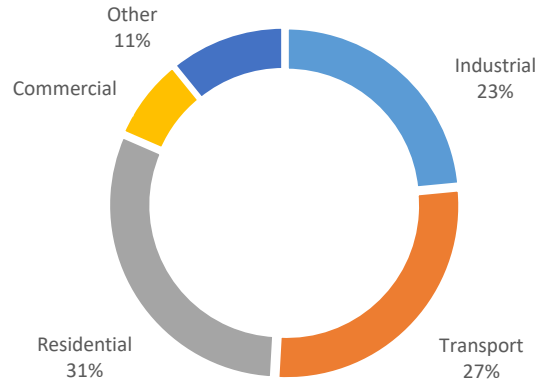
Targeted action by governments to design and roll out these delivery mechanisms at the national level and to make financing accessible is therefore critical to develop large-scale markets and catalyze increased levels of private sector participation and commercial financing.

The potential for more-efficient energy use

The EE savings potential is significant and varies significantly by end-use sector. The residential and transport sectors represent the largest components of TFEC, accounting for 50 to 70% of the total. Industry is also a significant consumer in Serbia, Montenegro and FYR Macedonia (see figure 4.1). Various IEA and World Bank estimates point to potential savings in the WB6 of up to 10% in the transport sector, 10-35% for households, 35-40% in the public sector, 10-30% in services and 5-25% in industry and commerce.

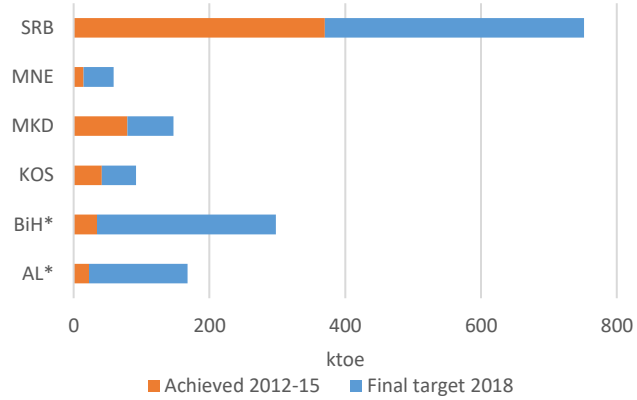
Significant energy savings potential exists in the existing buildings stock. Currently, buildings consume about half of the energy in the Western Balkans. Estimated energy savings in buildings range between 20 percent and 40 percent, with the highest potential expected in the public sector (35–40 percent), followed by the residential sector (10–35 percent). Although some efficiency gains are expected to be offset by increased demand given under-heating and relatively low penetration rates of appliances in some households, expected energy cost savings are significant. In monetary terms, public buildings and households alone could yield savings valued at €805 million by 2020 according to the Energy Community.

Figure 4.1. Final Energy Consumption by End-user sector, 2014



Source: Source: International Energy Agency, World Energy Balances, 2016

Figure 4.2: Progress with implementation of NEEAPs by country, 2015



Source: National Energy Efficiency Action Plans and progress reports. * Information on energy savings achieved until 2012.

Due to its cross-sectoral linkages with urban planning, transport, and buildings, energy efficiency is an important consideration for cities. Based on a multi-sector assessment of urban energy use and expenditures, energy savings potential is estimated to be significant in major WB6 cities (Box 10).

Box 10. Energy Savings Potential in Western Balkan Cities

Energy savings potential at the municipal level is significant. Many cities in this region are currently at a turning point in their development as potentially energy intensive infrastructure and urban design becomes hard-wired into the city fabric – thus, for example, the growing popularity of private vehicles and corresponding low-density development.

Using ESMAP's TRACE (Tool for Rapid Assessment of City Energy), energy use and savings potential were investigated in five major cities of the region (Banja Luka, Belgrade, Pristina, Sarajevo and Skopje) which spend about US$500 million on energy.* The energy savings potential for public services ranges from 26 percent in public transportation to 45 percent in potable water services, with street lighting, district heating, municipal buildings and solid waste disposal each ranging from 33 to 37 percent. Realizing these savings would significantly reduce public expenditures by an estimated US$154 million, and enable cities to spend funds productively in priority areas.

Source: World Bank Energy Sector Management Assistance Program (ESMAP) via projections from the Tool for Rapid Assessment of City Energy (TRACE), 2013. See www.esmap.org/TRACE
*This is an adjusted figure that does not take into account private transportation consumption and expenses.

Targets and policies

As signatories to the Energy Community Treaty, the WB6 countries have committed to energy saving targets of at least 9 percent between 2010 and 2018 (compared to a baseline of average consumption during the five latest available years). They have to prepare and adopt National Energy Efficiency Action Plans (NEEAPs) every three years detailing the actions they will take to achieve interim savings targets and report on results achieved during the previous period. The overall national savings targets, totaling 1,516 Ktoe by 2018, are ambitious and heterogeneous across countries. In Albania, the highest savings targets are expected in the transport sector (31 percent), in Bosnia and Herzegovina and Kosovo in the residential sector (45 percent and 40 percent, respectively) and in FYR Macedonia and Serbia in the industrial sector (45 percent). Progress within the implementation of the first (2010-2012) and second (2012-2015) NEEAPs has been mixed (see figure 4.2). Most of the countries have met at least one of their interim targets. However, given that the targets set in the first period were lower, they will have to redouble their efforts to achieve their final targets by 2018.

The WB6 countries have taken important steps to strengthen their EE legislative and regulatory frameworks, namely by transposing the relevant EU directives, passing important secondary legislation, and adopting NEEAPs. All countries, with the exception of the Federation of Bosnia and Herzegovina, have adopted Energy Efficiency Laws and secondary legislation. Transposition and implementation of the EU's Energy Performance of Buildings Directive (EPBD) has lagged behind the implementation of the Energy Labelling Directive (ELD) and Energy Service Directive (ESD[42]), as can be seen in figure 4.2. Only Montenegro and Serbia have advanced in the transposition of this directive, although monitoring is frequently quite limited. NEEAPs have proven to be a useful tool for laying out EE policy measures and specific actions to achieve countries' savings commitments, although progress reports could benefit from presenting an analysis of why certain targets were not met, deficiencies in specific programs, status of enforcement, and institutional weaknesses. As of January 2017, adoption of the 3rd NEEAPs has been achieved in Serbia and Montenegro, while FYR Macedonia and Kosovo have presented drafts to the Energy Community and Albania and Bosnia and Herzegovina do not have drafts yet.

[42] The Energy Efficiency (EED-2012/27/EU) supersedes the Energy Services Directive (ESD-2006/32/EC) from 2017.

Figure 4.3: Progress with EED, EPBD and ELD transposition as of April 2016

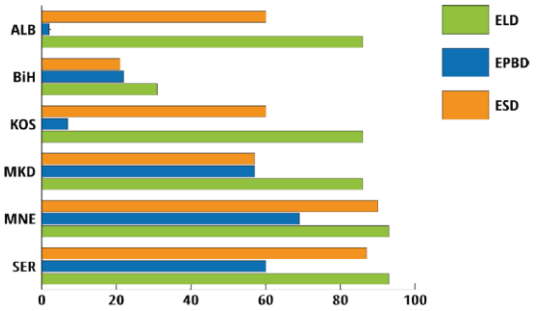
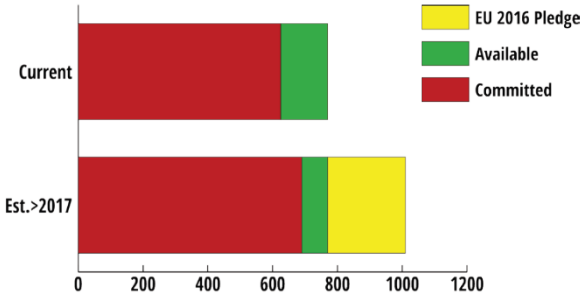


Figure 4.4: Available facilities for EE financing as of April 2016



Source: Financing Energy Efficiency Investments in the Western Balkans, EU 2016

Available financing to implement the measures envisioned in the NEEAPs may not be the binding constraint on EE investments. In addition to an adequate legal and regulatory framework, the necessary efficiency investment must be financed for the savings potential to be harvested. A recent study by the EU[43] estimated that active EE facilities focusing on EE in the region supported by donors and/or IFIs are in excess of €750 million in 2016 (see figure 4.4). These facilities rely on local financial intermediaries to identify and implement projects with approximately 45 commercial banks or financial institutions offering financial products targeted at corporations, SMEs, households and, less rarely, the public sector. These findings are consistent with an earlier report that estimated available financing for EE at €1.5 billion in 2013.[44] However, these EE facilities have been used at a slow pace: approximately €145 million was left available in 2016 for new projects. This evidence suggests that available EE financing is significant and diversified but may not always be accessible to beneficiaries on affordable terms, due to issues of creditworthiness, short loan tenors, and restrictions on public borrowing (see discussion below). It also suggests that there are other binding constraints and barriers to tapping into the EE potential in the region such as low energy prices and underdeveloped energy efficiency market.

Barriers to EE investments

A common finding is weak EE governance to support implementation of EE strategies, policies and programs – specifically, inadequate institutional arrangements, low capacity and under resourced agencies responsible for EE implementation, lack of accountability, and lack of coordination mechanisms. To be effective, the government agencies responsible for EE must have the authority and capability to carry out many functions (such as policy analysis, program design and administration, project management, marketing, results monitoring and program evaluation) while collaborating with many public and private agencies and other stakeholders. EE institutions in WB6 countries generally encompass few of these features, making them a weak link in EE implementation. In four of the six countries – Albania, Bosnia and Herzegovina (at both national and entity levels), Montenegro and Serbia – the ministry responsible for energy is also responsible for EE in terms of both policy development and implementation. Only Kosovo and FYR Macedonia have dedicated EE or energy agencies. These implementing ministries and agencies have very limited staff and expertise, and their budget provisions are not adequate to carry out the many functions assigned.

Because EE is an area that cuts across many different parts of government, another notable gap is the lack of coordination between different parts of government (e.g., energy, finance, economics,

[43] EU, *Financing Energy Efficiency Investments in the Western Balkans* (2016).

[44] WBIF, *Financing Energy Efficiency in the Western Balkans* (Brussels: WBIF IFI Coordination Office, May 2013 update).

environment and climate change, industry, health, education, transport, planning and construction) in the implementation of policies and programs. Similarly, both national and local government entities need to coordinate to achieve overall progress. Typically, the national institutions take the lead, providing guidelines, assigning tasks, approving plans and offering funding and technical assistance. In the past, some donors have funded such activities – in Kosovo[45] and Montenegro, for example – but these efforts need to be fully introduced, scaled-up and sustained.

Other binding constraints to EE implementation exist. Given the specificities of different EE market segments, the following discussion focuses on key barriers to and options for putting in place sustainable delivery mechanisms to scale up EE in buildings and industry.

IV.1 Buildings

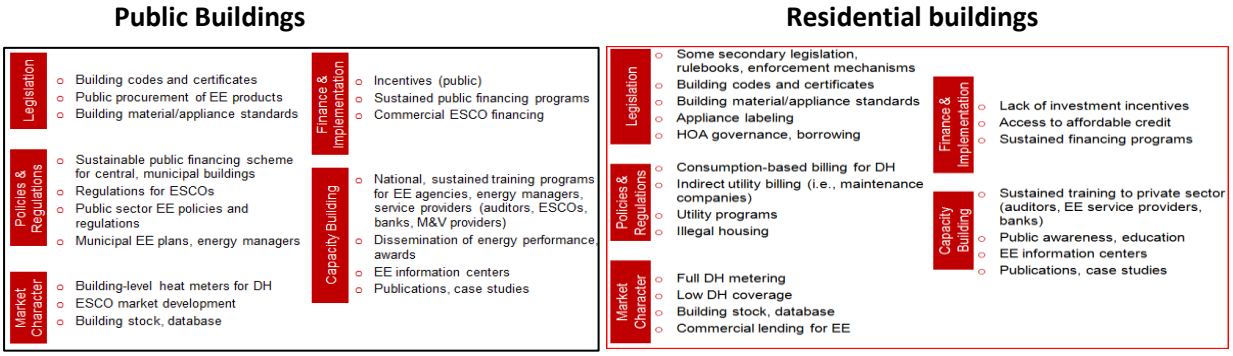
The energy retrofit of buildings is the unexploited "golden goose" of energy savings potential. Buildings in the WB6 countries are responsible for a major part of final energy consumption, ranging from 30 percent in Bosnia and Herzegovina to almost 50 percent in FYR Macedonia. Most of the region's building stock was constructed between 1950 and 1990, before advanced EE building standards were in force. Despite low per-capita energy consumption, average energy use per square meter varies across the WB6 countries, ranging from 100 KWh/m^2 in Montenegro to above 200 KWh/m^2 in Bosnia and Herzegovina. All countries, with the exception of Montenegro, approach or even surpass EU levels (at about 150 KWh/m^2).

The World Bank has developed an assessment framework based on the five major "building blocks," deemed necessary for the development of an efficient building stock: (i) legislation, (ii) policies and regulations, (iii) market characteristics, (iv) financing and implementation, and (v) capacity building and awareness. The major regional gaps, as of 2012, are summarized in figure 4.5. Progress in implementing the various measures within the five building blocks was quite mixed and, despite recent progress, some of the key barriers remain.

Specifically, legislation and regulations concerning homeowners' associations (HOAs) and housing management companies need to be reviewed to ensure the HOAs can implement EE modernization measures in multi-apartment buildings on behalf of individual owners. Energy pricing reforms are essential, but will take time, especially for the district heating sector, and they will have to be balanced with an improved social safety net and targeted heating subsidies for low-income families. Regulations and policies that support EE in the public sector, such as energy performance contracting (EPC), are slow in coming, and no country has yet embarked on a utility EE program. Capacity building programs for energy auditors and managers and other actors as well as awareness raising programs have progressed more, but need to be broadened and carried out in a sustained manner. Finally, despite increase in the availability of financing for EE investments, most energy users in the buildings sector still find them hard to access – due largely to the users' lack of creditworthiness, borrowing restrictions, and perception of high risk and unfamiliarity with EE lending on the part of financial institutions.

[45] Task Force on European Integration Kosovo (2012).

Figure 4.5: Major regional gaps in the public and residential sectors



Source: World Bank 2013.

Most of the experience with building energy retrofits has been limited to donor-led projects in the public sector with limited scale (e.g., Serbia, Montenegro, FYR Macedonia). These projects have demonstrated energy/cost savings of 30-45 percent per building, with simple payback periods of 6-8 years, in addition to substantial co-benefits.[46] These and other projects have suffered from several limitations – mainly (i) limited replication of pilot and demonstration programs and lack of sustainability of project implementation models and (ii) lack of private sector involvement in mobilizing financing and assuming technical (or performance) risks. Some credit lines have also been initiated for residential sector EE (e.g., Serbia, Kosovo) with some success among wealthier households.

To avoid the limited impact of previous efforts and address the key gaps identified earlier, efforts should focus on fostering and accelerating the scalable implementation of building renovation programs. The following principles should guide future programs:

- *Sustainability.* Require all public funds to revolve, which will allow programs to sustain themselves across individual project periods and expand as the market develops.
- *Targeting.* Prioritize public funds to make EE measures accessible to unserved markets, such as less-creditworthy public entities or low-income residential owners (this can be achieved through a variety of strategies, including higher subsidy levels for poorer households/municipalities and pooling of donor funds).
- *National Programs*. Implement program at a national scale that would allow to increase pace of retrofits, benefit from economies of scale, and help create markets for energy efficiency goods and services.

Based on these considerations, the financing options that appear most viable in the Western Balkan countries in the near team are presented below (table 4.1 provides brief descriptions of these options):

For the public sector	***For the residential sector***
EE revolving funds	EE revolving funds
Public ESCOs	Commercial bank financing with subsidies

Revolving Energy Efficiency Funds are already gaining traction in the region. Kosovo is planning to soon establish an Energy Efficiency Revolving Fund (EERF) to initially serve the public sector with support from the World Bank (EUR 5.3 million IDA credit) and European Commission (EUR 10 million EU-IPA

[46] Co-benefits included improved comfort, better health (fewer sick days), increased public/student awareness about EE, and urban renewal.

grant/equity). The legislation is being developed along with the proposed operational modalities of the Fund, which will be submitted to Parliament in mid-2018. It is hoped the Fund can be established and begin operations in 2019. FYR Macedonia has also agreed to set-up an EERF in 2014 (about EUR 20 million IBRD loan, about EUR 5 to 10 million EU-IPA grant/equity) but this has been on hold for the past four years due to a lack of consensus on the legal set-up of the Fund, with MOF preferring the development bank (MBDP) to manage the Fund and MOE preferring to establish a new entity. It is hoped preparatory work can resume in 2018 and the Fund can be operational in 2019. Bosnia and Herzegovina has two operational Funds providing financing for energy efficiency in public buildings and it is currently working on further developing scalable financing mechanisms, including a putting in place revolving mechanisms.

Table 4.1: The most viable financing options for public and residential sectors EE projects

Option	Description	Market conditions	Examples	Pros	Cons
EE Revolving Fund (Public and Residential)	Independent entity providing financing for EE (e.g., loans, energy service agreements,* guarantees): may or may not require full repayments from borrowers, but revolves by offering concessional loans or incentives and recovering funds from various revenue sources	- Local commercial banks unable/unwilling to enter EE market	Slovenia, Armenia, Bulgaria, Croatia, Greece, Slovenia	- Can be sustainable; mandated to promote EE; - Can develop specialized products; - Can serve both creditworthy and non-creditworthy municipalities/ homeowners as well as those unable to borrow or put up collateral	- May distort market - Could create monopoly - May not operate efficiently - Can be captured by political interests
Public ESCO	Publicly-owned company provides financing with at least part of repayments based on energy cost savings	- Underdeveloped public/ municipal credit market - No local, active, capable ESCOs - Rigid public procurement rules make ESCO hiring difficult - Credible public entity exists with demonstrated capacity to subcontract/manage projects	Armenia China Croatia Poland Ukraine Uruguay USA	- Builds ESCO market capacity through subcontracting - Helps address public procurement and financing issues - Centralized implementation and procurement can lower costs - Greater potential for bundling of projects and development of simple ESCOs models	- Public ESCO can be monopolistic and may be subject to public sector bureaucracies (procurement, staffing, budgeting) - Appropriate exit strategy may be needed if private ESCOs enter the market - Public ESCO requires access to long-term financing
Commercial Bank Financing with Subsidies (residential)	Commercial banks provide loans for EE; often in the form of credit lines; frequently with grant component or incentive payment	- Developed financial market, but not yet familiar with EE lending - Creditworthy customers	Austria, Belgium, Bulgaria, Czech Republic, Germany, Lithuania, Netherlands, Poland, Romania, Spain, UK	- Can be sustainable; allows for competition of financing and builds off existing credit system - Incentives can be graduated to provide incentives to implement better energy performance measures	- Only serves creditworthy customers - may involve high interest rates; - Banks may lack incentive to market aggressively

* Energy Service Agreement (ESA): Under an ESA, the client is offered a full package of services to identify, finance, implement and monitor EE projects. The client is usually required to pay all or a portion of their baseline energy bill to cover the investment cost and associated fees until the contract end period. In some cases, the contract duration is fixed; in other cases, the contract can be terminated after an agreed level of payment has been made which can offer more incentive for the client to save more energy.
Source: Based on Singh et al. 2013.

IV.2 Industry

The region's principal energy-consuming industries are steel, petrochemicals, and mining- and resource-based industries. The latter play a big role in Kosovo, FYR Macedonia, and Montenegro, whereas the industrial base in Serbia is somewhat more diversified. Industrial output experienced a dramatic decline in the 1990s as many production facilities, which were designed to serve a larger internal market, started and continue to work at a fraction of their full capacity. Numerous larger companies are still state-owned and have not been restructured or able to modernize their production processes. Data on energy intensity of the industrial sector in WB6 countries is scarce; however, it is believed to be high compared to other European countries. Montenegro stands out with especially high energy intensity due to the importance of aluminum production, which is responsible for 40 percent of final energy consumption.

Improved efficiency in industry is critical to improving its competitiveness. For the manufacturing sectors, is estimated that between 5 and 30 percent of energy consumption could be saved if they implemented EE measures, thereby directly improving their competitiveness. Most governments place great importance on the industrial sector in achieving the minimum 9 percent energy-saving targets for 2018 set out in their NEEAPs. Relatively few measures have been proposed, however, and governments seem to rely on market forces and the profit motive to induce companies to become more energy efficient.

To better understand the constraints on implementing EE in industries, a gap analysis (similar to that presented for the buildings sector) was undertaken. The list in Table 4.1 shows that so far only a few measures have been implemented to help companies achieve substantial energy savings. The analysis shows that one of the key barriers is the lack of information on actual energy use of different processes and types of retrofit projects and new technologies, as well as their savings and cost reduction potentials. This is closely linked to the lack of adequate capacity and expertise in the industrial EE field. Mandatory employment of energy managers and regular completion of energy audits is required in large industrial companies in the case of Serbia. However, in most countries, the development of energy auditing and management capacities is introduced first for the buildings sector. This is true also for appliance/equipment labeling and standards. Lighting and motor standards are fairly common but have not yet been adopted.

Table 4.1: Major regional gaps in the industrial sector

Legislation	- Industrial Products standards and labeling - Some secondary legislation, rulebooks, enforcement mechanisms	Policies/ Regulation	- Voluntary agreements with large companies - High-efficiency cogeneration scheme - DSM scheme/EE obligations/EU-ETS	Capacity Building/Information	- Sustained training and certification programs for energy auditors and managers - Industrial EE networking and/or information centers - Publications, case studies - Audit templates - Energy and cost savings calculators for EE products and equipment - Energy management systems - Benchmarking
Market character	- Industrial energy use and EE technology databases - ESCO market development	Finance/ Implementation	- Financial Incentives - Utility programs - Equipment leasing - Financing of technical product lines - Specialty ESCOs (e.g., cogeneration)		

Source: World Bank staff.

Financial incentives typically used to incentivize EE measures in industry – such as tax credits, accelerated depreciation or enhanced capital allowance schemes – are also not used. In contrast to the buildings sector, energy pricing in the industrial sector does not seem to be a major barrier as most industries are in the free market and pay market prices in the case of electricity, in line with the liberalization of energy

markets. The notable exceptions are some energy-intensive SOEs still benefiting from preferential tariffs (Kosovo and Montenegro). Other forms of subsidies, such as tolerance of nonpayment (in Serbia for instance), also hinder incentives to implement EE measures.

Addressing these gaps requires a mix of policy and program instruments. In the following, key actions are proposed to support the industrial sector in scaling up EE efforts. These recommendations are based on regional characteristics; some countries may be further ahead of others and already making progress on several actions listed below. Some of these measures are relatively easy to implement, such as information programs. But they require public funding, just like the other measures, and institutions to organize and develop them:

- **Information about the sector, saving opportunities, and technologies.** Surveys and energy audits could be complemented with benchmarking programs, to enable enterprises to compare their performance with that of other sector enterprises, encouraging them to identify and implement measures to reduce their inefficiencies. Information programs and databases could be organized through chambers of commerce or through similar organizations such as energy information centers.
- **Mandatory energy audits and training for energy managers**. The results of such audits should be analyzed and fed into a knowledge base that is combined with survey results and EE project information. To reach smaller companies, a cluster approach or peer networks could be used to reduce costs and share best practices.
- **Labeling and minimum energy-performance standards for industrial equipment, in particular motors**. Electric motor systems account for about 60 percent of industrial electricity consumption and about 15 percent of final energy use in industry worldwide. Labeling promotes the use of efficient motors by providing information about motor efficiency.
- **Incentives such as accelerated depreciation, tax credits/rebates, and VAT reduction should be devised for companies that invest in EE measures**. None of the six WB6 countries has yet introduced any fiscal incentives, whereas they are fairly common in EU countries.
- **Industrial sector EE investments should in general be financed through commercial means.** Since commercial financing of EE investments is still not mainstreamed for SMEs, it would be beneficial if IFIs and donors would continue to provide credit lines but gradually phase out subsidies.