CEE Bankwatch Network

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Western Balkans power sector future scenarios and the EBRD

This paper analyses Annex F of the EBRD's new draft Energy Strategy - a case study on electricity generation in the Western Balkans. The EBRD's new draft Energy Strategy contains a case study on electricity generation in the Western Balkans. The region is indeed worthy of greater scrutiny in the transition to sustainable energy as it has a population of no more than 18.3 million,[1] and all of the countries individually have populations well below that of London,[2] so its energy needs are not large. It also has significant renewable energy potential and a large fleet of ageing coal power plants that need replacing with sustainable energy sources. All this ought to make it a promising candidate for a relatively rapid transition.

However in reality, the transition is going too slowly. According to the EBRD's draft Energy Strategy, total power generation capacity across the Western Balkans region is 17.6 GW in 2018. Lignite capacity accounts for 48 percent, followed by hydropower (46 percent), gas (4 percent) and fuel oil (2 percent). New forms of renewables are beginning to break through but have still formed a negligible percentage of the total capacity so far. The proportions of each energy source vary widely, with Albania generating 100 percent of its domestic electricity from hydropower and Kosovo generating 96 percent of its electricity from lignite.

Gas is present to a much lesser extent than in the EU. Albania, Kosovo, Montenegro and parts of Macedonia and Bosnia-Herzegovina are not supplied by international gas pipeline networks and none of the countries produce any significant amounts of gas.

At the moment Bosnia-Herzegovina is the only country which generates a surplus of electricity year after year, but it will soon have to speed up the closure of its ageing coal power plants. Serbia is self-sufficient most years. Kosovo on paper covers almost all its own electricity needs but is vulnerable because of its reliance on old coal plants, its poor distribution network and its comparatively low interconnection with countries other than Serbia. Montenegro and Albania have to import some of their electricity most years when hydropower is not at its most effective.[3]

Most of the countries have strong electricity interconnections. Nevertheless, planning takes place very much on the level of individual states rather than regionally, and in Bosnia-Herzegovina even on the Entity level, resulting in each country planning more generation infrastructure than may really be needed or is affordable.

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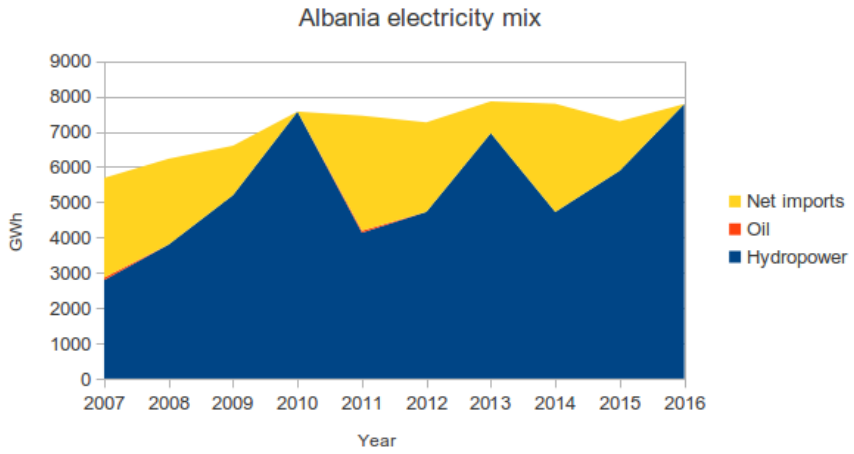
1 Albania: 2.9 million; BIH: 3.8 million; Kosovo: 1.8 million; Macedonia: 2.1; Montenegro: 0.6 million; Serbia: 7.1 million. Source: International Energy Agency: http://www.iea.org/statistics/statisticssearch/

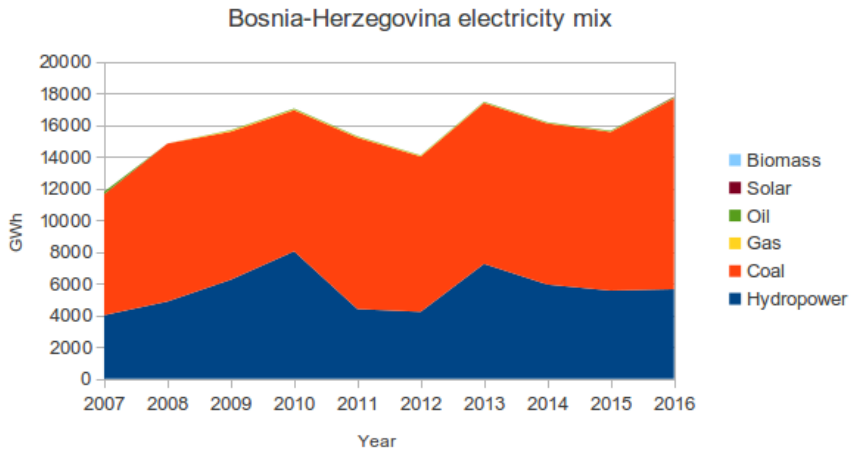
2 Mid-2016 population according to the UK Office of National Statistics: 8.78 million https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

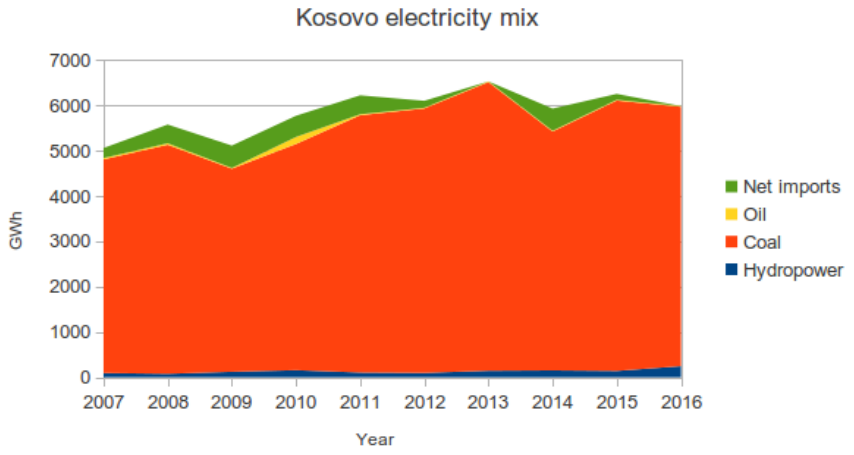
3 For import/export statistics see https://www.iea.org/classicstats/statisticssearch/ and https://www.entsoe.eu/

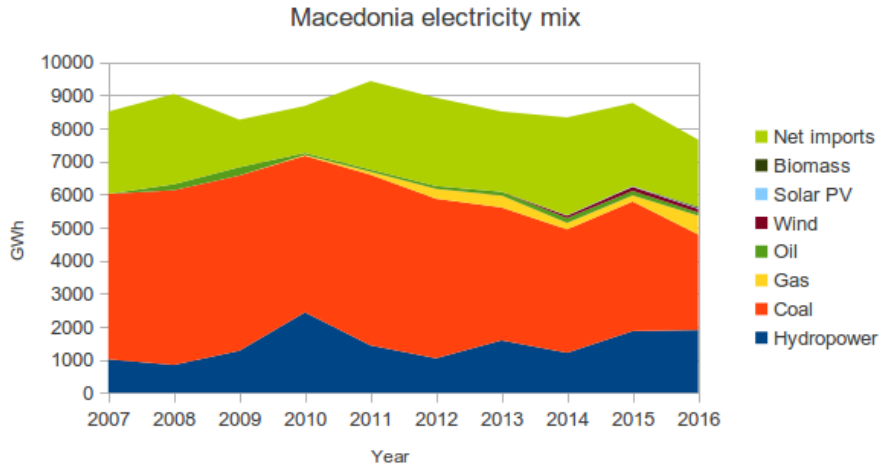
Future plans

An ideal of continued industrialisation and ever-growing energy consumption persists in the region. However in reality, electricity consumption has stabilised regionwide and even decreased in some of the countries since around 2010-2011.








Macedonia electricity mix
GWh
10000
9000
8000
7000
6000
5000
4000
3000
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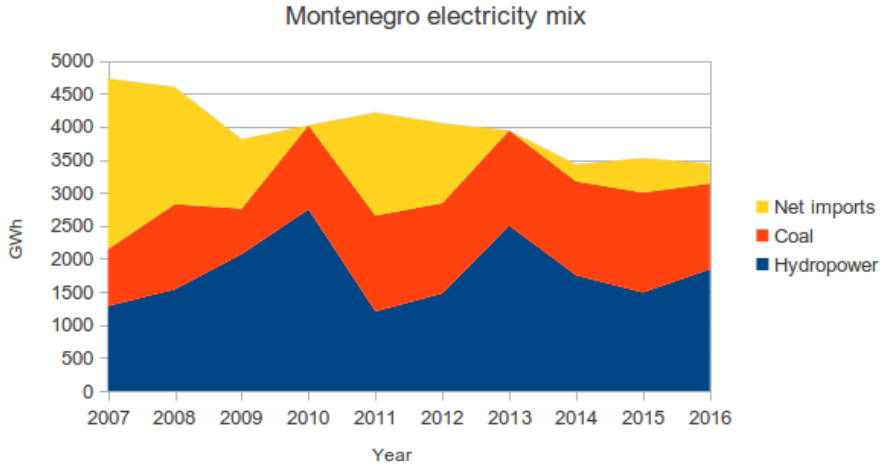
1000
0
2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Year
Net imports
Biomass
Solar PV
Wind
Oil
Gas
Coal
Hydropower


Montenegro electricity mix
GWh
5000
4500
4000
3500
3000
2500
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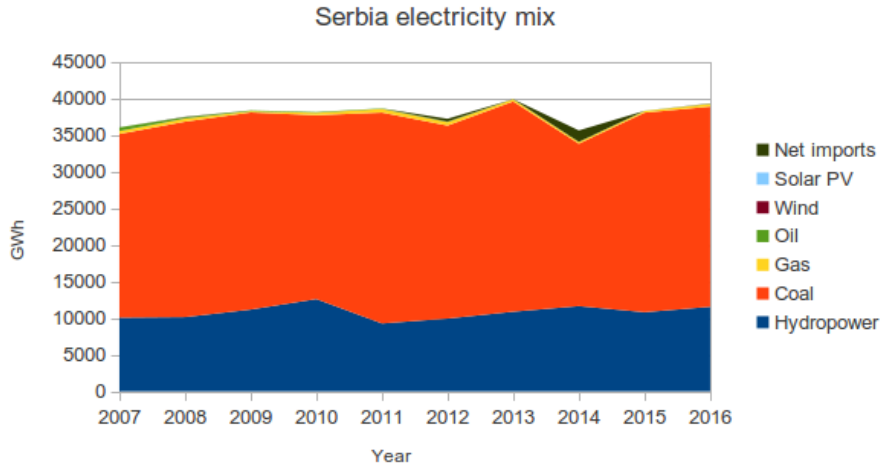
2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Year
Net imports
Coal
Hydropower


Serbia electricity mix
GWh
45000
40000
35000
30000
25000
20000
15000
10000
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2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Year
Net imports
Solar PV
Wind
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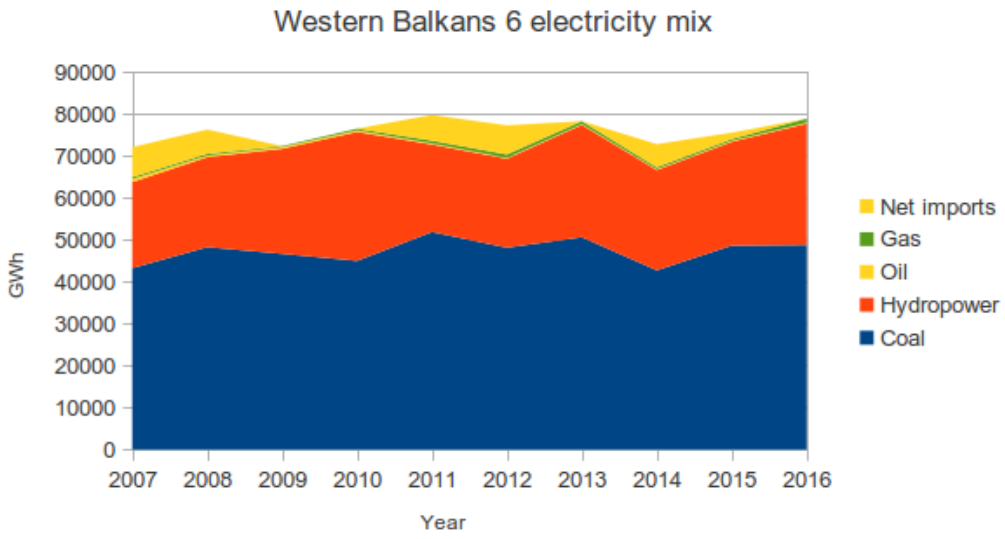
Hydropower



Source: IEA Electricity and Heat indicators

The exact reasons for this vary but are likely to be a combination of de-industrialisation (eg. reduction in operation of Podgorica Aluminium Plant (KAP)), reduction in energy wastage, and perhaps also outward migration. This has not been acknowledged or analysed in state energy strategies and official projections always expect that demand will grow continually.

The EBRD's draft Strategy suggests that current official plans foresee peak demand to grow from 10.8 GW to 15.3 GW by 2040. These plans, according to the Strategy, would result in:

- Existing lignite plants being replaced and keeping the lignite capacity at around 8.5 GW until 2040.
- An additional 3.8 GW of run-of-river[4] hydropower plants being built, bringing the total up to 12 GW in 2040.[5]
- Non-hydropower renewables to reach 2.1 GW in 2040, mostly wind.
- Gas to be at 1.7 GW in 2040.

This is rather confusing as peak demand for the region in 2017 was 13.2 GW according to ENTSO-E, so the baseline cited here seems to need updating.[6]

EBRD alternative options for power sector development

The EBRD's draft Strategy explores some illustrative power sector development scenarios:

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4 It is not clear why run-of-river plants are mentioned as hardly any of the major plants planned are run-of-river plants.

5 For some reason the graphs on p. 45 say 13 GW.

6 Peak load for 2015 was nearly 12.5 GW, and for 2016 nearly 12.7 GW so 10.8 GW seems significantly out of date. Sources: https://docstore.entsoe.eu/Documents/Publications/Statistics/Factsheet/entsoe_sfs_2017.pdf https://docstore.entsoe.eu/Documents/Publications/Statistics/Factsheet/entsoe_sfs_2016_web.pdf https://docstore.entsoe.eu/Documents/Publications/Statistics/Factsheet/entsoe_sfs2015_web.pdf, for Albania 2015 and 2016: ERE annual reports for 2016 and 2015.

- Replace all new lignite plants with gas.
- Decommission all lignite and replace with gas.
- Maintain small base of lignite and focus on solar and wind.
- Current policies.

The paper states that they are not intended to reflect optimal (on the basis of least-cost dispatch) combinations of technologies to meet demand growth. Instead, they represent different technology-based scenarios that provide insight into the trade-offs associated with different development options. Very few details are provided about assumptions and sources of data. Nevertheless, several comments are necessary:

Official demand projections must be critically examined and energy savings must be given top priority

Any scenario needs to undertake an independent analysis of the factors impacting on demand decreases (eg. energy efficiency, decrease in network losses, decrease in electricity-intensive heavy industry, decrease in use of conventional electric heaters) and increases (eg. transport electrification, increased use of heat pumps). None of the official national energy scenarios in the region have done this to a sufficient extent, nor have most regional-level energy scenario exercises. Annex G in the EBRD's draft Energy Strategy looks at potential increases from electrification across its region of operations, but not at potential savings from other developments.

The Southeast Europe 2050 Calculator produced in the scope of the SEE-SEP project suggests that overall electricity demand across the Western Balkans and Croatia could be reduced significantly in the coming years with strong demand side policies:[7]

- By 2050, energy consumption of buildings sector decreases by 34% (43 TWh) compared to 2010
- All new buildings are nearly zero-energy from 2025: they are well insulated and generate power from rooftop solar panels which is fed back into the grid.
- Retrofitting of existing buildings ramps up – starting with significant improvements like wall and loft insulation and super-glazing, but reaching energy cuts of 90% or more from 2030.
- Around ¾ of the existing buildings are renovated. This requires a sharp increase in renovation rates towards 2%–2.5% as of 2020.
- Floor space per person in the region grows moderately by 2050; at the same time, comfort levels improve (85% of space area heated in 2050). People lower their thermostats – to a lower but safe level of warmth.
- Service sector floor area grows, driven by the growth in value added for services which is assumed to increase 2.3% annually.
- Heating based on heat pumps ramps up, with up to 75% of heating coming from heat
- Pumps by 2050.
- Solar thermal will cover most residential water heating requirements.

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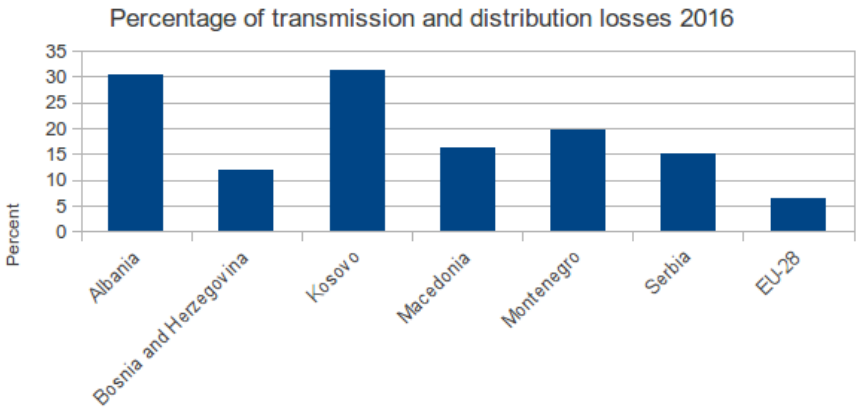
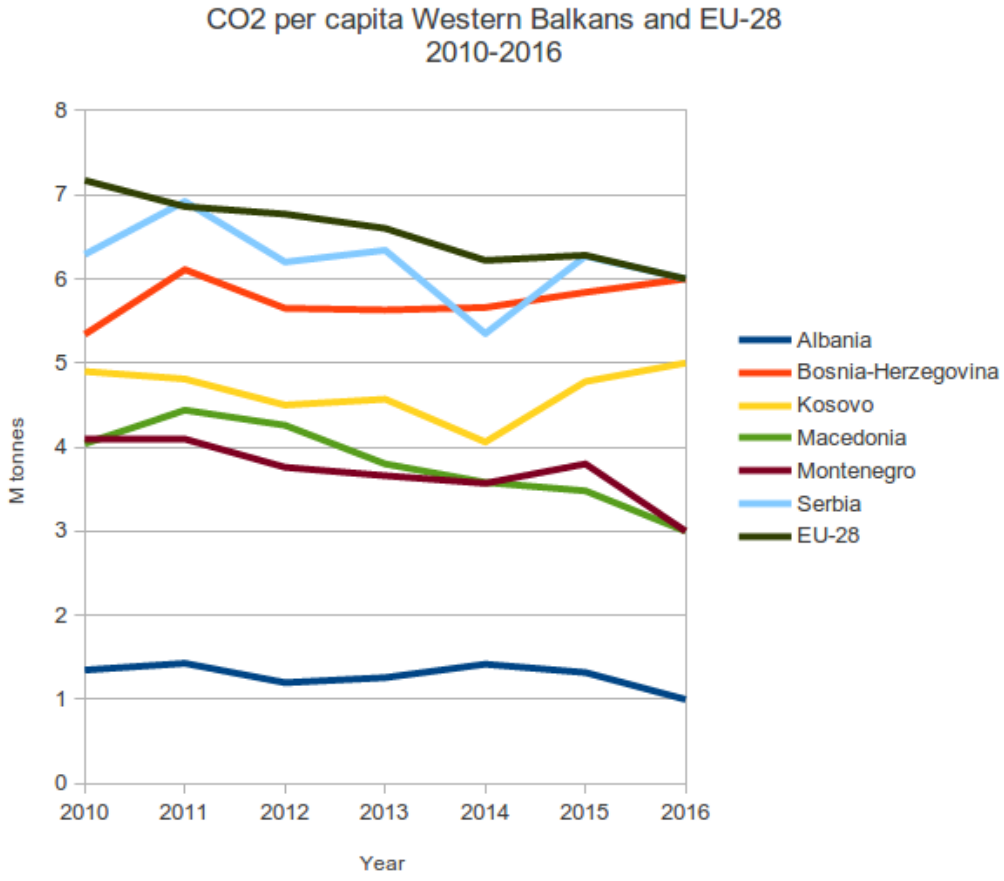
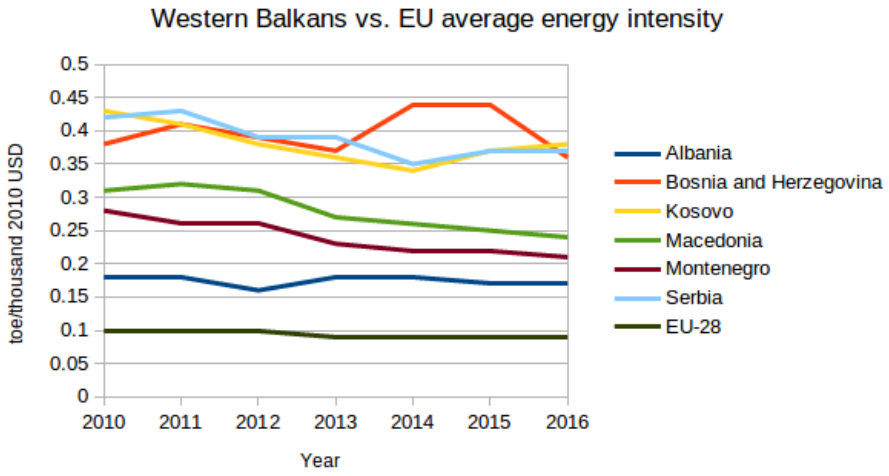
7 Southeast Europe Carbon Calculator, EU Road Scenario: https://see2050carboncalculator.net/2050/see/Electricity.php?code=20303030303030303033333333333333202030203010303020102030303030104040301515 20&select=2

- The number of buildings that effectively use air conditioners will be the same or lower than in 2010 as a result of heat pump penetration, which can also be used as cooling devices, as well as passive design measures.

CO_2 emissions per capita in the Western Balkans are lower than the EU average except in Serbia, but energy intensity and transmission and distribution losses are high. This means much more energy is used than necessary across the region.







Sources:
Losses: Energy Community Annual Implementation Report 2017; EU-28 IEA Key indicators
CO2 emissions per capita: IEA Key indicators
Energy intensity: IEA Key indicators

There is an urgent need to reduce network losses and to find other ways to use energy more efficiently. This should be the highest priority for EBRD energy sector activities in the region.

At the very least, a scenario needs to be included in the Western Balkans case study which examines what would happen under a high-wind-and-solar scenario with a high-ambition energy savings policy.

The role of additional hydropower in the region is exaggerated

All of the illustrative scenarios in the draft EBRD Energy Strategy indicate that there would be an increase in hydropower capacity from 8.2 GW to 13 GW by 2040. **This would almost certainly be impossible to carry out in a legal manner**, in line with the EU Water Framework Directive and Birds and Habitats Directives, or indeed with the EBRD's Environmental and Social Policy.

The Balkan region is a biodiversity hotspot on a global level. A recent study found that 113 freshwater fish species listed in one of the three IUCN threat categories and/or listed in one or more annexes of the European Habitats Directive or Bern Convention are present in the wider Balkan region. For 81 of these species, an analysis was carried out of the likely habitat loss if planned hydropower plants across the region are carried out. The findings predict that up to 49 freshwater fish species are faced with either the threat of extinction or loss of between 50 and 100% of their Balkan distribution. Of these, eleven endemic species are threatened with extinction, seven will become critically endangered, and the number of endangered species will double to twenty-four. For 68 of 69 endemic species, habitat losses are estimated between 30 and 100 percent.[8]

8 Weiss S, Apostolou A, Đug S, Marčić Z, Mušović M, Oikonomou A, Shumka S, Škrijelj R, Simonović P, Vesnić A, Zabric D. (2018). Endangered Fish Species in Balkan Rivers: their distributions and threats from hydropower development. Riverwatch & EuroNatur, 162 pp., February 2018, https://balkanrivers.net/sites/default/files/Fish_Study_web.pdf

The results of this study, combined with information about the hydromorphology and protection status of rivers in the Balkans, have been superimposed on an online map available at: https://www.balkanrivers.net/en/vmap. This shows that huge swathes of the rivers in the region are either protected, pristine or near natural, slightly to moderately modified, or are fish hotspots.

Hydropower development can also impact on local people through expropriation, issues with access to water for irrigation, livestock and sometimes also drinking, and harming other economic activities such as tourism and fishing. Even the current level of development of hydropower development in the region has resulted in strong resistance from many communities and environmental groups.

It is also questionable who will be willing to finance such a large expansion, as the EBRD, EIB and World Bank are becoming more aware that many of the projects cannot be carried out in line with their environmental and social standards.

All this makes it highly unlikely that much more hydropower can be added to the region's capacity in the coming years.

Existing hydropower adds a useful flexible element to the region's energy systems but it is doubtful whether it is desirable to greatly increase the share of hydropower considering its vulnerability to rainfall fluctuations.

The draft Strategy recognises this in a few cases such as Albania and Georgia, but does not make explicit that also countries with a much lower share of hydropower have been having serious fluctuations in electricity generation in recent years.

The country graphs above show that Montenegro has seen large fluctuations between rainy years such as 2010 and 2013, and dry years such as 2011 and 2012 (also 2017, not shown)[9], but also Bosnia-Herzegovina, which generates only around ⅓ of its electricity from hydropower has also seen large variations.

Therefore the role of additional hydropower should be re-examined and the construction of a large new fleet of hydropower plants should not be taken for granted. Although the scenarios are indicative, and the EBRD representatives in Belgrade stated that they do not represent the EBRD's position, it is confusing to include them in the Strategy if this is the case. It is important to avoid sending a message to the region's governments that massive hydropower expansion would be acceptable, when in fact it is incompatible with the EBRD's own Environmental and Social Policy. The scenarios should foresee only very limited hydropower expansion, if any, and must avoid hydropower expansion in the Western Balkan countries which are already suffering from heavy fluctuation in hydropower production, namely Albania, Bosnia-Herzegovina and Montenegro.

Expansion of gas infrastructure is not appropriate for the region

It is welcome that the case study recognises that coal has to be phased out as rapidly as possible in the region and that even maintaining a smaller fleet is not a favourable option, but the Western

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9 95 https://balkangreenenergynews.com/albania-launches-procedure-for-electricity-import-due-to-drought/, https://seenews.com/news/bosnias-epbih-expects-to-turn-to-net-loss-of-111-mln-euro-in-2017-594558, https://seenews.com/news/montenegros-hydro-power-output-nearly-halves-in-jan-aug-590982

Balkans case study in the draft Strategy reads like a promotional brochure for increasing gas infrastructure in the region. The lowest cost scenario, it is concluded, over the period 2018-2040 and in present value terms, would be the Gas/RES scenario in which current lignite capacity is replaced with gas due to lower CAPEX and environmental costs, resulting in no less than 9 GW of installed gas power capacity.

Indicative as this scenario may be, the message to decision-makers appears to be that they can freely continue to underestimate the potential of wind, solar and energy efficiency, and concentrate on new gas infrastructure.

This is not only in stark contrast to other scenarios for the region but also with the EBRD's own concern that new gas infrastructure must not lead to a danger of carbon lock-in, and security of supply concerns about dependence on imported fuel.

Gas has not played a major role in most of the Western Balkans countries so far. Albania, Kosovo, Montenegro and parts of Macedonia and Bosnia-Herzegovina are not connected to the European gas pipeline network and only Serbia produces any significant amount of gas - enough for about 20-25% of its consumption.[10]

The Trans-Adriatic Pipeline is currently under construction in Albania and branches to nearby countries are under discussion, such as the Ionian-Adriatic Pipeline to Montenegro and Croatia[11] and the ALKOGAP pipeline to Kosovo.[12]

In power generation, only Macedonia has any noticeable percentage of gas in its energy mix, with three gas power plants in Skopje with a combined electrical capacity of just under 300 MW.[13] Its gas is supplied via Bulgaria through the GA-MA pipeline owned jointly by the Macedonian government and Makpetrol.[14]

Serbia has nearly 390 MW of gas plants but these make up less than 1 percent of the electricity mix.[15] Its main gas extraction company Naftna Industrija Srbije (NIS) is majority owned by Gazprom, with the rest of the shares owned by the Serbian state and individual shareholders.[16] This means that promoting gas across the region also raises foreign policy concerns, given that not all countries will agree with the EU's line on diversifying away from Russian suppliers.

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10 Republic of Serbia Security of Supply Statement 2017 https://www.energy-community.org/dam/jcr:fa9b6c7b-57f5-4781-8ec3-4108e433f8b4/2017_SOS_RS.pdf

11 https://www.energy-community.org/regionalinitiatives/infrastructure/PLIMA/Gas16.html

12 https://www.energy-community.org/regionalinitiatives/infrastructure/PLIMA/Gas13.html

13 TE-TO Skopje: 227 MW, ELEM Energetika: 30 MW and KOGEL: 30 MW. ERC annual report 2017, p.11 http://www.erc.org.mk/odluki/2017.03.30_Godisen%20izvestaj%20za%20rabota%20na%20Regulatornata%20komisija%20za%20energetika%20na%20RM%20za%202016%20godina-final.pdf

14 http://www.gama.com.mk/Default.aspx?id=209e6d83-f100-49b3-8a1d-c8b72bff8092

15 TE TO Novi Sad 1, 135 MW and 2, 110 MW; TE TO Zrenjanin, 110 MW; TE TO Sremska Mitrovica, 32 MW

16 NIS website: http://ir.nis.eu/en/stock-information/shares-and-ownership-structure/

Albania has recently adopted an EU-supported[17] Gas Master Plan, hoping to make use of gas from the TAP pipeline running through its territory, even though, as the Strategy mentions, there are currently no plans to supply the country from TAP. Albania already has a 98 MW oil/gas power plant at Vlora, financed by the EBRD, EIB and World Bank, which has never functioned in reality,[18] but there are now ideas about rehabilitating it and running it on gas.[19] New gas power plants appear to be included in Vlora (Vlora II and III, 120 MW and 160 MW), to come online in 2020 and 2025, and Korce 500 MW.[20] A feasibility analysis for the latter has been supported by the IFC.[21]

In Bosnia-Herzegovina, the Swiss-based KTG has been planning a 300 MWe gas-powered cogeneration plant in Zenica together with Chinese Company HTG,[22] a subsidiary of SEPCO 3.[23] The project is going very slowly and in a 2017 World-Bank analysis, it was concluded that *"Zenica gas plant is not needed in any of the scenarios including extreme ones that consider emissions constraints and no new coal projects."24*

Serbia is also planning a 140 MW CHP in Pančevo, which also appears to be delayed due due to delays with the construction of a substation, but is part of the implementation plan for the national energy strategy.[25]

For the remaining three countries, no new gas power plant projects are known to be in the pipeline, so it is really only Albania which has significant plans in this field currently.

All this means that any significant increase in the use of gas in the region would require not only new power plants, but also huge investments in new pipelines and associated infrastructure. Increased use of gas for households would require even more investments in distribution infrastructure. This would surely crowd out investments in energy efficiency and renewables in the same way that governments' concentration on building new coal power plants has done in the last few years.

Considering the EU's climate commitments and the infrastructure costs associated with increasing the use of natural gas in the Western Balkans, such plans need to be revisited and

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17 https://www.wbif.eu/wbif-projects/details?code=PRJ-ALB-ENE-002&ogtitle=Gas%20Development%20Master%20Plan&ogdescription=PRJ-ALB-ENE-002&ogimage=workspace://SpacesStore/7f02a536-f24f-4818-850b-3d51affbac6f

18 World Bank website: http://projects.worldbank.org/P077526/power-sector-generation-restructuring-project?lang=en&tab=overview, KESH website: http://www.kesh.al/info.aspx?_NKatID=1197

19 Energy Regulator Authority: Annual report 2015: http://www.ere.gov.al/doc/Annual_Report__2015.pdf

20 https://www.energyworldmag.com/electricity-generation-capacity-development-albania/

21 http://www.gppkorca.com http://energjia.al/2018/03/30/gas-powered-plant-korca

22 http://ktg-ag.ch/

23 http://www.sepco3.com/about_lingd.aspx?CateId=132

24 Debabrata Chattopadhyay, Thomas Nikolakakis, Dzenan Malovic, Jari Väyrynen: Bosnia and Herzegovina Power Sector Note: Least-cost Power Development Plan, Final Report, World Bank, March 2017, http://documents.worldbank.org/curated/en/514131496684572941/pdf/115087-REVISED-ESM-P157714-PUBLIC-BiHPowerSectorNoteLeastCostPowerDevelopmentPlanFINALAFTERDISSEMINATIONwithupdatedESMAPdonors.pdf

25 http://mzoip.hr/doc/nacrt_programa__na_engleskom_jeziku.pdf

alternatives considered. The regional energy scenario developed for the wider southeast Europe region under the SEERMAP project has found for example that if TAP is built,

"All scenarios initially foresee an increase in natural gas use, but under a decarbonisation pathway in line with the EU target of 93-99% reduction in the electricity sector gas plays only a very minor role towards the end of the period, accounting for 1.5% of generation in 2050. In the 'decarbonisation' scenario total gas capacity declines from 2020, with the rate of newly added capacity lower than outgoing capacity."[26]

If capacity should start declining from 2020, investing in significant gasification seems likely to go in the opposite direction, locking the region into long-term dependency on imported gas and the price fluctuations that go with it.

The Buildings Performance Institute Europe has found that across the wider southeast Europe region, *"a dedicated renovation programme could, within 20 years, address all gas-consuming buildings in South-East Europe and reduce the building stock's gas consumption by as much as 8.2 bcm/a, or by 70% of the current consumption. The European institutions and countries in the region are therefore strongly encouraged to set energy efficiency as an infrastructure priority."*[27]

Of course this applies only to those countries currently using gas or electricity from gas for heating, while much of the Western Balkans uses electricity and firewood. But instead of replacing these with gas, other solutions such as heat pumps, solar thermal and more efficient wood-burners should be considered.

In short, the EBRD's promotion of gas for the Western Balkans goes in quite the opposite direction of other scenarios such as the SEERMAP consortium and the SEE-SEP EU Road scenario, and the World Bank's conclusions for Bosnia-Herzegovina. As the EBRD draft strategy itself shows, it could also only result in around 30 percent greenhouse gas reductions compared to coal, which is not a sufficient decrease to justify such large investments. It would surely crowd out investments in energy savings and solar and wind, thus resulting in a carbon lock-in, rather than simply providing back up for these sources. It therefore needs to be revisited and more scenarios presented in a more detailed way.

Conclusions and recommendations

The Western Balkans, as a region that represents both a post-Socialist economy and EU accession region, can benefit greatly from up-to-date insights by the EBRD on how to move its energy transition forward more rapidly. Its decision-makers have not yet recognised the potential of energy savings, solar and wind, and need support to do so.

For this reason it is regrettable that the indicative scenarios put forward by the EBRD's consultants do not emphasise the potential for energy savings and a large expansion of wind and solar, but instead all assume a large expansion of greenfield hydropower, to an extent which could almost certainly not be carried out in line with EU legislation. Existing hydropower plants

26 https://rekk.hu/downloads/projects/SEERMAP_RR_SEE_A4_ONLINE.pdf

27 http://bpie.eu/wp-content/uploads/2016/09/Safeguarding-energy-security-in-South-East-Europe-with-investment-in-demand-side-infrastructure.pdf

can play a useful role in balancing intermittent renewables but there is hardly any scope for environmentally tolerable expansion.

It is also unexpected and regrettable that the scenario most recommended is that which promotes huge expansion of gas power generation. Any significant increase in the use of gas in the region would require not only new power plants, but also huge investments in new pipelines and associated infrastructure. This is the opposite of decarbonisation, and would surely crowd out investments in energy savings and solar and wind, thus resulting in a carbon lock-in.

We have welcomed the EBRD's action to halt coal financing, an action which has been important for our region, and its support for developing wind projects in the region. We now ask the Bank to ensure that the cure is not worse than the disease, and that decarbonisation means a transition to a truly efficient, decarbonised and sustainable energy system. Specifically:

- The Scenarios need to include an examination of the energy savings and demand response potential
- It is hard to believe that gas expansion is the most cost-effective option, given the costs of new gas infrastructure and the need to decarbonise the energy sector, and this needs to be re-examined.
- The danger of gas investments crowding out investments in renewable energy and energy savings needs to be examined.
- Additional hydropower capacity should be included only to the extent that it can be carried out in line with the EBRD's Environmental and Social Policy and the EU Water Framework Directive and Birds and Habitats Directive.
- It should not be included in countries that are already suffering from serious fluctuation in hydropower generation due to changing hydrological conditions.