CHALLENGES AND OPPORTUNITIES FOR BIOGAS PRODUCTION IN BULGARIA, CROATIA, GREECE, LATVIA, ROMANIA, AND SLOVENIA

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ABSTRACT: In order to support the biogas market in Southern and Eastern Europe the BiG>East project "Promoting Biogas in Eastern Europe – Mobilization of Decision Makers and Training for Farmers" is supported by the European Commission under the Intelligent Energy for Europe Programme. The general objective of BiG>East is to promote the production and use of biogas as a secure and sustainable energy source in six target countries of Eastern and Southern Europe: Bulgaria, Croatia, Latvia, Romania, Slovenia, and Greece (BiG>East target countries). In the framework of the BiG>East project, studies on the biogas potential, agricultural structures, legislation, and policies in the BiG>East target countries were assessed. Some of the target countries have already established renewable energy laws, others still lag behind. Apart from these framework conditions in the target countries, the BiG>East project aims to build capacities and to transfer knowledge from project partners of Western Europe with extensive, long-term expertise to farmers, biogas plant operators and decision makers in Southern and Eastern Europe. This is achieved by training, study tours, and mobilisation campaigns for decision makers on national, regional and local level as well as for financiers and investors. Results of the BiG>East studies are publicly available and aim to facilitate investments of local companies and exporters.

Keywords: biogas, anaerobic digestion, barriers to bioenergy, socio-economic aspects

1 INTRODUCTION

Europe's current situation with increasing fossil energy prices and rising dependency on energy imports makes it highly necessary to produce and valorise biogas in terms of heat, electricity and fuel. In 2007, about 5.9 Mtoe of biogas were produced for energy uses in the European Union [1]. Nevertheless, the potential is estimated at much more than 20 Mtoe. Currently, the biogas sector in Western Europe is faced by rapid technical and non-technical developments and innovations, and biogas markets are growing at a considerable pace. In Germany, the biogas market is booming and there are currently about 4,000 biogas plants installed. Also Austria and Denmark have considerable biogas markets. In contrast, the biogas market in Southern and Eastern Europe is very small, although the potential is promising especially if organic wastes are used for biogas production [2].

In order to support the biogas market in Southern and Eastern Europe the BiG>East project "Promoting Biogas in Eastern Europe – Mobilization of Decision Makers and Training for Farmers" (Contract No. EIE/07/214) is supported by the European Commission under the Intelligent Energy for Europe Programme.

2 THE BiG>East PROJECT

The general objective of BiG>East (Figure 1) is to promote the production and use of biogas as a secure and sustainable energy source in six target countries of Eastern and Southern Europe: Bulgaria, Croatia, Latvia, Romania, Slovenia and Greece. This is achieved by knowledge transfer from project partners with extensive, long-term expertise of Western Europe to farmers, biogas plant operators and decision makers in Southern and Eastern Europe. The BiG>East project is coordinated by WIP Renewable Energies and includes twelve organisations which elaborate the following tasks of the BiG>East project:

- Studies on the biogas potential and barriers in the target countries
- Development of training handbooks for farmers in English and national languages
- Implementation of 18 pilot training courses for farmers
- Identification of promising sites for the set-up of new biogas plants
- Organisation of 12 mobilization campaigns for decision makers and funding bodies
- Dissemination of project results via workshops, technical study tours and presentations

Figure 1: BiG>East logo

BiG>East (Contract No. EIE/07/214) is supported by

the European Commission from 2007 to 2010 under the Intelligent Energy for Europe Programme. Further information about the BiG>East Project is available on the project website: www.big-east.eu.

3 THE BIOGAS MARKET IN SOUTHERN AND EASTERN EUROPE

Southern and Eastern Europe represents a great potential for biogas production and utilisation due to its significant agricultural sector and waste streams. However, this potential still remains unexploited. The biogas business sector identified these target countries as high potential biogas markets, but all share the same main barrier for its development: lack of suitable framework conditions for the set-up of new biogas plants. These missing framework conditions are related to three main areas:

- Lack of suitable policies and legislation
- High administrative burdens
- Difficult access to financing sources

If these barriers are not removed, the biogas development in these countries remains low. On the other hand, the production and wide-range utilisation of biogas could offer many benefits for Bulgaria, Croatia, Latvia, Romania, Slovenia and Greece, contributing to national and European legislation and targets as included in the Directives on: nitrate (Council Directive 91/676/EEC), fertilizers (2003/2003/EC), waste (2006/12/EC), and landfill of waste (1999/31/EC) [3]. The production of biogas in Southern and Eastern Europe may especially contribute towards the 20% renewable energy target of the Directive "on the promotion of the use of energy from renewable sources" (RED) (2009/28/EC) which recognises that "the use of agricultural material such as manure, slurry and other animal and organic waste for biogas production has, in view of the high greenhouse gas emission saving potential, significant environmental advantages in terms of heat and power production and its use as biofuel. Biogas installations can, as a result of their decentralised nature and the regional investment structure, contribute significantly to sustainable development in rural areas and offer farmers new income opportunities" (p. L 140/17) [4].

In the following, an overview of the current situation in target countries of the BiG>East project is presented [2, 5].

3.1 Bulgaria

Bulgaria has a large potential of biomass that can be used for energy production. The favourable climate for the production of different crops and the existence of large agricultural lands and animal farms contribute towards well-development agriculture and animal husbandry. This provides an opportunity for development of biomass potential for the production of biofuels and biogas, provided that the necessary stimulation mechanisms are laid down in legislation. Bulgaria has adopted the Renewable and Alternative Energy Sources and Biofuels Act (2007), without delivering regulations or support instruments (feed-in, tax incentives, financing) with respect to biogas. Future development of the biogas sector is highly dependant on the willingness of politicians and policy makers to formulate policies and introduce legislations. Currently, in Bulgaria, no commercial biogas plant is installed, but one biogas plant is under construction and some are in the planning phase.

3.2 Croatia

The biogas sector is one of the least developed renewable energy sectors in Croatia. A strong push towards biogas production from animal manure comes from the European Nitrate Directive and RED. The legislative framework for biogas production in Croatia is promising. A national energy law was introduced in 2001 and complemented by a renewable energy law in 2007. The renewable energy target for Croatia is 5.8% in 2010. Thereby, 2% have to be produced by combined heat and power generation. The electricity feed-in tariff for small-scale plants (<1 MW) is 0.1644 €/kWh and 0.1425 €/kWh for larger plants.

Until 2009, there is only one agricultural biogas plant eligible for the feed-in tariff. The interest of farmers in anaerobic digestion is increasing due to the high potential of agricultural wastes (manure).

The main barriers for biogas production in Croatia are the high investment costs as well as complete omission of biogas plants in regional spatial planning.

3.3 Greece

The biogas market in Greece is mainly based on agro-industrial effluents, sewage sludge and municipal solid waste (MSW) landfills. Currently, there are 15 biogas plants in operation in Greece. Furthermore, there are some 5-6 biogas plants in Greece in different project phases and most applications cover landfill plants and waste water treatment plants. Currently, there is no farm scale biogas plant installed.

In 2006 a new law (3468/2006) for the promotion of renewable energies was introduced in order to speed up the licensing procedures and to reform the electric energy production from renewable energy sources. The new feed-in tariff for electricity from biogas is 0,073 €/kWh, but it depends on the used technology.

3.4 Latvia

Due to the available biomass resources, the biogas potential of Latvia is very promising. However, at the moment, there are only few biogas plants with cogeneration units in operation. One plant uses sludge from waste water and two plants are installed on landfill sites. Their total installed capacity is 7.5 MW_{el}.

Recently, Latvia's first agricultural biogas plant was constructed and finalized in Vecauce, which was visited by the BiG>East consortium and participants of the Mobilisation Campaign in February 2009 (Figure 2).

Figure 2: Visit of the 1st Latvian agricultural biogas plant in Vecauce (February 2009)

3.5 Slovenia

Slovenia has a large potential for biogas production from farm residues and waste treatment plants. Up to now, there are only five agricultural biogas power plants in operation (4 MW_{el}) and several others are in the planning process. In addition, there are four landfill plants (3.7 MW_{el}) and six biogas plants for sewage sludge (2 MW_{el}).

The low feed-in tariff for biogas in Slovenia is 0.12 €/kWh which is guaranteed for only ten years and decreases by 5% after five years of operation.

3.6 Romania

The situation in Romania is different from the other Eastern European countries since it has a track of biogas research and production since many years. Research in the biogas sector in Romania started more than 50 years ago. In the late 1970's, the first industrial biogas plant was implemented. In the late 1980's, many small and large scale biogas plants were in operation, but after 1990, interest and investment decreased dramatically. Today, the number of large pig and cattle biogas units has decreased significantly and only very few projects have been developed and implemented after 1990. No plant from the 400 developed is currently still in operation. Some efforts for the promotion of biogas were done by NGO's, private companies and State Agencies after 2006.

4 BIG>EAST ACTIVITIES TO OVERCOME BARRIERS

4.1 Access to information

An important barrier which inhibits biogas development in Southern and Eastern Europe is the lack of information which can be divided into three categories [6]. Firstly, it is costly for exporting manufacturers from Western Europe to gain information on biofuel potentials, barriers, policies, and legislation of the target countries. Secondly, there is only very limited information on biogas technologies available for stakeholders in Southern and Eastern Europe. Finally, information on biogas potential, barriers and policies need to be easily accessible for decision makers in the target countries.

The BiG>East project aims to improve this information flow within these categories. Reports on biogas potentials and barriers were developed and published at the BiG>East website. These reports provide information for exporting manufacturers from Western Europe and for decision makers from Southern and Eastern Europe.

A biogas handbook was elaborated in seven languages, giving basic information about technical aspects of biogas production for stakeholders in the target countries. The handbook is available for download on the BiG>East website.

Furthermore, study tours to existing biogas plants were organised in order to inform project partners as well as decision makers and farmers about biogas opportunities. One-day study tours were organised in Germany and Latvia, and a three-day study tour was organised in Austria. The next study tour will take place in Denmark in September 2009.

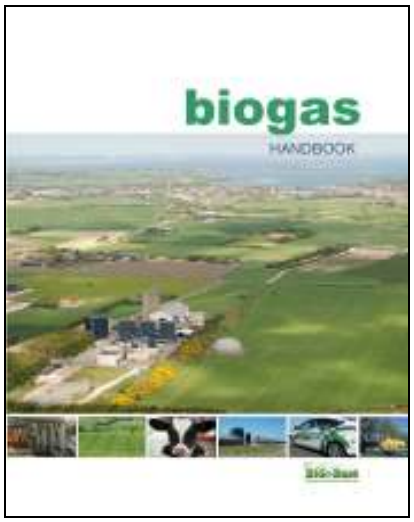

Figure 3: BiG>East Biogas Handbook (February 2009)

4.2 Mobilisation Campaigns

In order to promote biogas technology in Europe, it is crucial to inform and mobilize decision makers such as municipalities, politicians, utilities, environmental NGO's, project developers, funding bodies, waste management authorities, and SME's. Without the involvement of these decision makers and sufficient political support it will be impossible to realize biogas projects.

Decision makers are addressed in the framework of the BiG>East project by the implementation of so-called mobilisation campaigns which were already organised in Croatia, Bulgaria, and Latvia.

In order to make biogas technology as attractive as possible for decision makers, specific show cases are developed for Bulgaria, Croatia, Latvia, Romania, Slovenia and Greece including most promising sites for biogas production. These sites are identified by using guidelines [7] and assessment studies. The technical feasibility of biogas plants at these sites are presented to decision makers in the course of 12 mobilization campaigns.

4.3 Biogas Training

Capacity building is one of the key measures for the development of a sound biogas market. Within the BiG>East project, 18 biogas training courses for farmers and future biogas plant operators are implemented in Bulgaria, Croatia, Latvia, Romania, Slovenia and Greece. This increases the awareness among farmers and activates their willingness to work in the field of biogas. Training increases the quality of operating and maintaining biogas plants and avoids safety and health hazards, as well as malfunctioning installations. First training courses were already organised in Romania and Bulgaria.

5 CONCLUSIONS

In conclusion, the BiG>East project has the potential to increase biogas production in Southern and Eastern Europe through a bundle of non-technical supportive measures. Emphasis is given to awareness rising, European cooperation and capacity building. This supports the European Union to meet its renewable energy targets and to react on the waste problem which is very serious in many Southern and Eastern Europe. Economies of scale will be reached and the renewable energy market in Europe will be strengthened [8].

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