

**3_{rd} South East European Conference on Sustainable Development
of Energy, Water and Environment Systems**

**Supporting outset and consolidation of bioenergy
value chains in South East Europe
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**Biomass availability and competitive
uses in Vojvodina**

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Very important documents and publications which define sustainability of RES

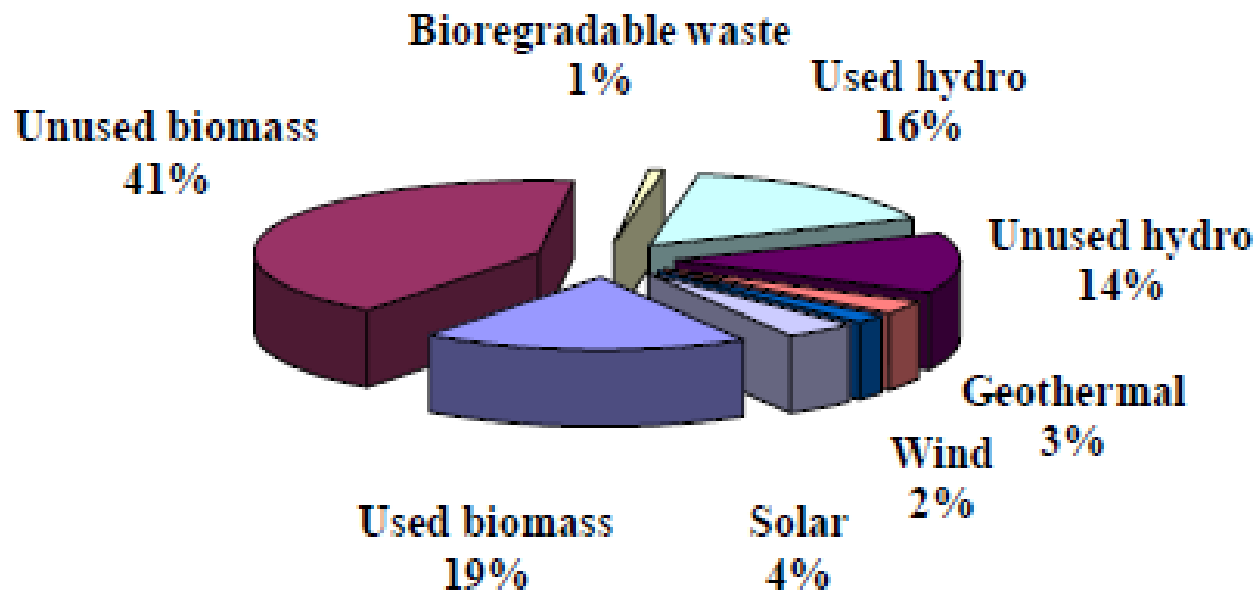
Directive 2015/1513 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources. European Commission, Brussels.

2016a. Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast). European Commission.

2016b. Annexes to the Proposal for a Directive of the European Parliament and the Council on the promotion of the use of energy from renewable sources (recast). European Commission.

RES ACTION PLAN IN SERBIA

Renewable energy sources with an estimated technically usable potential of about 5.6 Mtoe per annum can have a considerable contribution to a lesser utilization of fossil fuels and achievement of defined targets regarding the share of renewable sources in the GFEC, as well as regarding the improvement of environment. The biomass potential amounts to approximately 3.4 Mtoe per year (2.3 Mtoe per year is unused, and 1.1 Mtoe is used)...



Among unused biomass potentials are dominant crop residues, the most significant corn stover!

Electricity

	2009		2020	
	MW	GWh	MW	GWh
Hydro	2224	10276	2662	11416
<1MW	4	11	164	460
1MW–10 MW	12	31	40	140
>10MW	2208	10234	2458	10815
Wind	0	0	500	1000
Biomass	0	0	130	945
Solid	0	0	100	640
Biogas	0	0	30	305
TOTAL	2224	10276	3316	13381

Total about 81.3 ktoe or 7.0 % of all renewables.

Biogas could be doubled (after 2020), but this makes total 107 ktoe, or 9.3 % of all renewables.

Comments!! Viability.

Heating and cooling

	2009, ktoe	2020, ktoe
Geothermal	5	10
Solar	0	5
Biomass	1054	1152
Solid	1054	1142
Biogas	0	10
TOTAL	1059	1167
Of which DH	0	25
Of which households	994	1001

DH – district heating

Biomass makes about 99 % of all RES in the sector. Problem is low quality of heat generators, low efficiency, high emission of pollutants. Mobilization of biomass recourses, sustainable utilization of crop residues, more short rotation coppices.

Transport

	2009	2020
Bioethanol, ktoe	0	25
Of which imported, %		57
Biodiesel, ktoe	0	220
Of which imported, %		60
Total, ktoe	0	245

Biomass is only source for RES.

Most critical sector, high costs.

LCB can be about 35 ktoe from own sources.

Biomethane to be considered, but for the period after 2020.

Biodiesel or native plant oil for agriculture???

Summarized (GFEC- gross final energy consumption)

	2009		2020		Planned increase of RES, ktoe
	GFEC from RES, ktoe	Share of total RES/share of sector, %	GFEC from RES, ktoe	Share of total RES/share of sector, %	
Electricity	884	9.7/28.7	1,151	12.1/33.6	267
Heating/cooling	1,059	11.6/25.6	1,167	12.3/27.6	108
Transport	-	0	245	2.6/9.2	245
Total	1,943	21.3	2,564	27.0	621

Ascertainments:

Share of biomass of total RES is in 2009 about 54 %, and in 2020 about 58 %.

High share in heating & cooling sector, low in electricity.

Very well covered electricity, low coverage of transport fuels.

Principle of least cost and potentials will guide further development of RES incentives on country level!

Profitability of investment on private investors level!

Further R&D achievements should enable new solutions!

Excerpt from Decree related to *feed-in tariffs* for biogas plants

No.	Privileged producer's type of power plant	Installed power P, MW _e	Incentive purchase price, c€/kWh	Maximal annual effective operating time, h
3.	Biogas power plants			8600
3.1		0 - 2	18.333-1.111*P	
3.2		2-5	16.852-0.370*P	
3.3		over 5	15	
4.	Power plants for landfill gas and gas from waste water treatment plants		8.44	8600

P– nominal electric power in MW_e

Additional requests - positive

No more than 40 % of corn silage used as substrate. (Not all)

No more than 10 % electricity input for own use.

Negative – Placement of minimal thermal energy obligation not regulated.



Availability and competitive uses in Vojvodina

Here is focused electricity generation sector

The biggest unused biomass potential in Autonomous Province of Vojvodina, are crop residues, first place corn stover.

The electricity from biogas can be doubled, and based on development of profitable mini and micro units tripled.

Two biomass, crop residues, based CHP units are into consideration, each of 5 MWe. Realization seems to be realistic. The problem is, in all cases, continuous utilization of thermal energy.

Growing of short rotation coppices, SRC, first of all poplar and willow, is still not elaborated to the commercial maturity level.



FINAL MESSAGE

Only sustainable, that include economic aspects, profitable, utilization of biomass has a future!

Further technological development, on international level, are sought-after!