

BIOMASS STUDIES ROMANIA CONCLUSIONS and RECOMMENDATIONS

September 2009

The Romanian Ministry of Economy ([MEc](#)), responsible for development and enforcement of policy on renewable energy and bioenergy, has requested assistance from the Netherlands to perform the [project “Biomass Plan for Romania”](#). The Dutch Ministry of Economic Affairs has asked SenterNovem, the Dutch energy agency, to provide the required assistance. The Romanian beneficiaries are the General Directorate for Energy, Oil and Gas and the Directorate for Quality Infrastructure and Environment, both within the Romanian Ministry of Economy..

Subcontractor within the project is the Center for Promotion of Clean and Efficient Energy in Romania ENERO, who carried out 3 studies on biomass development in Romania:

1. Biomass potential and scenario's
2. Markets and technologies
3. Actors and organisation of the bioenergy field

The present conclusions and recommendations are based on the results of these 3 studies, and are focusing on the best use of biomass as fuels for energy and transport purposes, within the general RES quota target in 2020. This summary is also available in the Romanian language, but the main reports are only available in English.

1. THE PROSPECT FOR RES QUOTA FULFILEMENT IN 2020

The result of this chapter is based on the study on potentials and scenario for biomass in Romania.

The gross final energy consumption by 2020 is forecasted by the EC based on studies using PRIMES model. Within the document Annex to RES Directive impact assessment - SEC(2008) 85, the final consumption in Romania by 2020 is 34.9 Mtoe. More recent studies (RES2020, www.res2020.eu) consider the figure 30.48 Mtoe.

In the present summary the reference figure for the gross final consumption by 2020 is considered to be 31,000 ktoe, resulting in 7440 ktoe from RES in order to fulfill the 24% quota.

- Different Renewable Energy Systems and their contribution:

First, the possible maximal contribution of RES technologies is estimated, based on the most consistent information available at this moment on their contribution by 2020. This is open for discussion and additional information from other studies is welcomed.

- HIDROELECTRICA strategy is stating a hydro production of 20.1 TWh in its facilities (including some small hydro), while for small hydro recent studies (Phare 2008) indicates 2.3 TWh.
- TRANSELECTRICA is considering now that a maximal capacity of 3000 MW wind may be integrated in the grid. Most probably, with further grid reinforcement than planned today and a better dispatching of unbalances, some 3600...3700 MW may be accepted by 2020, producing some 8 TWh
- Geothermal heat is assumed to have a moderate increase in absolute terms, from today conditions (some 40 ktoe), towards 75 ktoe (an increase of 24 ktoe is estimated between 2011 and 2015 by the Romanian RES Strategy- GD 1535 /2008)
- Solar heat is expected to have a similar contribution by 2020, 75 ktoe. Anyhow the geothermal heat, solar heat and PV, altogether impact is limited in the range of 2-3% of the total required RES output.

Deducting the above contributions, it remains inevitably clear that the bioenergy share will be large to fulfill the rest of 4,700 ktoe (197 PJ). The result is presented in figure 1.

At least from the point of view of biomass resources, the bioenergy is able to have this decisive contribution, based on the large unexploited potential, related mainly to the available land.

In conclusion biomass (including biofuels for transport) will be the main contributor with more than 60% from all RES, meaning some 190-200 PJ/year, starting from ca. 130 PJ/year today.

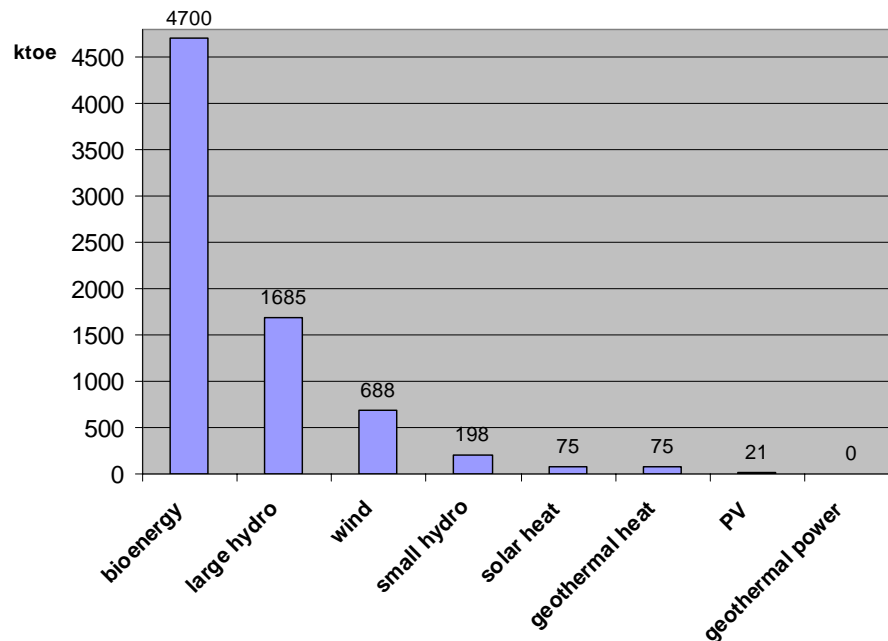


Figure 1. Scenario for RES contribution to 2020 year RES quota

Further premises are that:

- Biofuel is granted to penetrate to the needed level to fulfill the 10% quota
- Local biomass fuelled traditional stoves will remain an important consumer, but with a clear diminishing of their contribution.

Today, the statistics on biomass final consumption show a total of some 130 PJ/year, split in 110 PJ consumption in old rural traditional stoves (with around 18% efficiency) and 20 PJ in boilers in industry and tertiary sector.

There were considered the following rational evolutions of the **existing** biomass use and equipments, within the period 2010-2020 (11 years)

		Comments
Switch from traditional biomass stoves to natural gas heating	2% of stoves heating	Only in the next 2-3 years when NG may still look attractive
Switching from traditional biomass stoves to new local DH fuelled by biomass	c.a. 29% of stoves heating	
Replacing traditional biomass stoves by residential efficient biomass boilers *	18% of stoves heating	The average rate of replacement is 1.5%/year
Biomass consumption in remained traditional biomass stoves.....c.a. 66 PJ/year		
	Average Increase efficiency of	
Modernization of some of the existing industrial boilers	existing boilers by 15%	
Biomass consumption in existing industrial boilers..... c.a. 16 PJ/year		

*The RES directive, art. 13.6, is specifying the request to Member States to promote boilers with 85% efficiency in residential heating

- Co-firing with biomass should be encouraged only for coal fueled cogeneration units. Also here is debatable if biomass should be co-fired in obsolete, inefficient large coal thermal plants, so the co-firing with biomass was limited
- Municipal waste use for energy by 2020 is considered in line with ISPE studies
- The rest of needed output was split between the main biomass use technologies recommended for Romania: local DH with efficient boilers or CHP units and CHPs fuelled by biogas

Thus way we arrive to the following results:

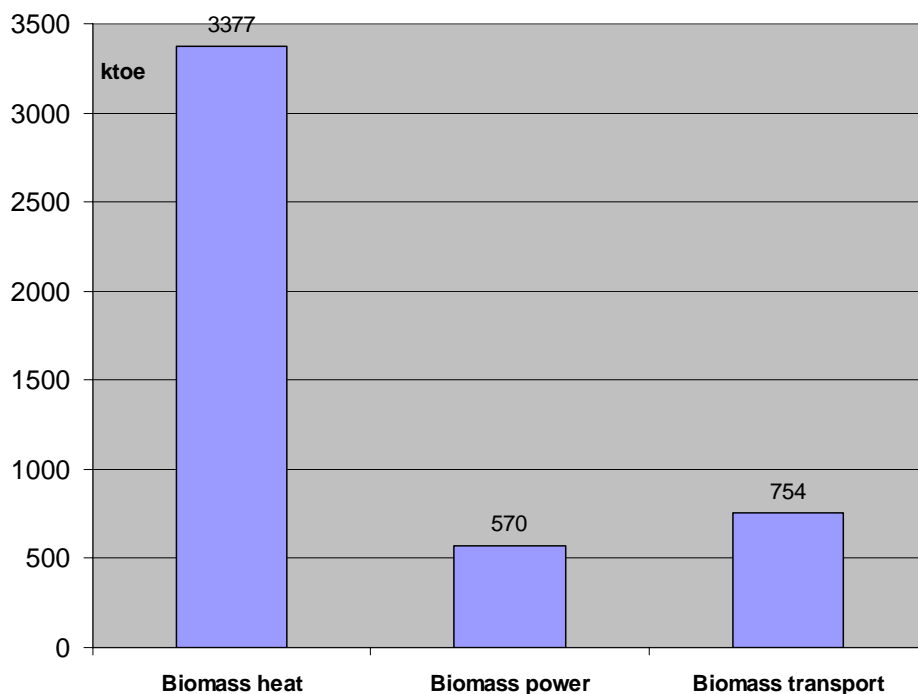


Figure 2. Biomass contributing to the Romania RES quota in 2020

Table 1. Biomass technologies scenario for energy output , by 2020, including biofuels

Technology	2009		2020	
	ktoe	Share	ktoe	Share
solid biomass stoves/boilers	2866	85.2%	1966	41.8%
solid biomas local DH	56.02	1.7%	669	14.2%
solid biomass electricity CHP	3.44	0.1%	344	7.3%
solid biomass heat CHP	4.13	0.1%	413	8.8%
cofiring biomass power	0.00	0.0%	41	0.9%
cofiring biomass heat	0.00	0.0%	12	0.3%
biogas electricity CHP	2.41	0.1%	155	3.3%
biogas heat	2.65	0.1%	217	4.6%
Municipal waste electricity CHP	0.00	0.0%	30	0.6%
Municipal waste heat	0.00	0.0%	100	2.1%
Biofuels	430	12.8%	754	16.0%
Total	3365	100%	4700	100.0%

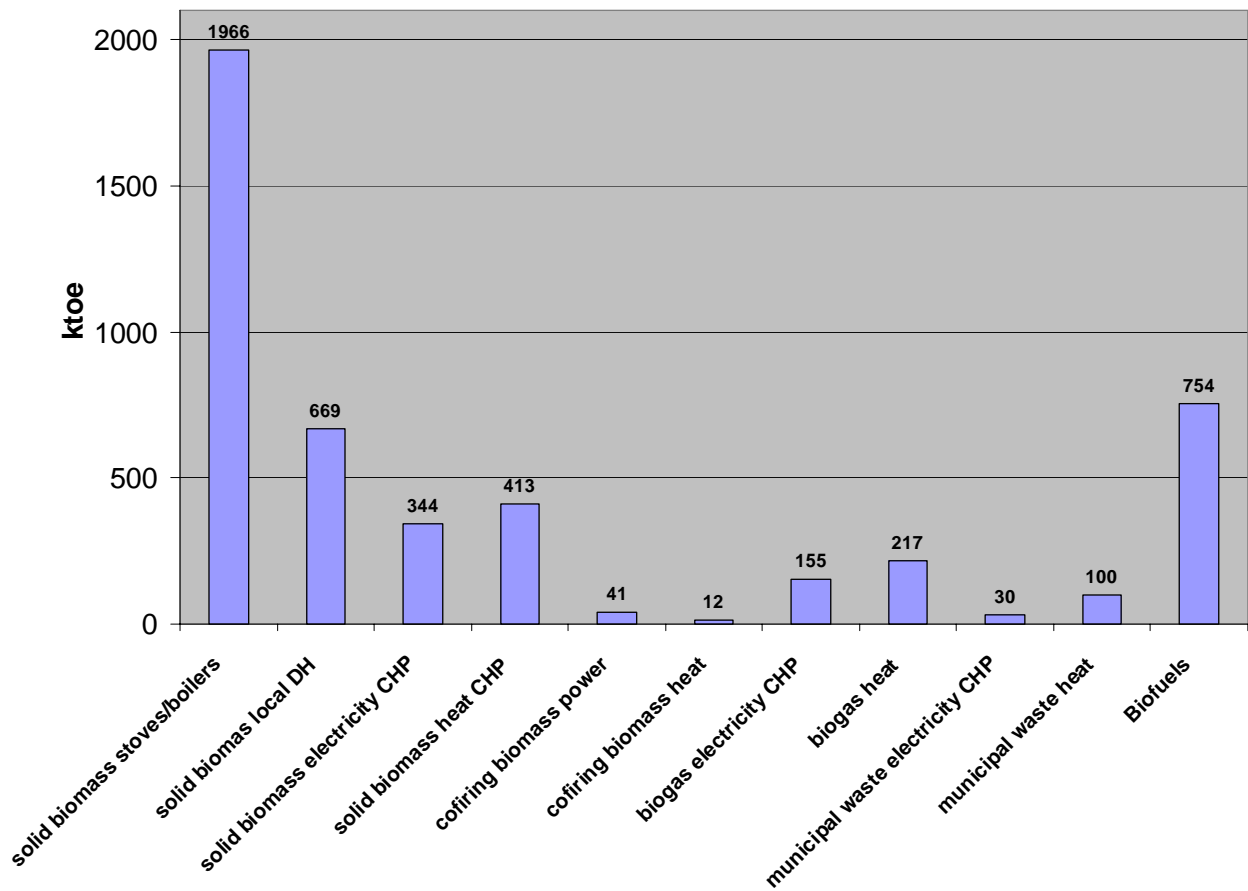


Figure 3. Biomass share scenario, contributing to the Romania RES quota in 2020

2. HOW TO ACHIEVE SUCH MAJOR CONTRIBUTION FROM BIOMASS ?

The results from this chapter are based on the second study on markets and technologies. The main present conditions are:

- There is a traditional acceptance for the biomass use for energy (heat)
- While the other RES technologies have already a mature position on the market (small hydro, geothermal for heat), or mark an irreversible progress (biofuels, wind energy), modern biomass technologies for heat and power are still at the beginning of market acceptance
- Presently the biomass contribution is high, by massive use of wood and agricultural waste in traditional rural stoves. Perversely, any switch to a more clean or efficient use of biomass technology (as asked by the RES Directive, art 13.6) will bring a reduction of biomass participation in the final consumption. Also by 2020 the major biomass contribution will come from the heating in rural stoves

Considering the aspects:

- Rural area is very developed in Romania (some 40% of the population is living there). The rural area is close to biomass resources and at the same time is fitted for decentralized, local heating systems.
- Large potential of forestry and agricultural waste.
- Large potential for biogas from agriculture and animals farming
- Historical experience to collect, deposit and use the biomass locally
- The need to improve the use of biomass for heating. Heating security is one of the main social concerns.

the studies recommend the following technologies as more efficient for Romania

LOCAL HEATING AND CHP BY USING:

- **WOOD AND STRAW**
- **BIOGAS FROM ANAEROBIC DIGESTION OF ORGANIC WASTE STREAMS**

These technologies need specific focus, because after biofuels and wind they will be the main resource for Renewable Energy in Romania. At present there are only a few Domestic Heating Plants from biomass in Romania and no CHP plant.

So it will be a very big step to realise the 200 District heating systems, the 200 CHP plants on biomass and almost 200 biogas plants (see Table 2 below)

All efforts should be focused to help the development of this market. These technologies may contribute to c.a. 24 % of the RES energy by 2020.

Table 2. Estimation of costs for heat and power plants fuelled by biomass, in view of 2020 year scenario fulfillment

New plants	Number	Unit capacity, MW	Total costs, millions Euro
solid biomass plant for local DH	around 200	8...12	750...850
solid biomass CHP	around 200	1...5	2400...2600
biogas CHP	150...180	0.7...1.3	850...900
municipal waste CHP	6...8	8...15	550...650

3. ACTORS AND ORGANISATIONS

The third report gives a complete overview of all actors in the Romanian government and market. It was concluded that there is a need for building of a governmental interdepartmental platform (Economy, Finance, Agriculture, Environment, Regional Development, Research) developing a governmental vision and legislation.

But also the market should get organised by building of a business platform or association for developing projects and undertake actions. An overview is presented in figure 4.

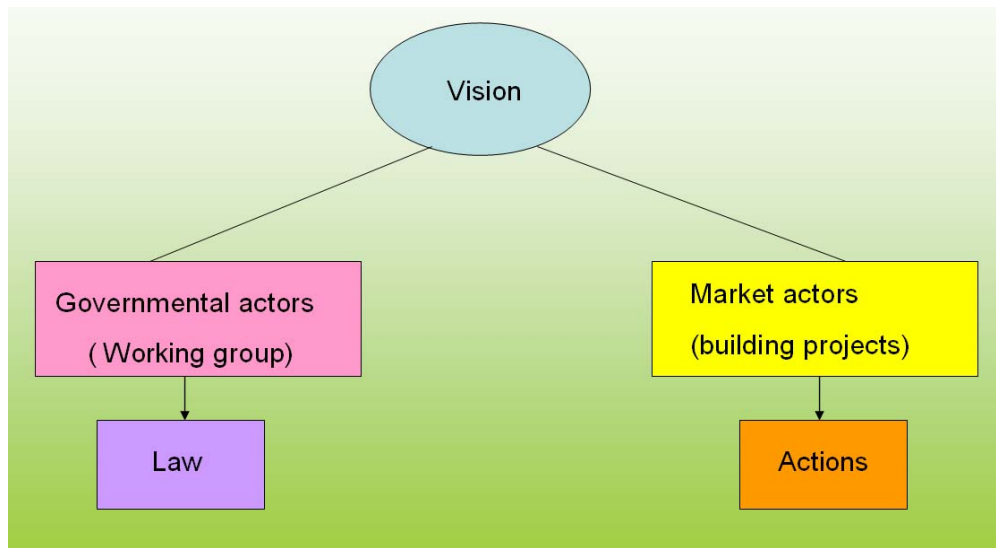


fig. 4. Governmental and Market organisation

- Active relation between the two platforms by regular meetings to convene on policy matters and give recommendations on how to link policy to action. The most topical action is to develop the Roadmaps to reach the convened targets.

4. HOW TO DEVELOP THE RECOMMENDED CHAINS?

GENERAL RECOMMENDATIONS

Policy

- Elaboration of the Biomass Action Plan, correlated with the RES Action Plan, with a large involvement of decisional bodies, experts, local authorities, other stakeholders. The National Action Plan to be split/aggregated to Regional Action Plans
- To work with the EC to nuance the value of an efficient heating from biomass (versus the fact that in Romania, replacing the inefficient use of biomass for heating will lead formally to a decrease of biomass contribution)
- Elaboration and implementation of a national strategy on cogeneration, with a dedicated concern on biomass cogeneration
- Improvement of the existing programme “Termoficare 2006-2015, caldura si confort” (“DH 2006-2015, heat and comfort”) with specific provisions on biomass DH promotion. The success of biomass for heating purposes and/or the success of biomass in combined heat and power will depend on the success of the district heating markets that constitute the indispensable link between larger-scale production facilities and a larger number of customers.
- Biomass is a ‘local fuel’, so the involvement of local authorities, local businesses and local communities is required to find appropriate local solutions, including collection of fuels
- Building of a governmental interdepartmental platform (Economy, Finance, Agriculture, Environment, Regional Development, Research) developing a governmental vision and legislation.
- Building of a business platform for developing projects and undertake actions.
- Active relation between the two platforms by regular meetings to convene on policy matters and give recommendations on how to link policy to action. The most topical action is to develop the Roadmaps to reach the convened targets.
- A governmental body to start to identify joint projects under the RES Directive flexible mechanisms and negotiate the Romania share within these projects
- To give priority to these projects within the co-financing by the Structural Funds and Environment Fund programmes. Within the first call of SOP-IEC Axis 4 only 3 projects on biomass CHP totaling 5.24 MW were selected to be co-financed with

13.75 millions Euro from a total 123 million Euro granted for renewables energy projects

- Increased research funds for biomass energy, mainly to up date the biomass potential and identify specific Romanian conditions and technological issue
- Elaboration of studies and scenarios to evaluate the economic impact, environmental impact and the sustainability for biomass resources of the biomass promotion policy, on short and long term as well
- Complete transfer of EU standards into Romania legislation

Market/ Financial

- Entering into force of the Law no. 220, providing 3 GCs for 1 MWh electricity from biomass. CHP for biomass is correctly incentivised by 3 GC per MWh (except biomass in co-firing which is over-incentivised), but the procedure should become operational
- The CASA VERDE programme of the Ministry of the Environment to promote with priority heating by biomass with modern boiler in new residential and public buildings or the switch of the heating systems from other sources (gas, DH by fossil fuels) to biomass. The programme should encourage the replacement of inefficient old biomass heating systems as well, once the value of the efficient use of biomass is recognized.
- For residential heating introducing a capital subsidy to be applied for the switch of gas fuelled boiler units to efficient biomass fuelled units.
- Introducing a support mechanism for local authorities to develop DH systems from biomass, as it exist for the electricity from RES. It could be a capital subsidy for DH systems fuelled by biomass or/and a regulated higher heat tariff introduced by the Regulatory bodies (ANRE, ANRSC).
- Biofuels look to be able to enter the market to the level of the quota asked, with no need for additional incentives (tax exemption or tax reduction).
- Developing legislation to implement sustainability criteria for biofuels and bioliquids
- Introduce a program to encourage the use of unused arable/degraded land for energy crops and introduce incentives for energy crop producers
- Introduce a regulatory framework on improving forest management in order to increase bioenergy from existing forests

Technical/Information/Awareness

- Monitoring of the installations co-financed by public funds, and collecting information from their operation, as open demonstrative projects, in view of replicability of the best practices.
- Dimensioning and developing guides and feasibility studies for standard biomass projects on 2-3 typical capacity sizes, free to be distributed, periodically improved based on the operation experience of the demo projects.
- Building by a specific guide forwarded to the local authorities of an inventory of possible biomass project location and economics. Many investors have indicated that funding is ready and available for full-developed biomass energy projects. Their main difficult task is finding project concepts and well-developed projects in which to invest.
- Demonstrative projects open to be visited
- Develop training courses for professionals and installers
- Campaigns for promoting local and residential biomass heating