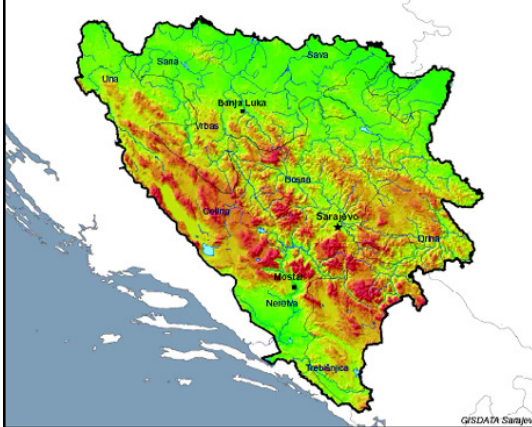


ENERGY SECTOR IN BOSNIA AND HERZEGOVINA

Alija Lekić

- Bosnia and Herzegovina and the status of energy sector in it
- Primary energy resources
- Energy infrastructure, production and consumption
- Plans

Bosnia and Herzegovina



The State of Bosnia and Herzegovina consist of two entities, the Federation of Bosnia and Herzegovina and the Republika Srpska, and Brčko District as a condominium of the two entities, under the direct sovereignty of the State of Bosnia and Herzegovina.

Status of energy sector

- Most of the decisions in the energy sector are the responsibility of the entities
- The initiatives and the efforts to include energy resources and energy sector in the responsibility of Bosnia and Herzegovina did not give positive response, as yet
- Bosnia and Herzegovina has no accepted energy strategy neither the entities have it

Primary energy resources

- The total balanced coal reserves in Bosnia and Herzegovina are estimated at 5464 million metric tons; out of it, the reserves of brown coal (calorific values between 11,728 and 18,471 kJ/kg) are 1886 million tons and that of lignite (calorific values between 8,002 and 11,439 kJ/kg) are 3578 million tons. The bulk of coal (over 80% in some years) is used for electric power generation
- The total hydro-power potential is estimated at 23,395 GWh annually, i.e. at about 6,500 MW of installed capacity.

Primary energy resources (cont.)

- Preliminary research surveys of oil and gas, which were interrupted by the war, had indicated the presence of promising deposits on a number of sites in B&H. Information about this research is not publicly available (although the off-balance reserves are estimated at about 50 million tons of oil, and less than 10 percent of potential deposits has been surveyed).
- It is not known what the future plans are regarding exploration of oil deposits.

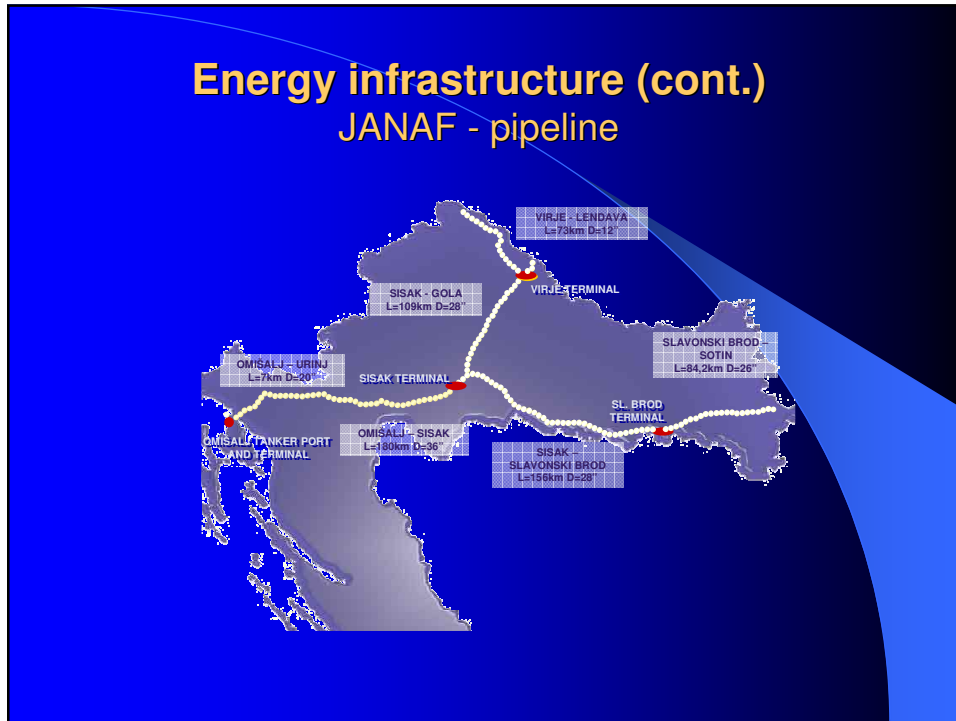
Primary energy resources (cont.)

- Potential for exploitation of geo-thermal, wind, solar and bio-mass energy have not been sufficiently explored but the share of these energy sources in the overall consumption will certainly remain modest for some time.
- In spite of the potential, B&H is importing energy, and about 27.5 % of consumed primary energy was imported (mainly liquid fuel and natural gas) in the year 2003.

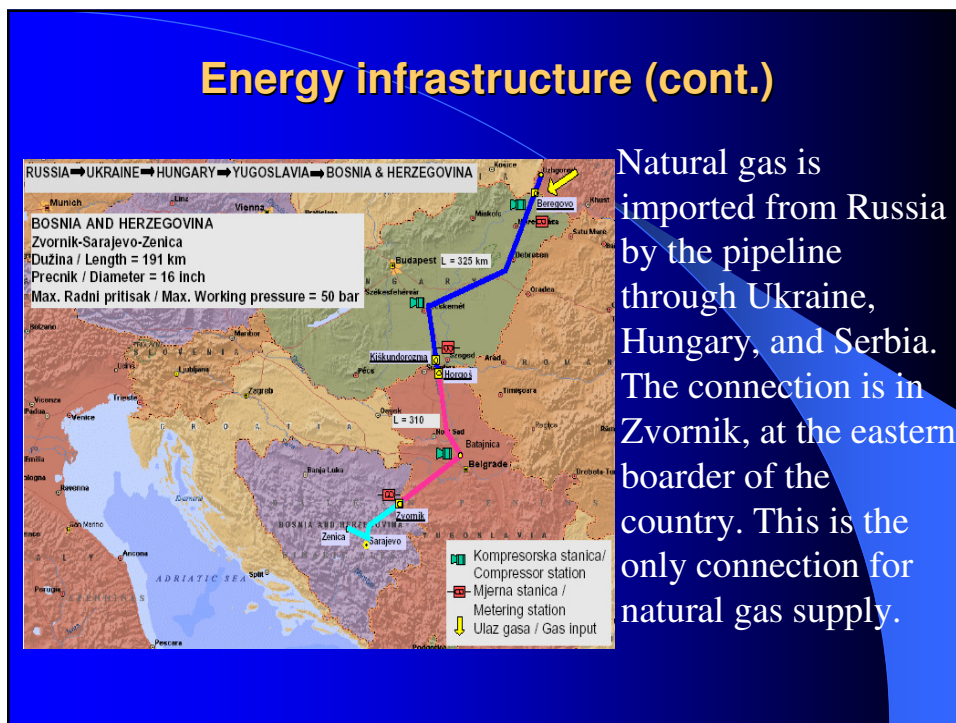
Energy infrastructure

- There are a number of coal mines in Bosnia and Herzegovina; 14 coal mines are now in operation, 10 in Federation of Bosnia and Herzegovina and 4 in Republika Srpska.
- There is an oil refinery in Bosanski Brod using imported oil. Another refinery- Modriča is producing only Motor Oils and Lubricants.
- The company Jadranski naftovod d.d (JANAF - The same pipeline which is used in Croatia) manages transport of crude oil from the harbor at Croatian cost to the refinery.
- Storage capacities for oil are not sufficient for coverage of 90 days consumption.

Energy infrastructure (cont.) JANAF - pipeline



Energy infrastructure (cont.)



Natural gas is imported from Russia by the pipeline through Ukraine, Hungary, and Serbia. The connection is in Zvornik, at the eastern boarder of the country. This is the only connection for natural gas supply.

Energy infrastructure (cont.)

- Three vertically integrated electric utility companies:
- Elektroprivreda BiH (Electric Power Utility of Bosnia and Herzegovina - EPBiH);
- Elektroprivreda HZ HB (Electric Power Utility of the Croatian Community Herzeg-Bosnia - EPHZHB); and
- Elektroprivreda Republike Srpske (Electric Power Utility of the Republika Srpska - EPRS).
- Total installed capacity in Bosnia and Herzegovina in the year 2003. was 3879 MW, out of which 1780 MW in thermal power plants and 2099 MW in hydro power plants. Beside that, there are about 25 MW installed capacities in small and mini hydro power plants.

Thermal power plants

No	Name	Installed capacity	Net el. energy output	Fuel type
		MW	GWh	
1	Tuzla A3	100	289.5	Lignite, brown coal
2	Tuzla A4	200	840.1	Lignite, brown coal
3	Tuzla A5	200	340.5	Lignite, brown coal
4	Tuzla A6	215	1137.3	Brown coal
5	Kakanj A5	110	151.8	Brown coal
6	Kakanj A6	110	483.0	Brown coal
7	Kakanj A7	230	871.5	Brown coal
8	Gacko	300	1274.5	Lignite
9	Ugljevik	300	1245.4	Brown coal

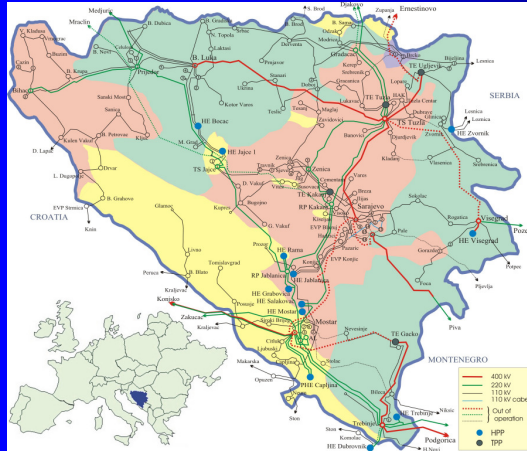
Coal characteristics

Coal	Calorific value (kJ/kg)		Water content (%)		Ash content (%)	
	From-to	Average	From-to	Average	From-to	Average
Brown	11728-18471	14335	7.25-27.76	17.06	20.06-36.50	27.10
Lignite	8002-11439	10295	32.23-55.04	37.32	7.41-25.48	16.65

Hydro power plants

- There are 14 hydro power plants in Bosnia and Herzegovina with 38 units.
- 10 hydro power plants are storage type, 3 run-of-river and one reversible
- The largest unit is one of the reversible type with 220 MW, and 5 storage type units have power higher than 100 MW.
- Total installed power of hydro power plants is 2099 MW

Energy infrastructure (cont.) Electricity network



- Length of lines 110kV, km
3292
- Length of lines 220kV, km
1405
- Length of lines 400kV, km
640
- Total capacity of network transformers, MW
9357

Energy consumption and intensity

	B&H	SEE countries	E-25	World
Energy consumption [GJ/cap]	50.2	76.6	166.0	74.1
Energy intensity [toe/000 US\$]	0.86	0.86	0.18	0.32
GDP [US\$/cap]	1407	2116	21516	5514

Electricity production and consumption (GWh)

- Net annual electricity production at country level
 - 12390.6
 - 6603.4 in thermal power plants
 - 5787.2 in hydro power plants
- Net annual electricity consumption at country level
 - 11043.6

Electric energy consumption

	B&H	SEE countries	E-25	World
El. energy consumption [TWh]	11.0	145.9	3121	15985
El. energy consumption [kWh/cap]	2180	2856	6792	2516

Plans in energy sector

- In coal sector - The comprehensive transformation and restructuring of coalmines in order to increase productivity, reduce employment and improve working conditions
- In oil sector - increasing the use of the existing refinery capacities
- In natural gas sector – new connecting lines with the natural gas networks in Europe and building natural gas storage capacity
- In the electricity sector – completion of the Power projects and new electric power capacities (hydro, including small hydro power plants and thermal power plants)

Plans in energy sector (cont.)

- Restructuring of the electricity sector
 - Unbundling the existing electric power utilities
 - Formation of State Transmission Company
 - Restructuring of the generating companies
 - Restructuring of distribution areas
 - Liberalization and market opening
- Restructuring of the natural gas sector will follow similar procedure.

Plans in energy sector (cont.)

- The plans for new electric power capacities are prepared by each electric utility separately
- Elektroprivreda BiH – 1220 MW in thermal power plants and 464 MW in hydro power plants
- Elektroprivreda HZ HB - 550 MW in thermal power plant and 114 MW in hydro power plants

Plans in energy sector (cont.)

- The ministry of energy, industry and mining of Federation of B&H has recently announced the Public invitation to express interest in strategic partnership for majority of the capacities planned by these two electric utilities and the response was unexpectedly high
- Elektroprivreda R S – 1370 MW in thermal power plants and 695 MW in hydro power plants
- With the planned capacities the total electricity generating capacities in B&H would be almost doubled

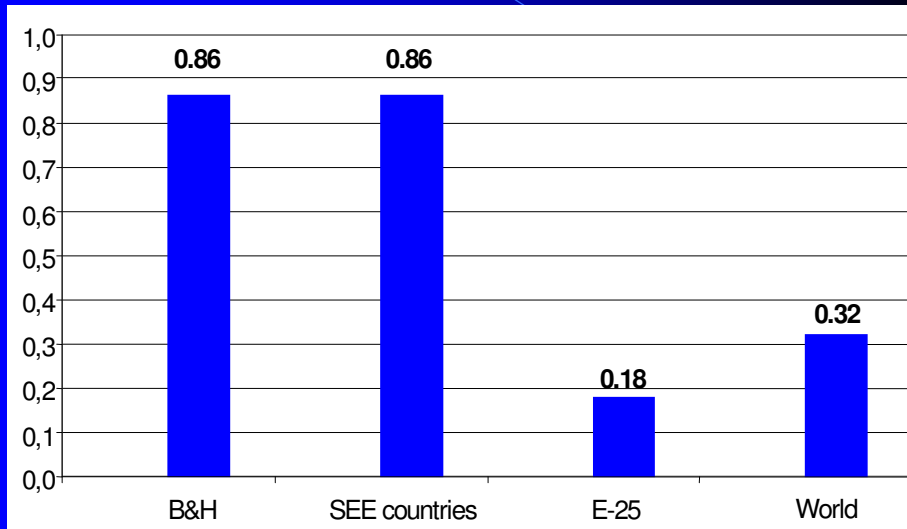
Why do I talk about energy sector in Bosnia and Herzegovina?

- According to the Intergovernmental Panel on Climate Change (IPCC) Assessment Report approved this month
- Global greenhouse gas (GHG) emissions have grown with an increase of 70% between 1970. and 2004.
- The largest growth in global GHG emissions between 1970. and 2004. has come from the energy supply sector (an increase of 145%)

What can be done?

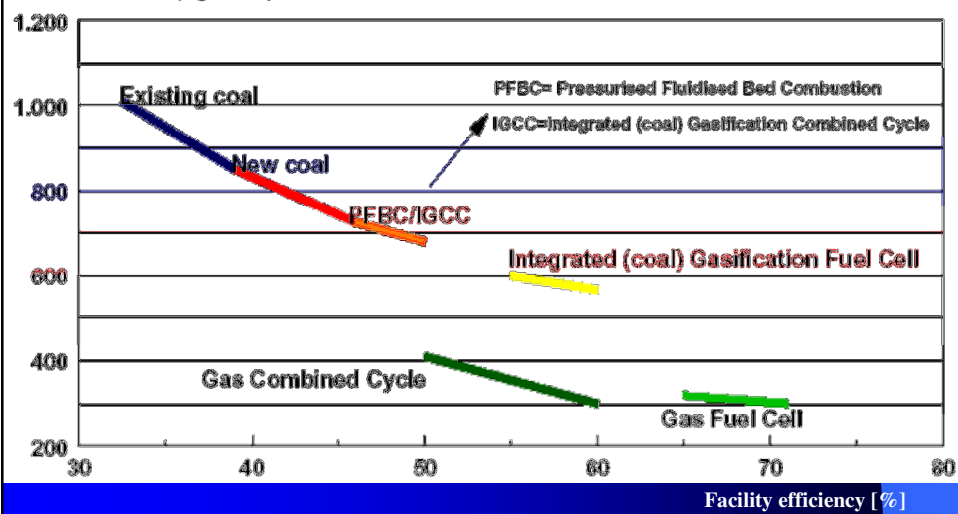
- Energy savings and improvement in energy conversion and use efficiency
- Introduction of renewable energy

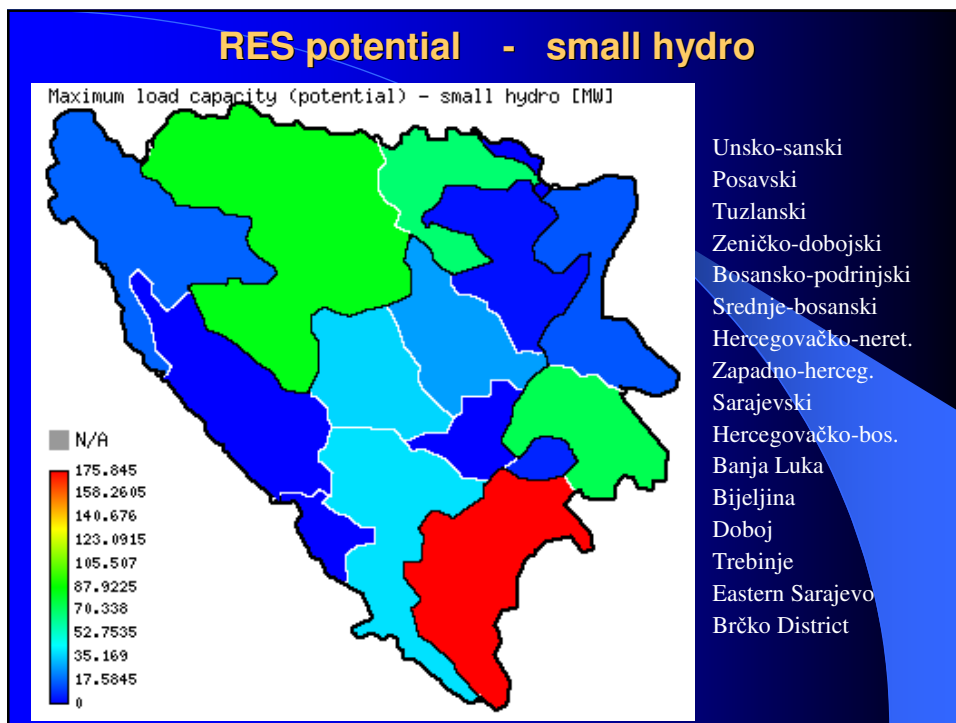
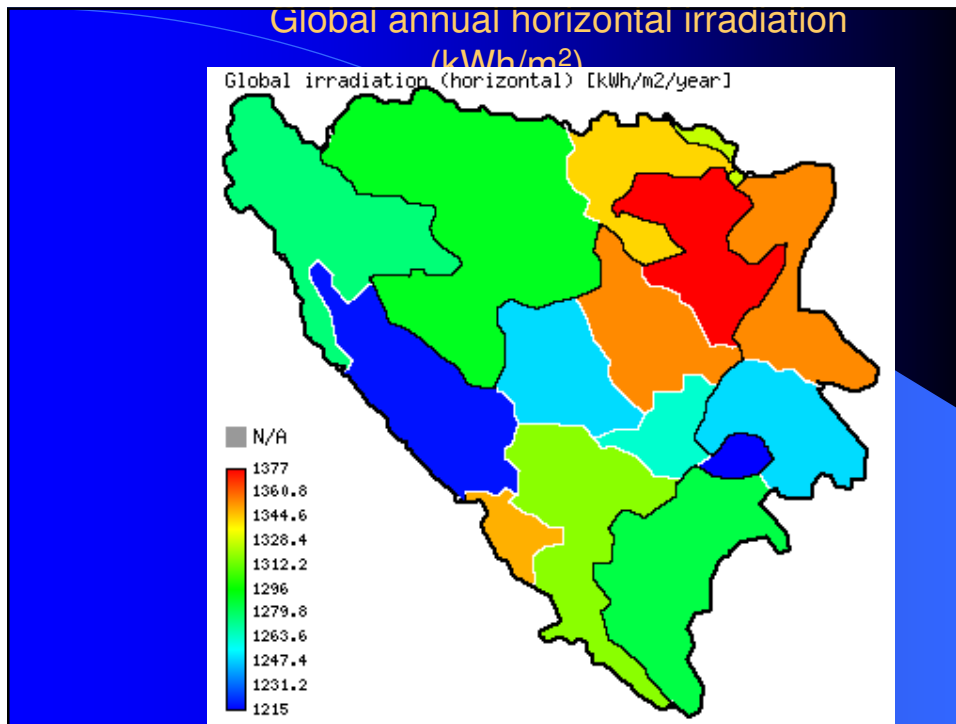
Energy intensity



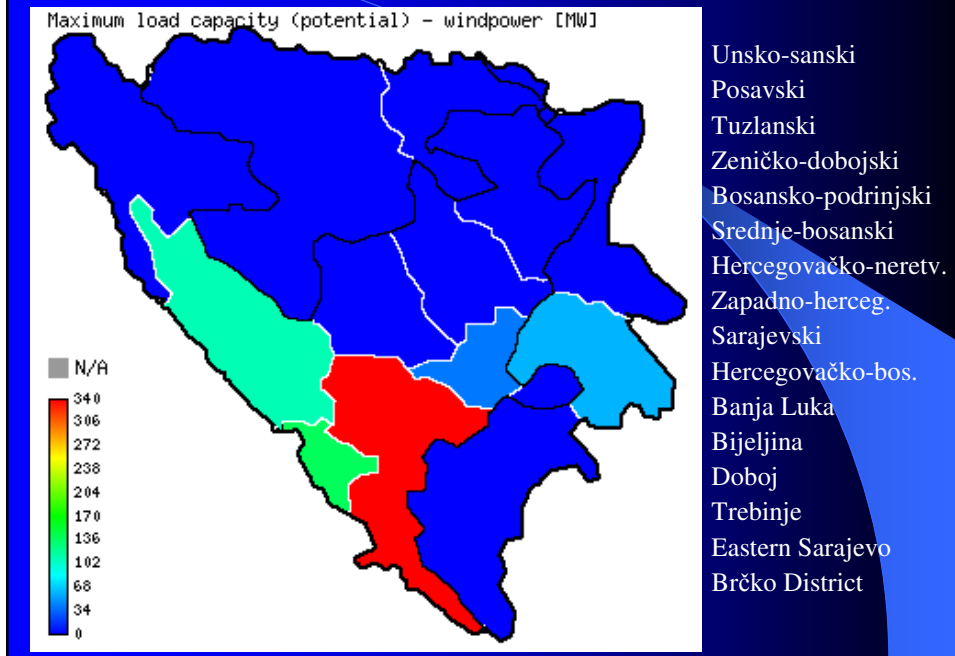
CO₂ emission of different technologies

Emission of CO₂ [kg/MWh]

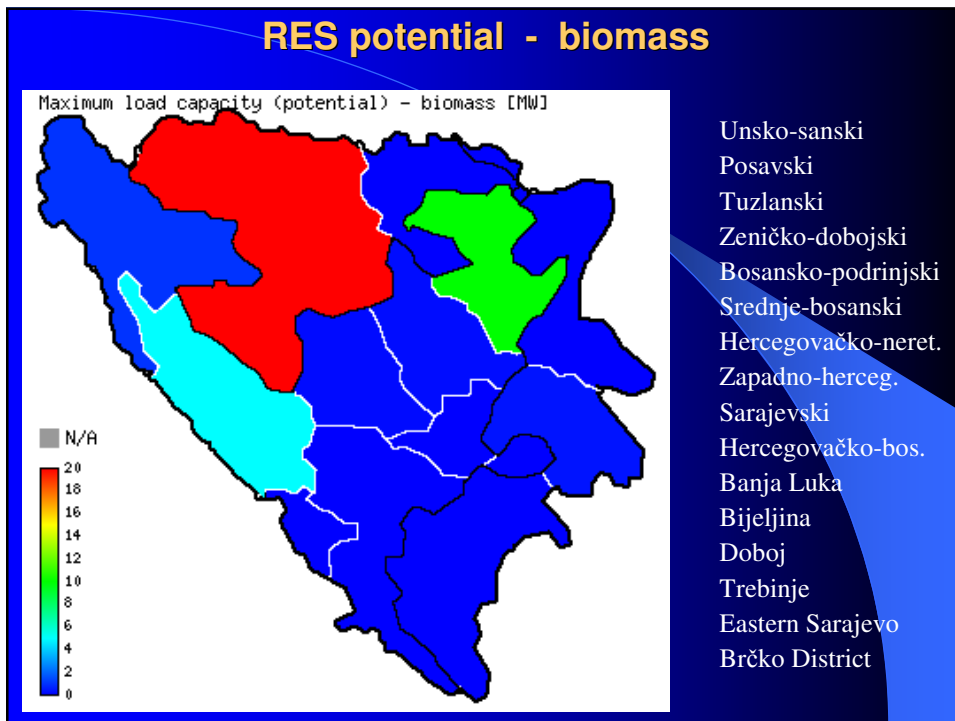




RES potential - wind power



RES potential - biomass



Conclusions

- The energy sector in Bosnia and Herzegovina has a considerable potential and might become a significant exporter in the region.
- Some initial steps to unify it at the state level are under way, but the application of accepted plans is rather slow and could reduced the possible effects.
- The new technologies with higher efficiencies, especially for electric power generation and final use should be taken into consideration.
- Investigation and implementation of renewable energy sources should be imposed.

Thank You!