

Biomass Assessment, Renewables Potential, Infrastructure, Policy and Legal Framework in Bosnia and Herzegovina

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Stakeholder Event



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- Potential for Implementation of Hydrogen Technologies
- Infrastructure
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Biomass assessment

Overview of documents related to biomass assessment in BiH:

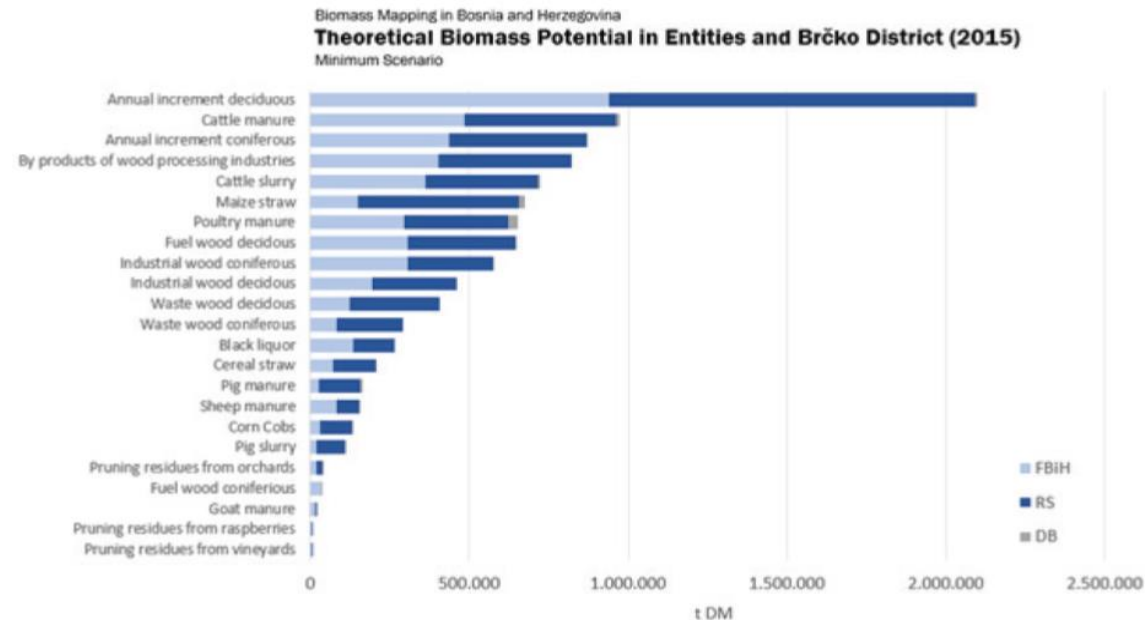
- Study of the renewable sources with focus on biomass, geothermal and solar energy in Bosnia and Herzegovina (UNDP, December 2019), Report on biomass potential monitoring in Bosnia and Herzegovina
- IRENA, Joanneum Research and University of Ljubljana (2017), Cost-Competitive Renewable Power Generation: Potential across South East Europe, International Renewable Energy Agency (IRENA), Abu Dhabi
- South East Europe Electricity Roadmap (SEERMAP, 2016), Country Report: Bosnia and Herzegovina
- Currently, the World Bank is financing the preparation of the Study „Biomass for Energy in Bosnia and Herzegovina” where goal is to provide analytical inputs for the development of 1) a well-functioning biomass market; 2) energy crops as needed; and 3) roadmaps for the development and use of biomass resources

Biomass assessment

- Biomass potential in Bosnia and Herzegovina is between 10,3 (minimum value) and 10,4 (maximum value) million tonnes of dry matter
- It could cover up to an additional 12% to 15% of the total primary energy supply of the country
- The largest contributor to biomass consumption for energy purposes is consumption for heating and electricity usage (f. e. for cooking) in the household sector
- Regarding the contribution to electricity generation, biomass as a renewable energy source remains comparatively insignificant

Biomass assessment

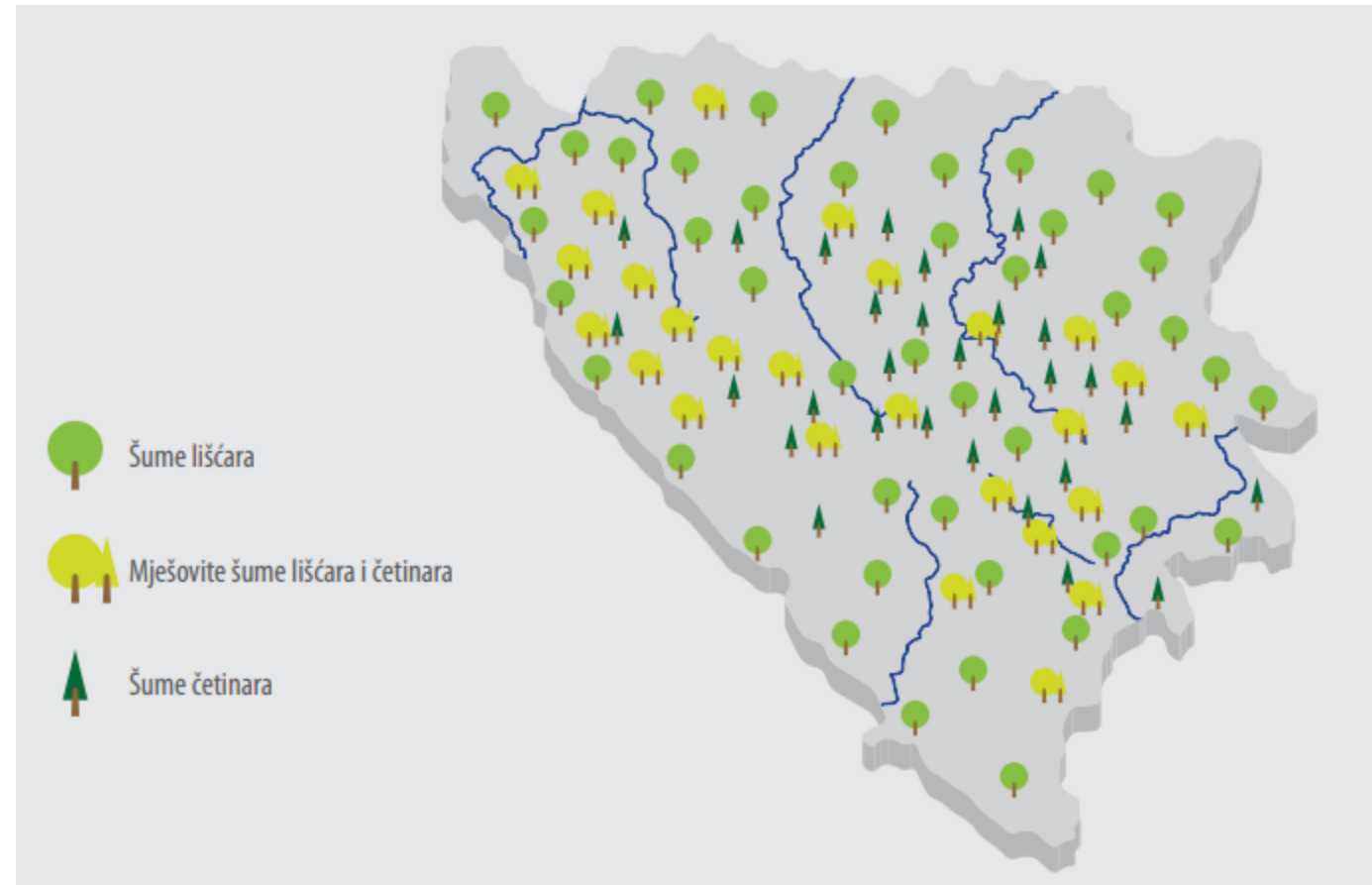
- Theoretical biomass potential by entities and Brčko District (minimum scenario)



Source: Study of the renewable sources with focus on biomass, geothermal and solar energy in Bosnia and Herzegovina (UNDP, December 2019)

Biomass assessment

- The total area of Bosnia and Herzegovina is 51.209 km². With 53% of forest land, BiH is one of the countries with the largest forest cover in Europe. State forests cover about 80% of the total forest area, while private forests cover 20%
- The potential of forest biomass in BiH for energy purposes is estimated at 23.3 PJ per year, of which in the Republika Srpska 8.4 PJ, the Federation of BiH 14.9 PJ, and the Brcko District 0.03 PJ
- Picture shows forest display with different type of trees



Source: Drvna biomasa – gorivo budućnosti, Czech Republic Development Cooperation, UNDP, 2017

Renewables potential in B&H

- Estimates of the country's renewable energy potential vary widely, depending on whether environmental criteria are used and what economic assessment is used. Some estimates of cost-competitive potential for solar PV and wind are:

Source	Solar PV	Wind
IRENA Cost-competitive potential	2955 MW 4126 GWh	13102 MW 26308 GWh
SEERMAP Decarbonisation scenario	1855 MW 1864 GWh	3809 MW 7279 GWh
SEE-SEP The EU Road scenario	4500 MW 7720 GWh	1990 MW 6810 GWh

Source: <https://bankwatch.org/beyond-coal/the-energy-sector-in-bosnia-and-herzegovina>

Renewables potential in B&H

The total installed power in generation facilities in Bosnia and Herzegovina amounts to 4.530,64 MW:

- Hydro power plants: 2.076,6 MW
- Thermal power plants: 2.065 MW,
- Small hydro power plants: 172,19 MW,
- Wind power plants: 86,6 MW*,
- PV power plants: 34,89 MW**,
- Biogas and Biomass power plants: 2,11 MW,
- Small wind power plants: 0,40 MW, and
- Industrial power plants: 92,85 MW is installed in industrial power plants

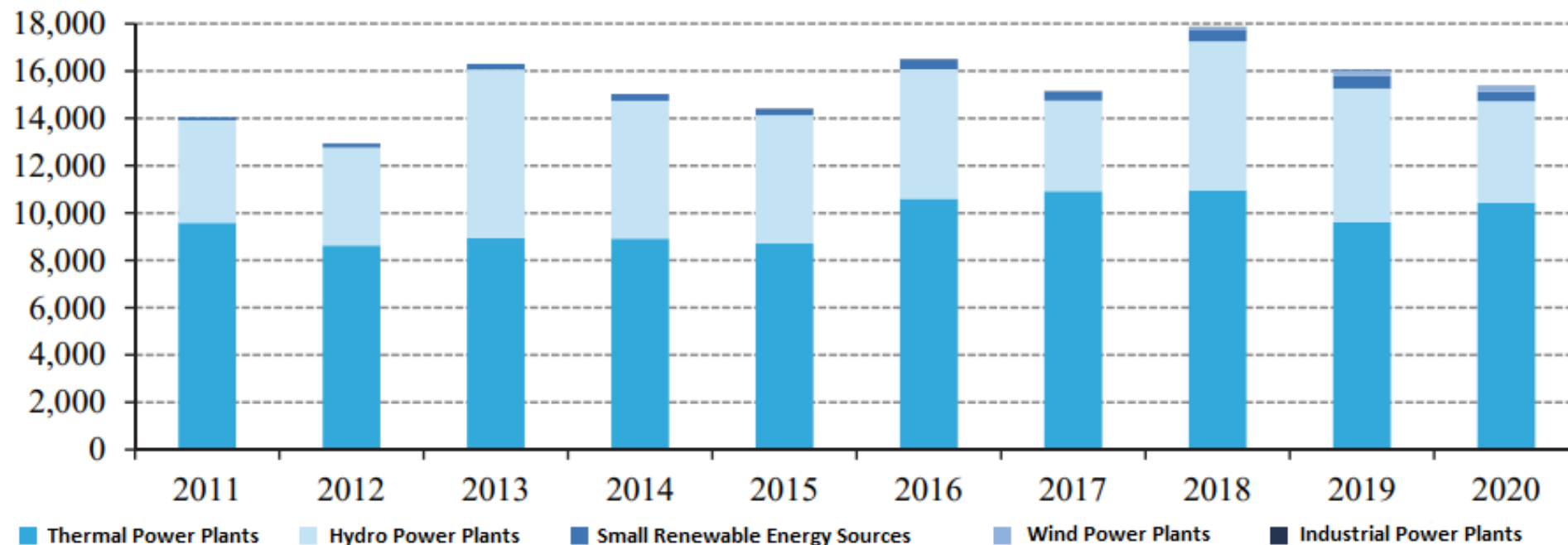
Source: SERC, Annual Report for 2020

*In the meantime, Wind power plant „Podveležje” 48 MW was put into operation

**Now, 79 MW from PV power plants are built and operating according to FMERI and REERS registries

Renewables potential in B&H

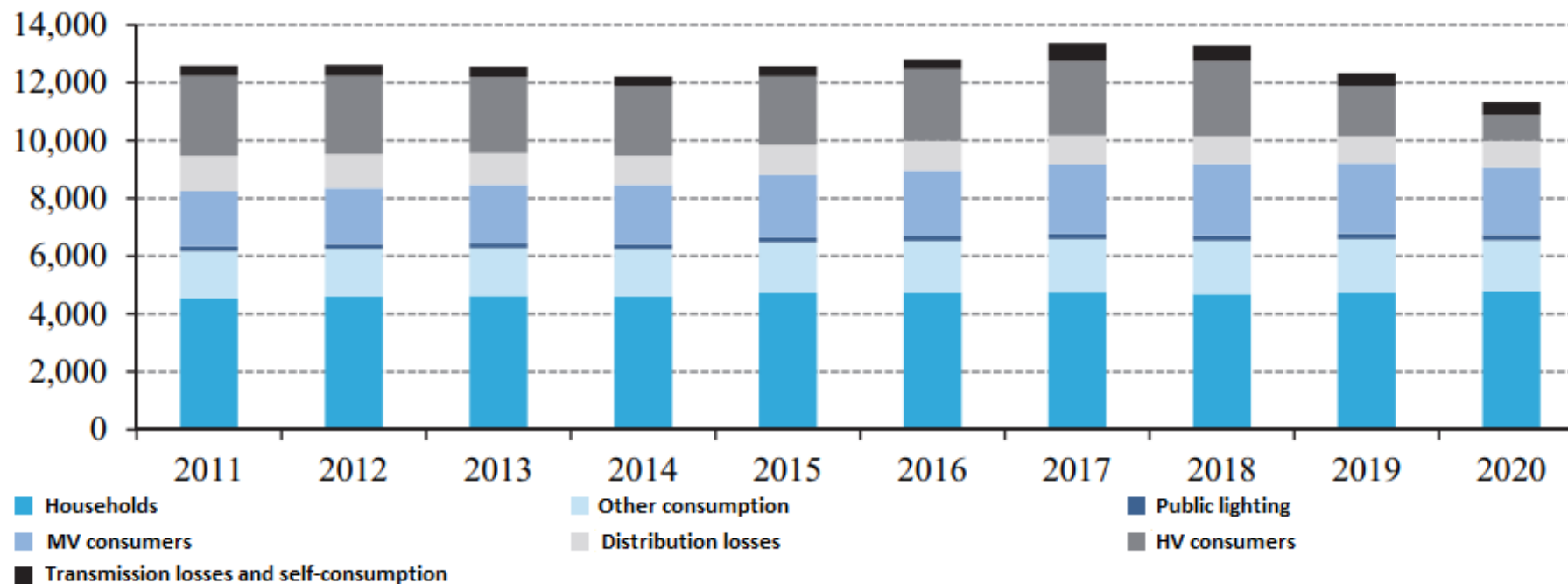
- Structure of electricity production in BiH during the previous ten years (GWh)



Source: SERC, Annual Report for 2020

Renewables potential in B&H

- Structure of electricity consumption in BiH during the previous ten years (GWh)



Source: SERC, Annual Report for 2020

Renewables potential in B&H

- Potential for renewable-based electricity in Bosnia and Herzegovina

Technologies	2009	2015		2020 (NREAP)	Additional cost-competitive potential			Technical potential	
	MW	MW	GWh	MW	MW	GWh	MW	GWh	
Solar PV	0.0	8.2	8.9	16.2	2016	0.0 – 993.5	0.0 – 1,477.2	2,963.7	4,135.2
					2030	2,955.5	4,126.2		
					2050	2,955.5	4,126.2		
Wind	0.0	0.3	n.a	330.0	2016	2,556.2 – 5,861.3	7,476.4 – 14,654.9	13,141.1	26,335.9
					2030	10,618.8 – 12,809.6	22,892.7 – 26,000.0		
					2050	12,982.1 – 13,102.8	26,192.7 – 26,308.0		
Hydro	2,006.0	2,150.0	5,806.4	2,700	2,510.0		9,399.6	6,110.0	24,498.0
≤ 10 MW	28.2	95.5	257.9	251.4	764.5		3,108.9	860.0	3,498.0
> 10 MW	1,978.0	2,054.5	5,548.5	2,448.8	1,745.5		6,285.2	5,250.0	21,000.0
Pumping	440.0	420.0	0.0	492.0	n.a		n.a	n.a	n.a
Biomass	0.3	1.0	0.0	35.7	29.0 – 857.0		180.0 – 5,470.0	983.0	6,220.0
Biogas	0.3	1.0	0.0	16.5	29.0-44.0		180.0 – 270.0	150.0	900.0
Solid Biomass	0.0	0.0	0.0	19.2	0.0 - 813.0		0.0 – 5,200.0	813.0	5,200.0
Biowaste	0.0	0.0	0.0	0.0	0.0		0.0	20.0	120.0
Geothermal el.	0.0	0.0	0.0	0.0	0.0 - 7.1		0.0 – 50.0	7.1	50.0
Total	2,006.3	2,159.5	5,815.3	3,081.9	2016	5,095.2 – 10,228.9	17,056.0 – 31,051.7	23,204.9	61,239.1

Source: IRENA, Joanneum Research and University of Ljubljana (2017), Cost-Competitive Renewable Power Generation: Potential across South East Europe, International Renewable Energy Agency (IRENA), Abu Dhabi.



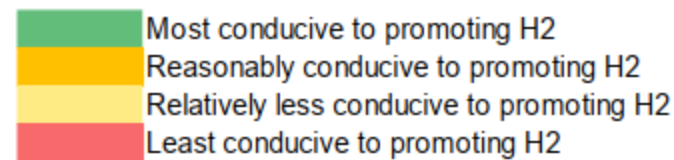
Potential for implementation of hydrogen technologies

- To support investments in clean hydrogen and new hydrogen-related project proposals in the European Neighborhood, the EU Commission will use financing instruments including the Western Balkans Investment Framework (WBIF)
- There is no information on renewable or low carbon hydrogen production in Bosnia and Herzegovina
- Currently, solar and wind power production are minimal in Bosnia and Herzegovina, providing limited resources for renewable hydrogen production, although there is much greater RES potential in B&H that could be harnessed
- Storage solutions will be a requirement for Bosnia and Herzegovina's ambition to increase RES in its electricity mix
- According to the study theoretical potential for producing hydrogen from renewables appears to be medium to high

Potential for implementation of hydrogen technologies

- Comparative assessment – relative appraisal of CP prospects of introducing hydrogen

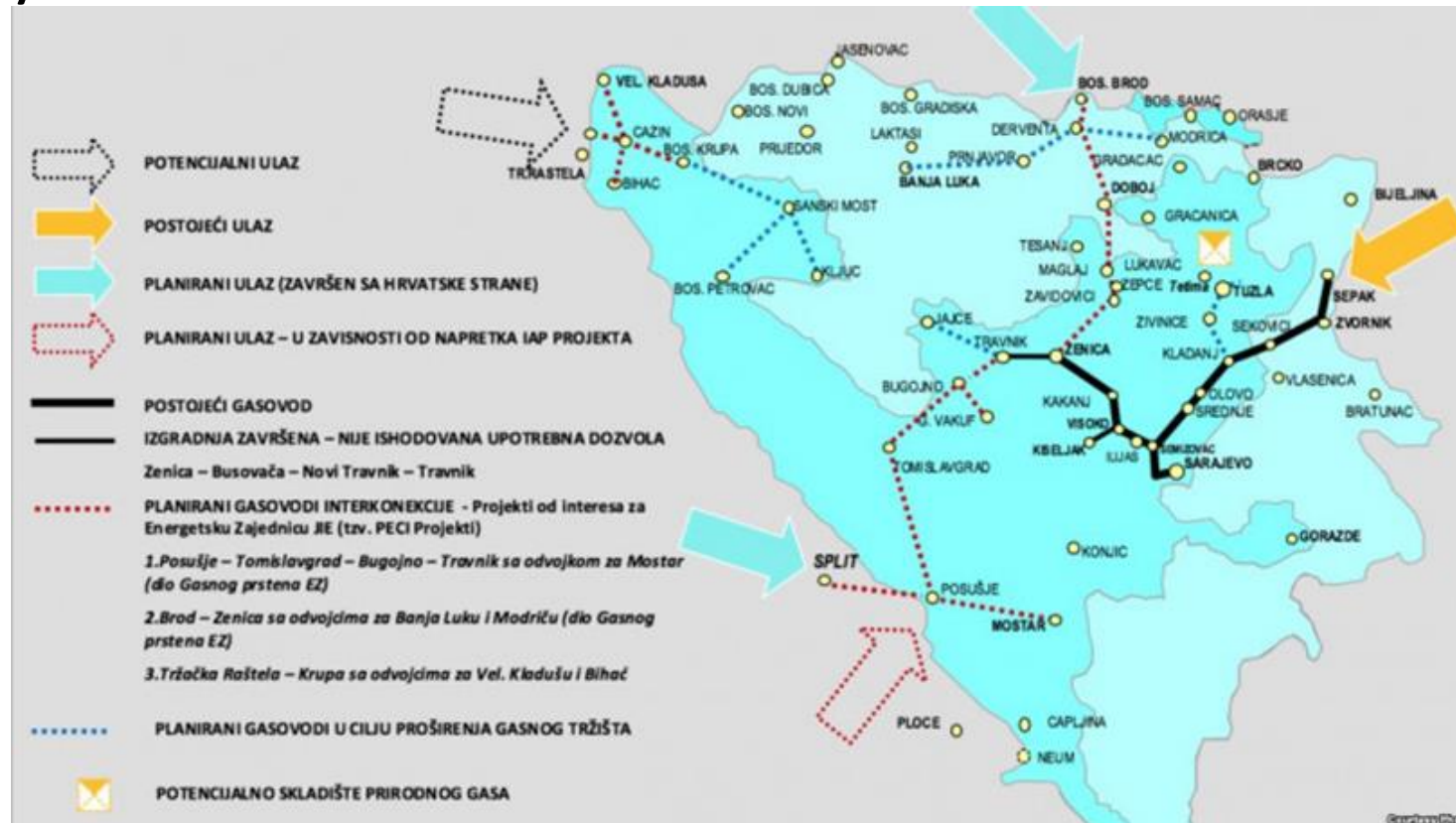
Assessment parameters	AL	BA	GE	MD	ME	MK	RS	UA	XK
Policy drivers	Red	Green	Orange	Yellow	Orange	Green	Green	Orange	Green
Potential H ₂ production capacity	Orange	Red	Green	Green	Red	Red	Red	Green	Red
Delivery infrastructure	Red	Red	Green	Yellow	Red	Red	Red	Yellow	Red
Potential hydrogen applications	Red	Orange	Red	Orange	Red	Green	Orange	Green	Red
Socioeconomic conditions	Red	Orange	Orange	Red	Green	Yellow	Yellow	Red	Red



Source: Study on the potential for implementation of hydrogen technologies and its utilization in the Energy Community (ECA, E4tech, February 2021)

Infrastructure

- B&H gas system



Source: <https://avaz.ba/vijesti/bih/428200/kako-ce-izgledati-plinovod-koji-ce-spajati-bih-i-hrvatsku>

Infrastructure

- Bosnia and Herzegovina's gas network and gasification plans are dependent on the planned cross-border projects
- Gas distribution exists in certain urban centers and there are plans to develop the gas sector further, at transmission and distribution level
- There are no plans to use current gas infrastructure for hydrogen mixes, and there have been no studies to support it
- There is an identified need for future storage solutions, but there are currently no official plans for the storage of energy from RES (excluding some PSHPP), including in the form of hydrogen
- There are old salt mines in the Tuzla region which could be theoretically used for gas storage, although this initiative has not been explored in depth
- Actual hydrogen applications are limited as hydrogen has not been included in any strategic planning so far

Biopower plants in B&H

- Natron-Hayat d.o.o. Maglaj (FBiH)

Biomass cogeneration production plant „TG 4”, installed as part of a production facility

- Installed power: 8,1 MWeI and 35 MWth
- Planned annual production: 64.152 MWh of electrical energy and 30.000 MWh of thermal energy
- Commissioning year: 2013



Biopower plants in B&H

▪ Toplana a.d. Prijedor (RS)

Biomass cogeneration production plant „Nova toplana”, installed as part of a district heating plant for the city of Prijedor

- Installed power: 250 kW
- Planned annual production: 1.430 MWh
- Commissioning year: 2016

▪ FAGUS d.o.o. Kotor Varoš (RS)

Biomass cogeneration production plant „Fagus”, installed within the wood industry complex „Nomar” a.d. Kneževo in Municipality of Kneževo

- Installed power: 870 kW
- Planned annual production: 6.438 MWh
- Commissioning year: 2019



Biopower plants in B&H

- Gold-MG d.o.o. (RS)

Biogas production plant „Buffalo Energy Gold-MG”
installed in Novo Selo, Municipality of Šamac

- Installed power: 0,99 MW
- Planned annual production: 8.274,8 MWh
- Commissioning year: 2019

The first biogas production plant in BiH with feed-in tariffs.

It works on the principle of anaerobic fermentation
(digestion, putrefaction).



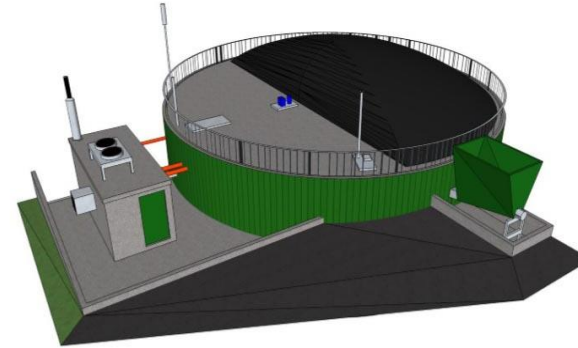
Biopower plants in B&H

- Future power plants

Farma Spreča d.o.o. Kalesija

Biogas production plant „Farma Spreča”

- Installed power: 600 kW 1st phase, up to 1.200 kW final
- Planned commissioning in 2021



Policy and legal framework

- The political and legislative framework for RES and for energy in general is extremely complicated
- There are divided competencies between the state and the entities (Federacija BiH and Republika Srpska, and Brčko District) in the energy sector
- The state level is responsible for international cooperation, coordination with the entities and transmission of electricity
- The entity level has real competencies in the field of energy - production, distribution, supply
- The current legislation does not meet the requirements of the third energy package of the EU, although we have this obligation as a contracting party to the Energy Community
- There is an urgent need for further development of legislation and regulations in the electricity (RES) and gas sectors
- A new law on electricity and a new law on renewable energy sources are currently being drafted in the Federation of BiH, which will meet the requirements of the fourth energy package „Clean Energy for All Europeans”

Policy and legal framework

BH institutions dealing with energy as well as biomass:

- MVTEO - Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina
- FMERI - Federal Ministry of Energy, Mining and Industry of the Federation of Bosnia and Herzegovina
- MIER RS - Ministry of Industry, Energy and Mining of Republika Srpska
- FMPVŠ - Federal Ministry of Agriculture, Water-Management and Forestry of the Federation of Bosnia and Herzegovina
- MPŠVRS - Ministry of Agriculture, Forestry and Waters of Republika Srpska
- State Electricity Regulatory Commission - DERK,
- Regulatory Commission for Energy in the Federation Bosnia and Herzegovina - FERK,
- Regulatory Commission for Energy of Republic of Srpska - REERS

Conclusion

- All assessment show that Bosnia and Herzegovina has a huge theoretical potential for biomass
- Currently, biomass potential is minimally used and/or used in the wrong way
- There is great potential for biomass that can be used to produce biogas and biochar
- All estimates show that there is an extremely high cost-competitive potential of renewables, especially solar and wind energy
- This potential of renewable energy sources exceeds the overall energy needs of BiH
- Bosnia and Herzegovina is a net exporter of electricity
- It can be said with certainty that there will be longer or shorter periods of time when there will be surplus production from RES
- This surplus of energy production from RES can be used to produce hydrogen
- There is no adequate infrastructure and it will need to be developed
- There is no appropriate legislation and regulations framework and should be developed



THANK YOU

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