Project: BiG>East

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Barriers for biogas implementation in Latvia

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Contents

Introduction

This report has been developed in the scope of the **BiG>East** project, supported by the European Commission in the framework of the Intelligent Energy for Europe (IEE) Program.

The objective of this report is to identify and prioritize market and financial barriers for biogas production and its utilization in Latvia. This assessment also addresses other related barriers such as lack of knowledge and lack of awareness. This assessment serves as a base for recommendations to mitigate the identified barriers by understanding how they influence the development and implementation of the biogas market in Latvia.

The identified barriers are grouped into the following three general categories:

- Market Barriers
- Financial Barriers
- Other Barriers (e.g. Economic, Social, Legal & Administrative)

The target groups of this report are politicians, researchers and decision makers in Latvia as well as other people and organizations from other countries who are interested in development of Latvian biogas sector.

1. Market barriers for biogas implementation

1.1. Awareness about the biogas potential

There are different biogas potential studies carried out in Latvia. All of them are indicating the highest biogas potential in agricultural sector[1]. However, it is still not clear what is the spatial distribution of biogas potential in the territory of Latvia and where exactly the available biomass hubs are located. Thus the use of the identified biogas potential is complicated.

One more important barrier for use of biogas potential is the lack of statistical data (e.g., there is no particular information on available food processing organic waste[1]), thus evaluation of biogas potential and waste flows is complicated.

1.2. Awareness about available biogas technologies

Biogas in Latvia is mainly produced in landfills and in wastewater treatment plant, using solid wastes and sewage sludge as feedstock respectively. Only from the end of 2007 biogas generation from the first agricultural biogas plant in Latvia has started. Thus, for the long time in Latvia, available biogas technologies were limited only to landfill gas and wastewater treatment biogas technologies.

[1] Data source: Biogas Development program 2007-2011, Ministry of Environment of Latvia, 2007

Since the biogas market in Latvia is on a very early stage of development, there is no local energy industry for design, construction and operation of biogas plants. Currently only few biogas technology providers from Austria, Denmark, Germany and Netherlands are working in the Latvian biogas market. In order to further develop the biogas market, there would be need for local technology producers and definitely for biogas experts gaining knowledge on biogas production under the country specific conditions.

1.3. Waste management & supply ("fuel availability")

There is no single data source to evaluate organic waste amounts that are available for biogas production. Information on waste flows are collected by different organizations and included in different databases. Those waste databases only partly cover the necessary information to determine how much of each kind of waste is generated and is available for biogas.

The market situation regarding the availability of agricultural by-products is different from case to case. Only small part of agricultural by-products and agricultural waste is collected and sorted from the total waste stream.

According to the information from the Environmental, Geological and Meteorological agency of Latvia[2], significant part of collected waste materials is considered as problematic for biogas production. In case of food processing waste, as problematic, are given around 47000 tons (or about 37%) of organic waste with lack of information on their content of organic mater. However, the most problematic part is the huge amount of unsorted household and municipal solid waste. Only 3.6% of household waste is collected separately from the total waste flow. The rest – around 885000 tons per year are considered as problematic material, since additional separation and treatment is necessary in order to use those waste for biogas production. In order to use this waste material, improvement on waste sorting practices has to be introduced.

Currently there is no regulation prohibiting expired food (except raw food) from supermarkets and kitchen waste from restaurants and catering industry to be delivered to landfills. Only few organizations have contracts with some of by-product processing companies on utilization of expired food and kitchen waste, the rest is going directly to landfills.

1.4. Electricity Market Liberalization

Since the 1st of July 2004, the electricity market for non-households customers has been opened and since May 2008 each large electricity consumer (with more than 50 employees and annual turnover exceeding 7 million LVL ~ € 9.96 million) in Latvia has to enter in bilateral agreement with electricity supplier. Mainly these agreements have been signed with JSC "Latvenergo", but there have been cases with agreement signed with other utilities, e.g., with Estonian company Eesti Energia.

[2] Data source: Environmental, Geological and Meteorological agency of Latvia. Overview on biological waste and materials in Latvia in 2006

From the 1st of July 2007, the electricity market in Latvia is open for all the customers. There are no doubts that liberalization of electricity market in Latvia is more a theory than a reality, in particular due to regulated prices. JS Company „Latvenergo“ was designated as public trader in the Electricity Law and is under an obligation to supply all customers, therefore concerning households there is no offer from other energy suppliers.

Latvia and other Baltic States are between those countries in EU where electricity is the cheapest for domestic consumers (see Figure 1).

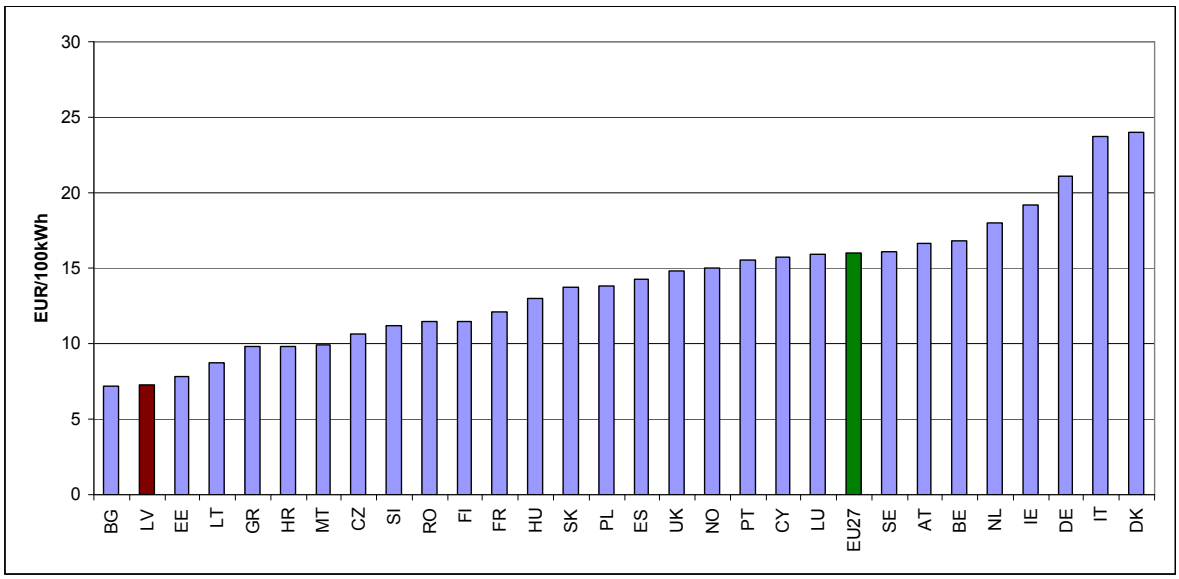

Figure 1. Electricity prices for domestic consumers in EU, 1 July 2007 (standard consumer Dc: 2500 kWh < Annual Consumption < 5000 kWh, all taxes included)[3]

For a standard Latvian consumer with annual consumption between 2500 and 5000 kWh the payment for 100 kWh is EUR 7.3, however EU-27 average price is EUR 16.03 (more than twice).

Industrial consumers with annual consumption between 20000 and 70000 MWh in Latvia pay € 5.28 per 100 kWh and the average price in the EU 27 is € 8.66 (see Figure 2).

In the beginning of 2007, the European Commission launched an evaluation paper on the development of electricity market in the Member States[4]. In this evaluation paper EC has evaluated the Latvian electricity market as not functioning and has suggested urgent need to create a Baltic energy market. In particular EC called for political will from the Baltic governments to liberalize the electricity market, but also for more regional and European regulatory powers. Though in the Baltic States, cooperation is ensured between the Baltic

[3] Data source: Eurostat

[4] Data source: Accompanying document to the Communication from the Commission to the Council and the European Parliament – Prospects for the internal gas and electricity market. Implementation report, Brussels, 10.1.2007. SEC (2006) 1709

Transmission System Operators and between the Baltic regulators, further integration of Transmission System Operators and more powers for regulators, including problem-solving mechanisms at regional level are needed in order to create a Baltic energy market.

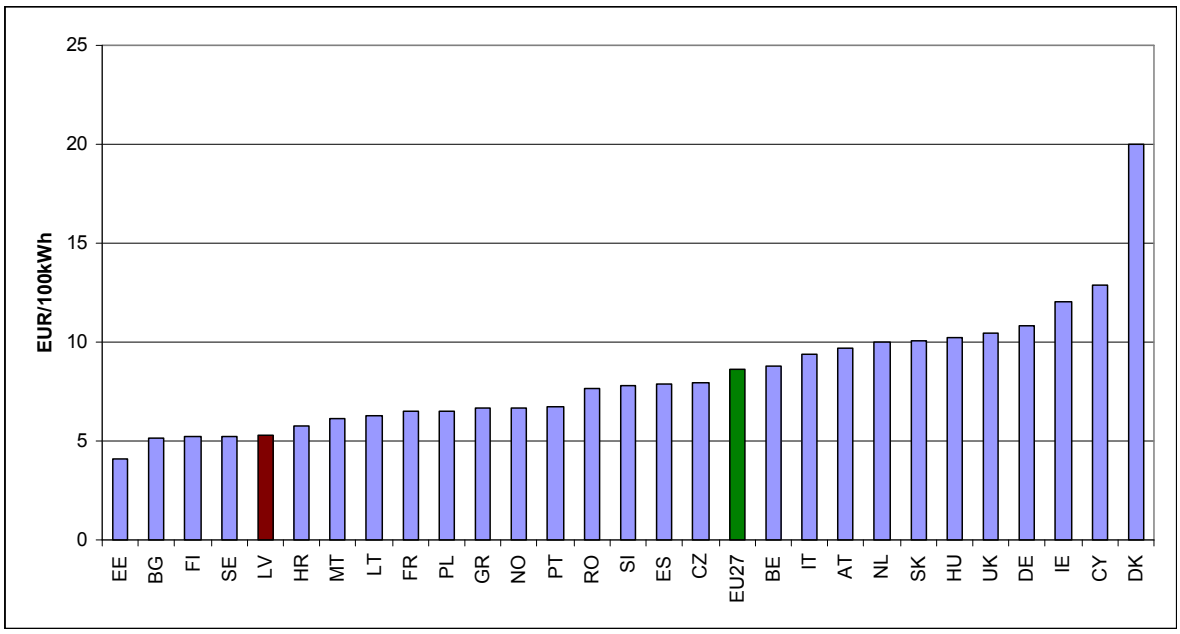

Figure 2. Electricity prices for industrial consumers in EU, 1 July 2007 (standard consumer Ie: 20000 kWh < Annual Consumption < 70000 MWh, all taxes included)[5]

1.5. End user related barriers

Electricity and Combined Heat and Power (CHP) market

In Latvia although the electricity market is fully liberalised since 1st of July 2007, the JS Company "Latvenergo" dominates in the field of electricity generation, transmission and distribution. Together with electricity market liberalization two daughter companies of JSC "Latvenergo" were founded – JSC "Augstsprieguma tīkls" is responsible for electricity transmission, and the second one – JSC "Sadales tīkls" is responsible for electricity distribution. So far there are only few other small distribution operators in the Latvian electricity market, the rest – more than 99%[6] of electricity consumers are served by JSC "Sadales tīkls". Thus, if a biogas plant wants to make a connection to the general electricity grid to be able to sell electricity produced in CHP, basically they are dependent from this one dominating company.

In practice, establishing connection to electricity grid is a very time consuming, expensive and bureaucratic procedure. First of all the operator has to receive a permit from the Ministry of Economy to become a legal electricity producer. And then the next step is to request

[5] Data source: Eurostat

[6] Data source: JSC „Latvenergo", www.st.latvenergo.lv

the grid connection to JSC "Latvenergo". Grid connection expenses could vary from case to case starting from few ten thousands Euros up to few hundred thousand Euros.

Heat market and infrastructure

In Latvia, the heat market is quite developed. The concept of district heating is widespread in Latvia. More than 70% of heat is produced in district heating systems. However heat sources usually are placed near the consumer. In case of biogas heat production it is very complicated to install biogas plant in the centre of a city or a village due to insufficient space, inappropriate logistics and possible undesirable odours.

Bio-methane production and possible injection to the grid

There are no regulations and legal bases on the technical criteria and experiences for Latvia for biomethane injection. In order to inject biomethane into the natural gas grid, it is necessary to amend chapter 8 "Gas supply system" of the Latvian Energy Law[7] ensuring that natural gas transmition operator gives permission for appropriate quality biomethane injection.

With reference to information obtained from JSC "Latvijas Gāze" so far no offers for biomethan injection were received. However, JSC "Latvijas Gāze" is constantly following experiences of other countries on this subject.

Vehicle fuel production and infrastructure

Despite the fact that there is experience for using natural gas as vehicle fuel in Latvia, the use of biogas for transport fuel is in a very early stage of development. The first investigations on possibility to use biogas as vehicle fuel were done in 2007 following the order of the Ministry of Economy of Latvia[8]. The main barriers for biogas use in transport in Latvia according to the investigation mentioned above are the following:

- The lack of long-term policy framework on biogas use in transport (e.g. tax allowances for vehicles using biogas);
- For municipalities and enterprises in public procurements are not included buses fuelled with gas;
- Existing gas station infrastructure is undeveloped (in 2007 only 3 fuel stations existed where natural gas can be filled);
- Lack of appropriate vehicles on market;
- Lack of companies for modification of existing vehicles for using gas fuel;
- Lack of overall public awareness.

[7] Data source: The Law on Energy, Riga, 1998

[8] Data source: Dr.habil.oec.A.Kalniņš „Biogāzes iespējas un tās kā tranportlīdzekļu degvielas izmantošana", 2007

Compost market

There are no special regulations on compost market and quality in Latvia, except if it is prepared from wastewater treatment sludge then it should meet the sanitary requirements stated in wastewater treatment regulations.

2. Financial and Economical barriers for biogas implementation

2.1. Availability of funding

Currently there are different sources of funding available for biogas projects in Latvia:

- It is possible to use Joint Implementation (JI) projects. In Biogas development program for Latvia it is predicted that during the next 5 years about 2 million Euros will be JI financing. However, at the moment clear actions for investment attraction is not elaborated.
- Theoretically it is possible to use Third Party Financing (TPF) and Public-Private Partnership (PPP) for biogas projects. Still the concept and awareness about TPF and PPP is not well developed in Latvia.
- Currently specific financial products from commercial banks are provided for energy efficiency projects (e.g. building energy efficiency projects, renovation of existing heat sources, support for CHP plants), some commercial banks are oriented on lending industrial companies. However, there are not any specific financial products particularly for biogas. During the last year the development of new financing products has significantly decreased together with implementation of government anti-inflationary plan in Latvia.
- State support for Biogas projects is envisaged in the frame of Rural Development Program. According to Biogas development program for Latvia, during the next 5 years about 5.7 million Euros will be available. However those are only indicative amounts and the real amount of available funding is uncertain.
- Support for biogas projects from EC in Latvia is provided in two different programs:
    1) Rural Development Program – support for farm modernization or for increase of added value for agricultural production (if biogas is produced from agricultural by-products).
    2) From Structural/Cohesion funds – support for biomass cogeneration plants.

However, the previous experiences showed that for farmers it is hard to prepare adequate project proposals, fulfil evaluation criteria and to get funding. This is due to the lack of capacity, lack of comprehensive project proposals, lack of resources for co-funding and complicated bureaucracy procedures.

Although, following the implementation of Biogas Development Program in Latvia, some investment and financial support mechanisms from government and involved state institutions has been established, there is still missing a continuous, targeted, well-considered and well-planned support for biogas projects in Latvia. The common practice for providing some unscheduled grant by the end of the year in case of surplus in annual budget is not suitable for appropriate investment planning and biogas sector development.

2.2. Evaluation of investment costs and financing options

Investment costs for biogas projects usually are high; therefore it is very important for each project to evaluate financing options properly. For example some agricultural biogas plant in Latvia got in financial difficulties due to the improper investment planning caused by the lack of working capital, miscounted support from government and underestimated operational costs during the first operation year.

2.3. Economical barriers

One of the most important economical barriers for biogas development in Latvia is energy price, which is low compared to EU average prices. Like it was mentioned before in Figure 1 and Figure 2, electricity prices are almost twice lower compared to EU-27 average.

Figure 3 compares natural gas prices for domestic consumers in different European countries. Natural gas in Latvia in 1 July 2007 costs 8.6 Euro per GJ and in the meantime EU-27 average price was 14.5 Euro per GJ. Low fossil energy prices are a barrier for the economic viability of biogas projects in Latvia.

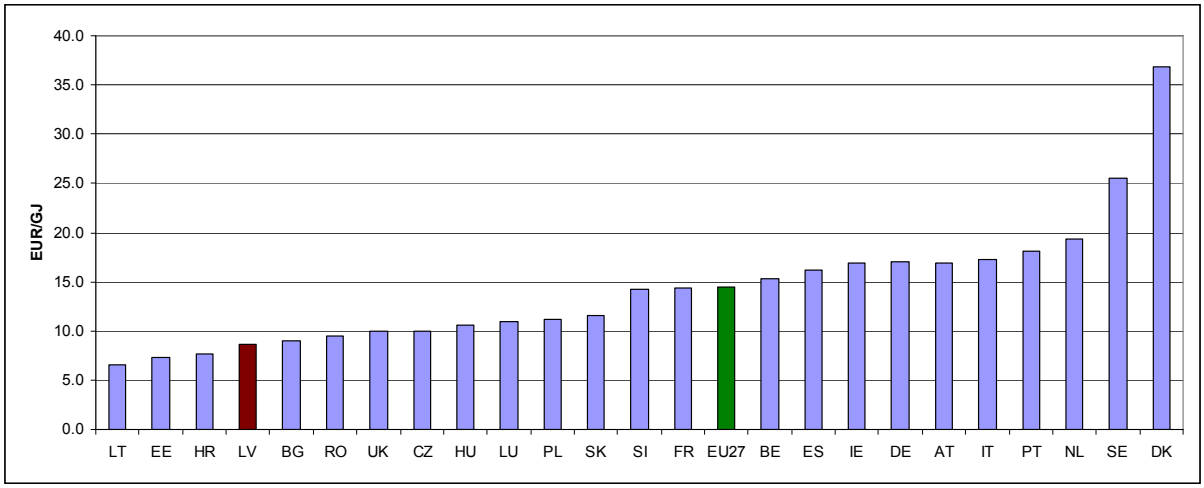

Figure 3. Natural gas prices for domestic consumers in EU, 1 July 2007 (standard consumer D2: 20 GJ < Annual Consumption < 200 GJ, all taxes included)[9]

[9] Data source: Eurostat

One more important issue is to consider the cash flow. Seasonal operation of the plant or changes in feedstock is influencing financing, both in terms of cost of an asset used for only part of the year and the risk associated with dependence on one industrial sector. Therefore, to ensure a stable cash flow, more attractive business proposals for financing purposes would include more than one feedstock (using of co-digestion).[10]

In case of implementation of high investment biogas projects the main problem for farmers in Latvia is to guarantee the investment. In order to ensure that biogas projects are implemented, it is necessary to develop some kind of financial support for guarantee of the investments particularly for biogas projects.

[10] Data source: EU Funded Project AnDigNet 2000-2001, CRES, http://www.cres.gr/andignet/index.htm

3. Other related barriers for biogas implementation

3.1. Social barriers

Developing a biogas project is complex process involving different organizations and individuals from different sectors. Sometimes it is hard to ensure successful cooperation among all involved parties, considering their interests and possibilities. Particularly in view of comparatively small Latvian biogas market where the absolute number of biogas research organizations, specialists in field, consulting companies, as well as potential biogas producers is limited.

One more important barrier for biogas development in Latvia is a lack of local energy agencies, as well as a lack of trained staff and experts in municipalities and local governments for the evaluation of energy related projects. Thus there is a gap between potential biogas producers (farmers, food processing companies etc.) and biogas project developers and investors. In order to establish a connection between those two crucial parties, it is necessary to develop some intermediate body (e.g. network of local energy agencies, advising boards) and to train the staff of local governments on energy project development.

Biogas implementation could be significantly influenced by previous experiences on biogas production. So far, since only 3 biogas projects are operating in Latvia and the first agricultural and industrial biogas plants are in the stage of development, it is very important to ensure that the next agricultural and industrial waste biogas pilot projects will be implemented successfully.

Biogas projects are complex also by the public acceptance point of view. From the one side farmers are conservative and do not want to change their management habits, being suspicious and not willing to take a risk in new business. From the other side public acceptance sometimes is problematic. Existing legislation in Latvia determines that before receiving a building permit it is necessary to organize a public discussion. There are some cases in Latvia where good biogas project ideas have been refused because of public objections. This was a case of some biogas plant in Limbaži region planning to use organic waste from potato processing plant for biogas production. Finally this project has been refused due to objections of local inhabitants having bad experience regarding odors from above mentioned potato processing plant. Awareness on biogas environmental benefits in Latvian society is still very low.

3.2. Legal & Administrative barriers

In order to incorporate the Biogas development program for Latvia within the national and regional energy and environmental Policy, a large number of local authorities are involved. Thus the proper coordination among agricultural policy (represented by the Ministry of Agriculture of Latvia), environmental protection (represented by the Ministry of Environment of Latvia) and energy investments (coordinated by the Ministry of Economy of Latvia) has to be organized.

Permitting procedures for biogas projects are inconsistent, involving numerous levels and departments, as well as time- and resource- intensive.[11] Since biogas conception is quite new in Latvia, responsible authorities sometimes are lacking the experience – particularly on biogas technologies and their evaluation in view to environmental and social impacts.

One of the significant biogas administrative promotion tools is spatial planning. However, there is no regulation for taking RES projects into account in Spatial Planning in Latvia. Only a few pilot projects are dealing with mapping of RES potentials and site allocations for particular regions.

Moreover, there is an indicative biogas production target specified by the Biogas development program for Latvia to increase produced biogas amounts from 3500 m^3 in 2007 to 13000 m^3 in 2011[12], this statement is not strong enough to facilitate the development of all kind of biogas utilization (incl. using biogas as a vehicle fuel, purification and fed into general gas grid, production of biomethane, etc).

3.3. Other General Barriers

One of the limiting factors for biogas development in Latvia is a comparatively small size of farms. Regarding the statistical data on farm size in Latvia in 2007[13] about 97.1% of cattle farms and 98.5% of pig farms in Latvia are small-scale farms (up to 50 animals). Only 0.1% cattle farms have more than 500 cattle and 0.1% from pig farms has more than 5000 pigs. From the other side, generally the location of small animal farms is so wide dispersed that it is difficult to develop centralized biogas plants, which are economically feasible.

Since so far, there are only a few biogas plants implemented in Latvia there is still some lack of knowledge and lack of experience in contract negotiations with biogas technology suppliers, resulting in unsatisfactory contribution from supplier during the installation, putting in operation and process stabilization. Since there is no local biogas technology producer in Latvia and equipment suppliers are coming from more biogas experienced countries like Germany, Austria, and Netherlands, often the difference in climate conditions is underestimated, causing additional expenses and problems in starting the plant operation.

[11] Data source: EU Funded Project AnDigNet 2000-2001, CRES, http://www.cres.gr/andignet/index.htm

[12] Data source: Biogas Development program 2007-2011, Ministry of Environment of Latvia, 2007

[13] Data source: Central Statistical Bureau of Latvia (www.csb.gov.lv)

Conclusions and recommendations

According to the above analysis the most crucial barriers for the development of a biogas project nowadays in Latvia are:

- The lack of regulations and legal bases for biogas development (incl. biogas use in transport and injection into natural gas grid) and the lack of continuous, targeted, well-considered and well-planned state support for biogas projects in Latvia, e.g. providing of investment guarantees for biogas project developers.
- The lack of local energy agencies, as well as a lack of trained staff and experts in municipalities and local governments for the evaluation of energy related projects.
- Liberalization of electricity market in Latvia is more a theory than a reality, causing the dependence from one dominating electricity generation, transmission and distribution company and thus establishing connection to electricity grid is a very time consuming, expensive and bureaucratic procedure.
- The lack of statistical data and the lack of information on biogas potential spatial distribution.
- Low awareness on biogas and its environmental benefits in Latvian society.

Recommendations for broadening the use of biogas potential

In order to continuously update existing biogas potential studies and to find new possibilities for biogas production in Latvia, improvements in collecting statistical data on biogas feedstock and biological waste is necessary.

To extend the use of biogas potential, additional investigation on a spatial distribution of biogas feedstock in Latvia is necessary.

Biogas potential could be utilized more efficient, if RES projects would be incorporated in regional and spatial planning.

Existing investigations on available waste material is showing that significant parts of waste material could be used for biogas production. In order to broaden the use of this waste, it is necessary to make improvements in municipal waste sorting practices.

To ensure additional waste flow for biogas production, a regulation that prohibits the delivery of expired food from supermarkets and kitchen waste from restaurants and catering industry to landfills. The situation could be significantly improved together with the implementation of Landfill Directive (1999/31/EC) in Latvia. For municipal waste landfills it is planned to implement this Directive latest until 2013 when the biodegradable municipal waste going to landfill must be reduced to 50% of biodegradable waste produced in Latvia in 1995.

Recommendations on the development of a local biogas market

In order to develop biogas market in Latvia, there is a need for local technology producers and biogas experts gaining knowledge on biogas production under the country specific conditions. Since biogas technologies are complex and require the specific know-how, one

of the best ways for potential local biogas technology producers would be to make partnerships with some foreign companies already having the specific experience and knowledge.

The development of local and regional energy agencies is necessary to close the gap between potential biogas producers and biogas project developers and investors.

Recommendations to overcome the administrative barriers for biogas development

Liberalization of electricity market in Latvia not only in theory but also in practice, would give a positive impact regarding biogas development. Free competition in electricity market could reduce the existing administrative and financial barriers for establishing a grid connection. Biogas plant owners could choose the best price for selling the electricity.

In order to overcome the administrative barriers related to permit procedure, the development of roadmap or guide for permit procedure is necessary.

Recommendations for improving the existing legislative and financial framework

In order to inject biomethane in natural gas grid, it is necessary to amend chapter 8 "Gas supply system" of the Latvian Law on Energy ensuring that natural gas transmition operator gives permission for appropriate quality biomethane injection.

A long-term policy framework on biogas use in transport (e.g. tax allowances for vehicles using biogas) is necessary.

Yet, there is an indicative biogas production target specified by the Biogas development program for Latvia, this statement is not strong enough to facilitate the development of all kind of biogas utilization. Setting of clear national biogas targets is necessary.

So far, provided state support for biogas projects was inconsistent and unregulated, therefore successful biogas sector development in future could be ensured only if the state support will be continuous, targeted, well considered and well planned.

Other conclusions and recommendations

The awareness on biogas environmental, economical and social benefits in Latvian society is still low. It is necessary to promote the awareness on biogas in all levels, including public in general, potential biogas producers, decision-makers, politicians, authorities responsible for giving a permit for potential biogas project, etc.

To overcome the lack of knowledge and experience in contract negotiations with biogas technology suppliers, it is necessary to develop a guideline indicating the most important issues to consider and providing some good examples on common practice of how the cooperation between plant owner and technology supplier is secured in other – more experienced on biogas countries.

In order to avoid additional expenses and problems during the biogas plant operation, it is necessary not to underestimate the difference in climate conditions and the need for additional insulation, the need for frost endurance building materials, etc.