

# Strategic Analysis for the Bioenergy Sector in Western Balkan Countries as well as Moldova and Ukraine.

C. Perakis<sup>a</sup>, V. Papandreou<sup>a</sup>, S. Ntoulas<sup>a</sup>, E. Alexopoulou<sup>a</sup>, P. Gvero<sup>b</sup>, S. Petrovic<sup>c</sup>, J. Domac<sup>d</sup>, K. Popovski<sup>e</sup>, C. Bordeianu<sup>f</sup>, V. Nikcevic<sup>g</sup>, B. Glavonjic<sup>h</sup>, D. Stojiljkovic<sup>i</sup>, T. Zheliezna<sup>j</sup> and C. Panoutsou<sup>a</sup>

<sup>a</sup>Center for Renewable Energy Sources -19<sup>th</sup> Km Marathonos Ave., 190 09 Pikermi, Greece, <sup>b</sup> University of Banja Luka, Faculty of Mechanical Engineering, [petargvero@yahoo.com](mailto:petargvero@yahoo.com), <sup>c</sup> IGT-Research and Development Centre of Gas Technology Sarajevo, [seminpetrovic@yahoo.com](mailto:seminpetrovic@yahoo.com), <sup>d</sup> North-West Croatia Regional Energy Agency, [jdomac@regea.org](mailto:jdomac@regea.org), <sup>e</sup> MAGA, [kpovovski@mac.com](mailto:kpovovski@mac.com), <sup>f</sup> [cbordeianu@starnet.md](mailto:cbordeianu@starnet.md), <sup>g</sup> [vesna.nikcevic@zis.gov.me](mailto:vesna.nikcevic@zis.gov.me), <sup>h</sup> Belgrade State University, Faculty of Forestry, [brankogl@rcub.bg.ac.rs](mailto:brankogl@rcub.bg.ac.rs), <sup>i</sup> Belgrade University, Faculty of Mechanical Engineering, Fuels and Combustion Lab., [dstojiljkovic@mas.bg.ac.rs](mailto:dstojiljkovic@mas.bg.ac.rs), <sup>j</sup> SEC "Biomass" Ltd, Ukraine, [zhelyezna@biomass.kiev.ua](mailto:zhelyezna@biomass.kiev.ua)

## Introduction

The main purpose of this work is to present a strategic analysis of the bioenergy sector in the western Balkan region, namely Albania, Bosnia & Herzegovina, Croatia, FYROM, Montenegro and Serbia, as well as Moldova and Ukraine, evaluate the role it can play in the future energy mix and provide suggestions for future investment possibilities.

## Bioenergy in the Energy Community (EC)

### CROATIA

- The most important source of biomass for energy is wood from forestry and wood processing. The total forest and forest land area in Croatia amounts to 2 688 690 ha, with approximately 78 % managed by the public company 'Hrvatske šume', Ltd. Zagreb. This may prove a key factor to facilitate the development of the energy market.
- Agricultural biomass residues (mainly from wheat and maize) can be found in both Eastern Croatia and coastal zone but to a large extent they remain unexploited.
- Animal manure is expected to deliver a modest contribution to bioenergy in Croatia as cattle breeding has been on a steady decrease in the last years.
- Fuelwood mainly consumed in residential sector for heating purposes.
- Wood industry residues are used for industrial heating, however, biomass boilers in wood industry need refurbishment- replacement.
- Currently there are 9 plants producing 172.5 ktonnes of pellets and and 19.4 ktonnes of briquettes. Nearly 80% of the pellets and 50% of the briquettes are exported.
- Biofuels market is underdeveloped.

### BOSNIA & HERZEGOVINA

- Almost 50 % of the area of Bosnia and Herzegovina is covered by forests, making forest biomass potential substantially high. However, agricultural residues have also good energy potential in the regions of Northern, Central and Southern Bosnia and Herzegovina.
- Current biomass use amounts to 7% of TPES (2008), mainly fuelwood and wood waste.
- Wood industry residues are used for industrial heating, however, biomass boilers in wood industry need refurbishment-replacement.
- Fast growing industry of pellets and briquettes.
- Biofuels market is underdeveloped.

### MONTENEGRO

- Montenegro has both forest and agricultural biomass feedstocks deriving from forest and wood processing operations, viticulture and olives.
- The residual wood from hardwood is traditionally used for heating in households in heaters.
- Small production of briquettes in some wood-processing companies is used in local markets.
- Biofuels market is not developed

## Approach

The work is structured in three sections:  
•A review of the renewables & the bioenergy sector in the countries based on national level information for biomass supply and use.  
•A SWOT analysis for the bioenergy & biofuels sectors at national and regional levels.  
•Identification of promising biomass to energy & fuel applications and the related market segments which should be targeted for future investments.

## SWOT Analysis

<b>STRENGTHS</b> <ul style="list-style-type: none"><li>•Significant biomass potential</li><li>•Experience in biomass research and exploitation (boilers, combustion research)</li><li>•Significant existing utilization</li><li>•Acknowledged role and importance by makers</li></ul>	<b>WEAKNESSES</b> <ul style="list-style-type: none"><li>•Limited capital flow for new investments</li><li>•Restricted knowledge on biomass potentials prohibits fast development of strategies and investment opportunities</li><li>•Limited use of solid biomass for district heating, CHPs and electricity production (traditional use vs modern use)</li><li>•Delays on implementation of policies</li><li>•Lack of support mechanisms in most cases</li><li>•Scattered ownership of agricultural land prohibits economies of scale</li></ul>
<b>OPPORTUNITIES</b> <ul style="list-style-type: none"><li>Existing boilers in wood industry use fossil fuels or need re- refurbishment.</li><li>-Electricity or CHP in wood industry</li><li>-Substantial use of firewood but old fashioned- not high efficiency stoves</li><li>-Development of regional pellets and briquettes market</li><li>-Development of a regional biofuels market</li><li>-Attraction of additional investments by the Kyoto Protocol mechanisms.</li><li>-Creation of new jobs</li><li>-New opportunities under the new EU RES Directive</li><li>-Good potential for local equipment producers</li><li>-Opportunities for fuel replacement in DH plants</li></ul>	<b>THREATS</b> <ul style="list-style-type: none"><li>Lack of coherent statistics at regional level</li><li>-Issues with illegal cuttings from forest</li><li>-Low electricity prices from fossil fuels</li><li>-Low competitiveness of agricultural systems</li><li>-Lack of well structured proposals for targeted investments</li><li>-Unstable legislative framework in some cases</li></ul>

### UKRAINE

- Current biomass use comprises of 80% fuelwood and 20% peat.
- Wood industry residues are used for industrial heating, however, biomass boilers in wood industry need refurbishment-replacement.
- Fast growing industry of pellets and briquettes.
- Vast unexploited potential of agricultural residues.
- Several units operating on agro-residues or manure have been installed lately; even more projects are in the pipeline of implementation.
- Increased interest for investment on biomass for electricity generation following the introduction of green tariffs in 2009.

### SERBIA

- Biomass is the dominant source of RES accounting for nearly 63% of total RES potential (excl. large hydro).
- Fuelwood is extensively used in the residential sector for heating; ~8% of total final consumption.
- Little use of biomass in DH plants ~13ktoe, but significant potential.
- Production capacity of pellets reaches 250 ktonnes/yr; the entire production is exported to the EU
- Target to produce 44.5 GWh from biomass and cover 2.2% of transport fuel demand with biofuels by 2012
- Favourable supporting scheme (feed-in-tariff) for biomass power production introduced; 12-13.6 c€/kWh depending on plant size
- National Biomass Action Plan to be announced within 2010

### MOLDOVA

- High proportion of rural population & high prices of imported conventional fuels have led to significant exploitation of agro-residues.
- Current biomass consumption amounts almost to 25% (of TPES in 2008).
- The available solid biomass is mostly used in rural areas by private householders - for heating, cooking and heat water supply, as well as for heating public buildings (schools, hospitals, etc).
- Over the last couple of years, in the frame of a GEF project, 11 straw boiler-houses have been implemented, supplying a series of public buildings.
- Biofuels market is underdeveloped.

## Conclusions

Biomass is the dominant RES in the region and is widely used for heating in the residential sector. Despite the good potential and favourable geopolitical conditions implementation of investments will require harmonisation of efforts concerning the following issues:  
•Development of a favourable legislative framework (licensing, planning etc) and support mechanisms  
•Coherent statistics at local administrative level  
•Fast implementation of European policies and certification/standardisation procedures

### ALBANIA

- Fuelwood is currently the only biomass source used for energy purposes. The recorded consumption in 2008 was 0,36 PJ in industry, 7,54 PJ in households, 0,89 PJ in services and 0,21 PJ in the agricultural sector.
- Biomass is mainly used for heat production.
- Other forms of biomass, e.g. agro-residues and animal waste, remain unexploited.
- Biofuels market is not developed

### FYROM

- The average share of firewood in the national energy balance is approximately 8-10% for the last 30 years.
- Presently, wood and charcoal take about 80% of the biomass use for energy production. Other 20% consist of burning the vineyard branches, rice shells, orchard branches, straw of grains, etc..
- All the biomass is used for heat production.
- Biofuels market is underdeveloped.