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PREFACE

This report comprises the results from the work accomplished under task 1.2 of the Collective Research project AGRIBIOGAS “An integrated approach for biogas production with agricultural waste” which is co-financed by European Union’s the 6th Framework Programme. The report was elaborated under leadership of the European Biomass Industry Association (EUBIA) with assistance from the following partners:

- SDU (Denmark)
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## CONTENT

1. EXECUTIVE SUMMARY ............................................................................................................ 6  
2. INTRODUCTION .................................................................................................................... 7  
3. EUROPEAN LEGISLATION ON ENERGY GENERATION ....................................................... 8  
   3.1. EC White Paper and Green Paper ....................................................................................... 8  
   3.2. RES-E Directive ................................................................................................................ 9  
   3.3. Communication on the share of renewable energy in the EU .................................................................. 10  
   3.4. Communication on the support of electricity from renewable energy sources .................................................................. 10  
   3.5. Biomass Action Plan ......................................................................................................... 11  
   3.6. EU Strategy for Biofuels .................................................................................................. 11  
   3.7. Conclusions for European Legislation on Energy Generation ........................................... 12  
4. EUROPEAN AGRICULTURAL REGULATIONS ...................................................................... 13  
      4.1.1. Council Regulation establishing common rules for direct support schemes under the common agricultural policy ........................................................................................................... 13  
      4.1.2. Commission Regulation laying down detailed for the implementation of the single payment scheme .............................................................................................................................. 13  
      4.1.3. Commission Regulation laying down detailed rules for the application of Council Regulation as regards the support schemes and the use of land set aside for the production of raw materials ........................................................................................................... 13  
   4.2. Rural Development Policy ................................................................................................. 16  
      4.2.1. EAGGF Regulation ....................................................................................................... 16  
      4.2.2. Rural development policy within New Member States .................................................. 17  
   4.3. 2007-2013 CAP REFORM .................................................................................................... 18  
      4.3.1. Strategic Guidelines on support for rural development by the European Agricultural Fund for Rural Development (EAFRD Regulation) ....................................................................... 18  
   4.4. Conclusions for European Agricultural Regulations .......................................................... 18  
5. BIOGAS AND AGRICULTURAL WASTE EUROPEAN REGULATIONS ................................................. 19  
   5.1. Biogas and European Legislation ....................................................................................... 19  
   5.2. Biogas and Internal European Market of Natural Gas ................................................................ 20  
   5.3. Compost/Biogas production and animal by-products ............................................................ 20  
   5.4. Conclusions for Biogas and Agricultural Waste European Regulations ................................ 24  
6. SITUATION IN BELGIUM : Walloon Region ............................................................................. 25  
   6.1. Wastes treatment and recycling norms and incentives .......................................................... 25  
   6.2. Authorisation procedures ................................................................................................... 25  
      6.2.1. Licences to obtain ......................................................................................................... 25  
      6.2.2. Rules defined by the General Direction of the Regional Development, the accommodation and the heritage (CWATUP) for the installation of an anaerobic digestion (AD) unit ........................................................................................................... 25  
   6.3. Emissions control and management ...................................................................................... 26  
      6.3.1. Use of digestate .......................................................................................................... 26  
      6.3.2. Management of ranch effluents .................................................................................. 26  
      6.3.3. Rules related to the storage conditions of ranch effluent ............................................... 26  
      6.3.4. The Nitrogen Directive ................................................................................................ 26  
   6.4. Subsidies and financial incentives promoting the production use of biogas ................................ 27
7 SITUATION IN BELGIUM: Flemish Region

7.1 Wastes treatment and recycling norms and incentives ................................................. 31

7.2 Authorisation procedures ................................................................................................. 31

7.3 Emissions control and management .................................................................................. 32

7.4 Subsidies and financial incentives promoting the production use of biogas ....................... 33

8 SITUATION IN LUXEMBOURG

8.1 Wastes treatment and recycling norms and incentives .................................................. 37

8.2 Authorisation procedures .................................................................................................. 37

8.3 Emissions control and management .................................................................................. 37

8.4 Subsidies and financial incentives promoting the production use of biogas ....................... 38

9 SITUATION IN NETHERLANDS

9.1 Wastes treatment and recycling norms and incentives .................................................. 39

9.2 Authorisation procedures .................................................................................................. 39

9.3 Emissions control and management .................................................................................. 42

9.4 Subsidies and financial incentives promoting the production use of biogas ....................... 42
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.1</td>
<td>Biogas plant</td>
<td>45</td>
</tr>
<tr>
<td>10.1.2</td>
<td>Investment support</td>
<td>45</td>
</tr>
<tr>
<td>10.2</td>
<td>Energy consumption related support</td>
<td>46</td>
</tr>
<tr>
<td>10.2.1</td>
<td>Green electricity certificate</td>
<td>46</td>
</tr>
<tr>
<td>10.2.2</td>
<td>Vehicle related taxes</td>
<td>46</td>
</tr>
<tr>
<td>10.2.3</td>
<td>Energy tax</td>
<td>46</td>
</tr>
<tr>
<td>10.3.1</td>
<td>Animal related substrates</td>
<td>46</td>
</tr>
<tr>
<td>10.3.2</td>
<td>Municipality responsibility for refuse collection</td>
<td>47</td>
</tr>
<tr>
<td>10.4</td>
<td>Important governmental organizations</td>
<td>47</td>
</tr>
<tr>
<td>11.1</td>
<td>Wastes treatment and recycling norms and incentives</td>
<td>47</td>
</tr>
<tr>
<td>11.2</td>
<td>Specific norms related to agro-forestry residues utilisation</td>
<td>48</td>
</tr>
<tr>
<td>11.3</td>
<td>Danish legislation related to biogas production</td>
<td>48</td>
</tr>
<tr>
<td>11.4</td>
<td>Authorisation procedures</td>
<td>49</td>
</tr>
<tr>
<td>11.5</td>
<td>Emissions control and management</td>
<td>49</td>
</tr>
<tr>
<td>11.5.1</td>
<td>Gaseous emissions</td>
<td>49</td>
</tr>
<tr>
<td>11.5.2</td>
<td>Liquids</td>
<td>49</td>
</tr>
<tr>
<td>11.5.3</td>
<td>Noise from the plant and traffic nuisance</td>
<td>49</td>
</tr>
<tr>
<td>11.5.4</td>
<td>Location</td>
<td>50</td>
</tr>
<tr>
<td>11.5.5</td>
<td>Odour</td>
<td>50</td>
</tr>
<tr>
<td>11.6</td>
<td>Subsidies and financial incentives for promoting the production use of biogas</td>
<td>50</td>
</tr>
<tr>
<td>11.7</td>
<td>European legislation and regulations</td>
<td>50</td>
</tr>
<tr>
<td>11.8</td>
<td>National organisations that are dealing with biogas issues</td>
<td>51</td>
</tr>
<tr>
<td>12.1</td>
<td>Wastes treatment and recycling norms and incentives</td>
<td>52</td>
</tr>
<tr>
<td>12.2</td>
<td>Subsidies and financial incentives promoting the production use of biogas</td>
<td>53</td>
</tr>
<tr>
<td>13.1</td>
<td>Wastes treatment and recycling norms and Emissions management</td>
<td>55</td>
</tr>
<tr>
<td>13.2</td>
<td>Authorisation procedures and incentives</td>
<td>56</td>
</tr>
<tr>
<td>13.3</td>
<td>Subsidies and financial incentives promoting the production use of biogas</td>
<td>57</td>
</tr>
<tr>
<td>14.1</td>
<td>Wastes treatment and recycling norms and incentives</td>
<td>58</td>
</tr>
<tr>
<td>14.1.1</td>
<td>Heavy Metals</td>
<td>58</td>
</tr>
<tr>
<td>14.1.2</td>
<td>Organic pollutants</td>
<td>58</td>
</tr>
<tr>
<td>14.1.3</td>
<td>Hygienic aspects</td>
<td>59</td>
</tr>
<tr>
<td>14.1.4</td>
<td>Nitrogen</td>
<td>60</td>
</tr>
<tr>
<td>14.2</td>
<td>Subsidies and financial incentives promoting the production use of biogas</td>
<td>60</td>
</tr>
<tr>
<td>14.2.1</td>
<td>Amendment of the Austrian green electricity law 2006</td>
<td>60</td>
</tr>
<tr>
<td>15.1</td>
<td>Wastes treatment and recycling norms and incentives</td>
<td>62</td>
</tr>
<tr>
<td>15.2</td>
<td>Subsidies and financial incentives promoting the production use of biogas</td>
<td>63</td>
</tr>
</tbody>
</table>
16  SITUATION IN UNITED-KINGDOM...................................................................................... 63
16.1 Wastes treatment and recycling norms and incentives ..................................................... 63
16.2 Authorisation procedures ............................................................................................... 63
16.3 Subsidies and financial incentives promoting the production use of biogas ..................... 64
17  SITUATION IN IRELAND........................................................................................................ 65
18  SITUATION IN ITALY .......................................................................................................... 66
18.1 Wastes treatment and recycling norms and incentives ..................................................... 66
18.2 Emissions control and management ................................................................................. 67
18.3 Subsidies and financial incentives promoting the production use of biogas ..................... 67
19  SITUATION IN SPAIN.......................................................................................................... 69
19.1 Wastes treatment and recycling norms and incentives (Annex I.6)...................................... 69
19.1.1 Norms about Spills ...................................................................................................... 69
19.1.2 Norms about wastes .................................................................................................... 69
19.1.3 Manure-Slurry Treatment Technologies ....................................................................... 70
19.1.4 specific norms related to agro-forestry residues utilization .......................................... 72
19.2 Authorisation Procedures ................................................................................................. 73
19.3 Emissions (liquid, gas, solid) control & management ....................................................... 73
19.3.1 Emissions from Agriculture ......................................................................................... 74
19.4 Subsidies and financial incentives for promoting the production use of biogas (heat, cogeneration, transport) i.e.green-certificates, CO2-trading; ....................................................... 76
19.5 Address of National Organization that dealing with these problems; ............................... 78
19.6 Spanish Legislation ........................................................................................................ 79
20  SITUATION IN PORTUGAL.................................................................................................... 80
20.1 Wastes treatment and recycling norms and incentives ..................................................... 80
20.2 Subsidies and financial incentives promoting the production use of biogas ..................... 80
21  SITUATION IN GREECE ......................................................................................................... 81
21.1 Wastes treatment and recycling norms and incentives ..................................................... 82
21.2 Subsidies and financial incentives promoting the production use of biogas ..................... 83
22  CONCLUSION.................................................................................................................. 84

ANNEX

Annex I. Review of the existing local, national and international legislation pertaining to AGROBIOGAS

I.1. Switzerland.......................................................... ............................................................... 88
I.2. Germany.......................................................................................................................... 93
I.3. France............................................................................................................................. 101
I.4. United Kingdom.................................................. ................................................................ 104
I.5. Ireland.................................................................................................................................. 108
I.6. Italy...................................................................................................................................... 110
I.7. Spain.................................................................................................................................... 117
I.8. Portugal................................................................. .................................................................. 128
I.9. Greece................................................................................................................................... 129
ABREVIATIONS

BAP Biomass Action Plan
CAP Common Agricultural Policy
EAFRD European Agricultural Fund for Rural Development
EAGGF European Agricultural Guidance and Guarantee
EC European Commission
EU European Union
ha Hectare
mg Milligram
Mtoe Million tons of oil equivalent
N Nitrate
RES Renewable Energy Sources
RES-E Renewable Energy Source – Electricity
SAPS Single Area Payment Scheme
SPS Single Payment Scheme
1 EXECUTIVE SUMMARY

This report covers the legal framework of the AGROBIOGAS project. This means that it discusses all supporting and limiting legislation related to AD Biogas production in agricultural applications, both at European and country level. The European legislation is treated in Chapters 3-5 and then the legislative framework for each partner country having a RTD partner, are discussed in chapters 6-21 (Belgium; Luxembourg; Netherland; Sweden; Denmark; Switzerland; Germany; Austria; France; United Kingdom; Ireland; Italy; Spain; Portugal; Greece). The complete lists of legislation provided by some countries, to which chapters 7-21 are referring, are included in Annex I of this report. The Annex provides too the summaries of the legislation relevant to Biogas production found in the complete lists. As a general conclusion for the legislative reports of the participating countries, it can be revealed that the legislative framework applying to Biogas production is very different and huge in all countries analysed. Therefore, the AGROBIOGAS project has an important role to play in clarifying the different legislative systems in the different countries as well as by proposing improvements in this regard in order to harmonise the legislation needs for the development of the Agricultural Biogas production.

The following paragraphs can be concluded regarding the European legislation:

Firstly, in Chapter 3, legislation related to Energy Generation is explained. Here it can be concluded that among the different renewable energy sources currently available, biomass has the largest growth potential in the near future but the use of biomass for energy purposes has not yet been developed to its full potential in the EU. Also, although almost all countries have plans and/or policies to raise the use of renewable energies, as required by the EU, often with specific targets for using biomass, work is continuing on the development of the EU policies and a legislative framework to be implemented within the Member States, which will encourage the use of sustainable energies.

Secondly, in Chapter 4 agricultural regulations at European level are treated. As a summary of chapter 4 it can be concluded that there is a wide range of biomass that could be used to produce the generation of electricity, heating and transport, deriving, among others, from agricultural and forestry products. The CAP reform has increased market orientation by providing better opportunities for farmers to adapt production to increasing demand for biomass. The 2003 reform has decoupled the link between crop production and subsidies, which should have the effect of levelling the playing field for other crops. In addition, subsidies will be paid on a per hectare basis with the stipulation that farmers must maintain their land in good agricultural and environmental condition. On the other hand, rural development measures are also to be taken into account for the development of energy crops.

Thirdly, in Chapter 5, legislation related to Biogas and Agricultural Waste Use are discussed. From this chapter, it can be concluded that Agricultural Waste such as animal and vegetable by-products have proved suitable solutions to be used for biogas and compost production. At the same time Biogas production, applied to an agricultural context, should be developed in such a way that the AD production could actually change energy market dependencies.
2 INTRODUCTION

RES have become a central element of EU energy policy, which aims to secure energy supply while reducing CO2 emissions. Anaerobic Digestion (AD) provides opportunities to produce renewable energy from organic materials in decentralized sites. It also allows effective nutrient management, the reduction of green house gases and the production of a valuable organic fertiliser. In addition there are benefits for rural society through alternative income opportunities for the farming sector. The European Commission White Paper on Renewable Sources of Energy has set a target to increase the contribution of renewable energy supply from 6% to 12% between 1995 and 2010.

Following the White Paper, the Commission has produced several policy documents and legislative measures that have implications for the Bioenergy sector, notably the Directive about gas and electricity from renewable sources and the Directives on Biofuels and co-generation.

While there has been considerable progress made in certain countries on the other hand there are many shared obstacles across all the European countries. These include the lack of economic incentives for green electricity and new restrictions arising from waste management legislation. Countries like Denmark, Germany, and Sweden have taken the lead in promoting effective mechanisms to foster the biogas sector through a variety of national supports. This has been complemented by the industry itself, which is growing in technical expertise and experience. Therefore, actually every Member State has to provide the adequate framework in order to adapt effectively the European legislation to their systems.

Therefore, the AGROBIOGAS project has an important role to play by clarifying the different legislative systems in the different countries as well as by proposing improvements in this regard.
3 EUROPEAN LEGISLATION ON ENERGY GENERATION

3.1 EC White Paper and Green Paper


The European Union (EU) began working towards a policy framework for renewable energies in the early 1990s, which culminated in the adoption of the White Paper and, shortly after, the Green Paper.

The main components of the White Paper were an overall goal of doubling the contribution of renewable energy sources (RES) in the gross EU energy consumption from 6% to 12% by 2010 and the establishment of an Action Plan for achieving this goal, including the Campaign for Take-Off, which ran from 1997 until the end of 2003.

The White Paper acknowledged the large unexploited potential of biomass and its potential to create a large number of jobs within the production of raw materials.

Further, the White Paper set targets for each renewable energy. Biomass should produce more than 80% of the additional contribution to RES by 2010 as seen below:

Table 1: White Paper targets for 2010 – Biomass (Source: EC, 1997) (Mtoe - Million tonnes of oil equivalent)

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<tr>
<th>Contribution in 1995</th>
<th>Contribution in 2010</th>
<th>Additional contribution</th>
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<td>44.80</td>
<td>135</td>
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- Biogas exploitation (livestock production, sewage treatment, landfills): 15 Mtoe
- Agricultural and Forest Residues: 30 Mtoe
- Energy Crops: 45 Mtoe (18Mtoe of liquid Biofuels and 27 Mtoe of heat/power)

As shown within the table above, the production of energy crops is essential to achieve the objective of doubling the renewable energies share by 2010. Further, as far as the potential contribution of 27 Mtoe from solid cellulosic bioenergy crops is concerned, the White Paper specifically refers to short rotation forestry (ex: willow) as a relevant option for production.

On the other hand, the Green Paper forecasted that EU dependence on imported energy would rise to 70% by 2030 if no measures were taken. Further, the document confirmed the important role of renewable energies in the future EU energy economy and the need to accelerate the growth of renewable energy markets in order to diversify EU energy supplies and improve energy security.
Based on this policy framework, the Commission began to work in 1999 to put in place legislation, which was designed to achieve the agreed policy goals. Indeed, the biomass sector has benefited from a number of European legislative instruments as will be seen below.

3.2 RES-E Directive


(Deadline for implementation: 27/10/2003)

The first pioneering EU legislation in the renewable energy sector was the Renewable Energy Sources – Electricity, the RES-E directive.

The purpose of this Directive is to promote an increase in the contribution of renewable energy sources to electricity production in the internal market for electricity. The RES-E Directive supports the overall 12% target established within the White Paper by establishing the EU obligation to increase the share of electricity produced from RES to gross electricity consumption from 13.9% in 1997 up to 22% in 2010.

Member States were required to take appropriate steps to encourage greater consumption of electricity produced from RES in conformity with the national indicative targets for a ten-year period set by the RES-E Directive. For the New Member States\(^1\), the targets were established in the accession treaties.

The RES-E Directive clearly provides a complementary framework to encourage and support the production of biomass for energy uses and it is for the Member States to come with laws, policies, incentives, regulations and administrative provisions necessary to fully implement its goals.

\(^1\) By New Member States it is specifically referred to as Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and the Slovak Republic, which joined formally the EU on 1 May 2004. Prior to joining, the new members had to adopt the so-called *acquis communautaire* which meant applying 80,000 pages of EU law and are now running a process of fully integration to the EU. Therefore, these countries are also generally included in the term “Member State” when no specific reference/exception is made to them, since they are obliged to comply with all EU legislation.

Bulgaria and Romania, having completed negotiations, signed their Treaty of accession on 25 April 2005 and they should normally join the Union on 1 January 2007.
3.3 Communication on the share of renewable energy in the EU


In 2004, as required by the RES-E directive, the EU produced an assessment of Member States’ progress towards the renewable energy targets and the implications for Europe. The assessment was published in May 2004 in the Communication on the share of renewable energy in the EU where the Commission also assessed the progress being made in achieving the general 2010 target of 12% in overall energy consumption.

This document emphasized that more had be done for the production of electricity from bioenergy. The wide range of scale, raw materials and technologies of bioenergy sources were not still supported by the necessary measures to achieve relevant results and the defined targets.

3.4 Communication on the support of electricity from renewable energy sources

Communication from the Commission of December 7th 2005: The support of electricity from renewable energy sources COM (2005) 627

This document fulfils, among others, the requirement of Article 4 of RES-E directive; by presenting an inventory and the experience gained with the application and coexistence of the different mechanisms used in Member States for supporting electricity from renewable energy sources.

According to this report, more than half of the Member States are not giving enough support to green electricity. Therefore, the Commission considers that direct support measures will remain essential in the future to ensure sufficient market penetration of green electricity and calls on Member States to optimise their support schemes and remove barriers.

Concerning electricity produced from biomass resources, Annex III of the Communication (Costs of current support systems and effectiveness) shows the differences between support schemes and the effectiveness of RES support for electricity produced from solid biomass, laying down the following main conclusion:

“At EU-15 level, only a small part of the available potential was exploited on an annual basis during the period 1998-2003. The effectiveness indicator for solid biomass electricity is significantly lower compared with wind exploitation². This confirms the conclusion of the Communication of May 20043 that the development of biomass electricity is lagging behind expectations at EU level.”

Finally, the same annex stresses “good management of agriculture and forest residues is an important factor for good biomass exploitation.”

² Countries with a high effectiveness in wind energy have an indicator around 6%. For biomass, the top figures are around 4%.
3.5 Biomass Action Plan

**Biomass Action Plan of 7th December 2005**  
**Communication from the Commission COM (2005) 628 final**

On December 7th 2005, the Commission officially adopted the Biomass Action Plan (BAP) as a step forward to increase the use of biomass as a renewable energy source and to contribute to the achievement of the EU’s goal of doubling the share of renewable energy from 6% to 12% by 2010.

The BAP contains a number of measures, to be implemented from 2006 onwards, to increase the development of biomass energy from wood, wastes and agricultural crops by creating market-based incentives to its use and removing barriers to the development of the market. Further, the BAP also establishes measures to promote biomass in heating, electricity and transport, followed by crosscutting measures affecting biomass supply, financing and research. This document is accompanied by a general impact assessment.

If the proposed actions are duly implemented, the Commission foresees an increase of the use of biomass to 150 Mtoe by 2010 (compared with 69 Mtoe in 2003). Further, the measures of the BAP would allow for a reduction of greenhouse gas emissions by 209 million tons CO2-equiv. per year, it would provide direct employment for up to 300,000 people and reduce reliance on imported energy from 48% to 42%.

The BAP has acknowledged the importance of promoting and supporting adequate policies supporting energy crops. According to the BAP, decisions about the appropriate energy crops to grow are best taken at a regional or local level. Therefore, the BAP has indicated that the EC would finance an information campaign about the properties of energy crops and the opportunities they offer (the campaign will also cover forestry).

Finally, the BAP specifically mentions fast-growing wood and indicates the need of a changed approach since farmers have to tie up land for several years and at least 4 years must pass before the first harvest.

3.6 EU Strategy for Biofuels

**Biomass Action Plan of 8th February 2006**  
**Communication from the Commission COM (2006) 34 final**

On December 8th 2006, the Commission officially adopted the Biofuels Strategy which complements the Biomass Action Plan in order to meet sustainability goals, in particular the reduction of greenhouse gas emissions agreed under the Kyoto Protocol, it is therefore essential to find ways of reducing emissions from transport. This communication is accompanied by an Impact Assessment, which presents different policy options.

This communication sets out a biofuel strategy with three aims:

- to further promote biofuels in the EU and developing countries, ensure that their production and use is globally positive for the environment and that they contribute to the objectives of the Lisbon Strategy taking into account competitiveness considerations;
• to prepare for the large-scale use of biofuels by improving their cost-competitiveness through the optimised cultivation of dedicated feedstocks, research into “second generation” biofuels, and support for market penetration by scaling up demonstration projects and removing non-technical barriers;
• to explore the opportunities for developing countries – including those affected by the reform of the EU sugar regime – for the production of biofuel feedstocks and biofuels, and to set out the role the EU could play in supporting the development of sustainable biofuel production.

3.7 Conclusions for European Legislation on Energy Generation

Among the different renewable energy sources currently available, biomass has the largest growth potential in the near future but the use of biomass for energy purposes has not yet been developed to its full potential in the EU.

Although almost all countries have plans and/or policies to raise the use of renewable energies, as required by the EU, often with specific targets for using biomass. Work is continuing on the development of the EU policy and legislative framework, which will encourage the use of sustainable energies.
4 EUROPEAN AGRICULTURAL REGULATIONS

4.1 The Common Agricultural Policy – 2003 Reform

4.1.1 Council Regulation establishing common rules for direct support schemes under the common agricultural policy


4.1.2 Commission Regulation laying down detailed for the implementation of the single payment scheme


4.1.3 Commission Regulation laying down detailed rules for the application of Council Regulation as regards the support schemes and the use of land set aside for the production of raw materials


It is clear that the provision of biomass feedstock is crucial for the biomass energy system development. Therefore, potential of dedicated energy crops should be exploited, being one of the main drivers the given support to these crops by agricultural policies and regulations, notably the Common Agricultural Policy (CAP).

The Treaty of Rome defined the general objectives of a common agricultural policy. The principles of the CAP were set out at the Stresa Conference in July 1958. In 1960, the six founding Member States adopted the CAP mechanisms and two years later, in 1962, the CAP came into force.

The CAP is comprised of a set of rules and mechanisms, which regulate the production, trade and processing of agricultural products in the EU, with attention being focused increasingly on rural development. Among the European Union's policies, the CAP is regarded as one of the most important policy areas.
The CAP is financed from the European Agricultural Guidance and Guarantee Fund (EAGGF), which accounts for a substantial part of the Community budget and includes, apart from agricultural expenditure, measures linked to the environment and structural and rural development measures.

In its four-decade existence, the CAP has undergone several reforms. Particularly, the reform of 1992 encouraged the use of agricultural land for non-food crop production. Set-aside land was an option for enlargement of land area under energy crops and additional source of income for farmers.

But the most important contribution made by the CAP towards the production of renewable energies from biomass resources such as energy crops came with the reform that took place in 2003.

The 2003 reform covered market-related support systems and direct aids for farmers through the Single Payment Scheme (SPS). Aids to farmers would not be linked to production but instead would be in a form of a single payment that is expected to guarantee to a certain degree stable income of farmers and freedom of choice to produce what consumers demand.

The 2003 CAP reform also established an annual payment for energy crops (available from 1 January 2004) and continued with the existing scheme for set-aside land to be used for the production of non-food crops such as energy crops.

Therefore, the CAP currently offers two systems to encourage the production of crops for energy use: energy crops aid and set-aside scheme for non-food uses, including energy production.

### 4.1.3.1 The energy crops aid

An aid of 45 € per hectare (ha) is available to farmers who produce energy crops. It will be applied on a maximum guaranteed area in the whole EU of 1,500,000 hectares. Penalties will be applied in the form of reductions of aid if the EU maximum guaranteed area is exceeded (the area per farmer for which aid is claimed is reduced proportionately in the year in question).

It must be ensured that crops are grown, delivered and processed into energy. Therefore, there are specific conditions to be fulfilled by the farmers and processors to qualify for the aid:

- The production of energy crops has to be covered by a contract between the farmer and the appropriate processing industry (processor). The contract must cover all details of the applicant, the crop, the processor and the intended end use of raw material. The farmer and processor do not have to be in the same Member State.
- Farmers may also process the crops into energy products for themselves. Where the processing occurs on the farm concerned, no contract is necessary. They might use their crops as fuel for heating, electricity or transport to be used within their agricultural holding, for the production.
- Farmers’ obligations end once the total quantity of raw material harvested is delivered to the processors.
- The obligations of the processors start on delivery and end with the final processing of the raw materials into energy products.
- To ensure that the raw material is processed into the specified energy product, processors must lodge a security (high enough to prevent any risk that the raw materials are ultimately diverted from their destination).
Processors must report what crops are delivered, specifying the species, the name and the address of the party delivered the raw materials, the place of delivery and the contract reference.

Energy crops must be supplied essentially for the production of biofuels or other renewable fuels for transport and/or electricity and thermal energy produced from biomass.

All crops including perennial/multi-annual crops such as Short Rotation Coppice (SRC) are eligible for aid, except for sugar beet. Eligibility is kept under review and Member States may seek the exclusion of other crops for justified reasons.

Penalties may be applied (reductions in aid for farmers, or loss of security in the case of processors) where the above-mentioned conditions/requirements are not met. These conditions are being kept under continual review in the light of experienced. Member States must conduct spot-checks at the premises of at least 25% of processors, selected on the basis of a risk analysis, to ensure compliance. Checks must also be carried out on 10% of applicants for aid (farmers), also selected on the basis of a risk analysis.

By 31 December 2006, the Commission must submit a report to the Council on the implementation of the energy crops aid scheme, in light of the implementation of the EU biofuels initiative. Member States should report annually on application of the system.

4.1.3.2 Set aside scheme

Up until the 2003 reform, support for energy crops consisted of allowing the cultivation of crops for non-food uses, one of which is energy production.

With the 2003 CAP reform set-aside continues to operate. Farmers would qualify for payment of set-aside entitlements under the SPS. Set aside land may be subject to rotation and may continue to be used for non-food production, including energy crops such as SRC, reed canary grass (Phalaris arundicea) and Miscanthus sinensis.

Further, according to article 56.4 of the Council Regulation 1782/2003, Member States shall be authorized to pay national aid up to 50% of the costs associated with establish multi-annual crops (such as short rotation coppice) intended for biomass production on set-aside land.

The energy crops aid is additional to the SPS. However, if set-aside land is used for energy crops, the area is not eligible for additional aid for energy crops of 45 EUR/ha.

Finally, it should be noted that all direct aids are subject to conditions introduced by the CAP reform, including cross-compliance, this is the linking of the SPS to the respect of environmental, food safety, animal and plant health and animal welfare standards, and to the prohibition of applying organic wastes and fertilisers in quantities in excess of those accepted as being in accordance with normal farming practice.
4.1.3.3 Implementation of the CAP within the New Member States

The implementation of the 2003 CAP reform differed from the EU-15 Member States and New Member States.

New Member States (NMS) had the choice, when signing the accession treaties, to be subject to the same general conditions as stated in the corresponding regulations or to operate special arrangements, notably the Single Area Payment Scheme (SAPS), involving payment of a flat rate (uniform amounts) per hectare of agricultural land in the New Member State concerned, including energy crops. The only requirement is that land be maintained in good agricultural condition. The amount is calculated by the total amount of direct payment funds available for a given member state in the calendar year, divided by the utilized agricultural area of the member state. This payment would be yearly increased until 2013 where full integration will take place. Further New Member States had also the possibility to “top-up” EU payments with additional funds.

4.2 Rural Development Policy

The future of agriculture is closely linked to the balanced development of the countryside, which accounts for 80% of the area of Europe. The European rural development policy plays a major role in economic, social and territorial cohesion. It is based on the principles of recognising the multifunctional role of agriculture, improving competitiveness, ensuring that environmental issues are taken into account, diversifying economic activity and conserving rural heritage.

4.2.1 EAGGF Regulation


Amended by:

Official Journal L 270, 21/10/2003 P. 0070 - 0077

Official Journal L 090, 27/03/2004 P. 0001 - 0002

Official Journal L 091, 30/03/2004 P. 0001 - 0014

Related acts:

The EAGGF Regulation sets up the framework for Community support for sustainable rural development from 1 January 2000. It accompanies and complements other instruments of the CAP and the Community's structural policy.

The rural development measures eligible under this Regulation fall into two groups:

- Accompanying measures of the 1992 reform: early retirement, agro-environment and afforestation, as well as the less-favoured areas scheme;
- Measures to modernise and diversify agricultural holdings: farm investment, setting-up of young farmers, training, investment aid for processing and marketing facilities, additional assistance for forestry, promotion and conversion of agriculture.

Afforestation refers to measures encouraging new woodland development, including financial incentives for farmers who convert agricultural land to woodland and forest.

The afforestation of agricultural land involves an aid to cover the costs of planting and maintenance and to compensate farmers for income forgone, provided that such planting is adapted to local conditions and is compatible with the environment. The aid may amount to between 185€ and 725€ per hectare per year depending on the farmer's characteristics. In the case of fast growing species cultivated in the short term, support for afforestation shall be granted for planting costs only. According to article 27.2 of the Council Regulation No445/2002, “fast-growing species cultivated in the short term” means species with a rotation time, namely the period between two harvest cuts on the same parcel, of less than 15 years. Therefore SRC would be eligible for afforestation and, consequently, for the financial support under this measure.

Rural development measures must be compatible with Community law and coherent with other Community policies. Such coherence is especially important in the case of the CAP provisions on the common market organisations and measures on quality and health in agriculture.

In addition, measures receiving financial assistance under the EAGGF Regulation may not receive aid under any other Community support scheme. Moreover, any measure which is incompatible with a specific condition laid down in this Regulation will not be eligible for support under other Community support schemes.

4.2.2 Rural development policy within New Member States

Chapter VII of the Accession Treaty completed by Commission Regulations (EC) No 27/2004 and (EC) No 141/2004 defines for the period 2004-2006 a special rural development regime for New Member States. This regime is mainly based on a new Temporary Rural Development Instrument, funded by the EAGGF Guarantee, to support the four so-called "accompanying measures" (agro-environment, early retirement, afforestation and compensatory payments for less favoured areas and areas subject to environmental constraint) and a number of specific rural development measures.
4.3 2007-2013 CAP REFORM

4.3.1 Strategic Guidelines on support for rural development by the European Agricultural Fund for Rural Development (EAFRD Regulation)


Following the fundamental reform of the first pillar of the CAP in 2003 and 2004, covering market-related CAP support systems and direct aids for farmers, the major focus for policy reform in the new financial period (2007 to 2013) will be rural development (known as the second pillar of the CAP).

The EAFRD Regulation, which will come into effect in January 2007, will replace the EAGGF Regulation and aims to increase the level of resources available for rural development from the CAP. In this regard, a new European Agricultural Fund for Rural Development (EAFRD) will be created with three “axes” for action:

1. The competitiveness of farming and forestry;
2. Land management and the environment; and
3. Diversification of the rural economy and the quality of life in rural areas.

The Strategic Guidelines adopted by the European Commission on the 5 July 2005 set out a strategic approach and a range of options, which Member States could use, in their national Rural Development programmes.

4.4 Conclusions for European Agricultural Regulations

There is a wide range of biomass that could be used to produce the generation of biogas, deriving, among others, from agricultural by-products. The CAP reform has increased market orientation by providing better opportunities for farmers to adapt production to increasing demand for biomass. The 2003 reform has decoupled the link between crop production and subsidies, which should have the effect of levelling the playing field for energy crops. In addition, subsidies will be paid on a per hectare basis with the stipulation that farmers must maintain their land in good agricultural and environmental condition. Therefore, what farmers would be producing in their holdings would be driven by the profitability and the impact of their activity thereby encouraging crops and practices that are environmentally favourable.

The set-aside scheme applied to the cultivation of energy crops would allow farmers to optimise the production. They would receive set aside payment while growing energy crops in this land and, at the same time, they could grow food crops and qualify for the energy crop aid in other not set-aside areas.

Therefore, promoting the use of biomass by encouraging sustainable farming practices would offer new opportunities for sustainable rural development and would help create a new market with innovative energy agricultural crops and agricultural waste valorisation.
5 BIOGAS AND AGRICULTURAL WASTE EUROPEAN REGULATIONS

5.1 Biogas and European Legislation

Official Journal L 094 , 10/04/2003 P. 0001 - 0042

The European Community, in a will of increasing the use of the Biofuel, especially Biogas, has adopted various propositions to assist is development. Two main aims for this choice can be defined: environmental conscience and economic interest. In fact these choices can improve the environmental situation and help to reach Kyoto protocol objectives but can help the European Union to be more independent in the sector of energy needs and production particularly in front of the growth of the petrol needs and prices.

So “On 7 November 2001, the Commission adopted two proposals. The first concerns a directive requiring an increasing proportion of all diesel fuel and petrol sold in Member States to be biofuel. The second proposal creates a Community framework allowing Member States to apply under fiscal supervision differentiated tax rates in favour of biofuels. In this context, the Commission has already pointed out that the implications of a gradual introduction of biofuels are well known, and contrary to the introduction of natural gas or hydrogen there are no objective reasons for further delay. Biofuels are in the short and medium term the only option, therefore launching the appropriate policy instruments to promote the introduction of biofuels will give a clear signal that the Community is serious about developing alternatives to petroleum products in transportation.”

This theme, in EU, still was little considered up to now, so the situation in the European countries is very heterogeneous. The Commission noted that “The situation regarding biofuels varies enormously throughout Europe. A 93 % increase in biofuel production was recorded between 1997 and 1999. Only six Member States make any real contribution to total European biofuel production. Austria and France are the most active countries in this area.

For example, “over the next 20 to 40 years, Sweden intends to replace 25 to 50 % of today's fuel use by fuel based on forest and agricultural residues. The Swedish National Energy Administration believes it is possible to attain a 10 % 10.4.2003 EN Official Journal of the European Union L 94/33 market share for biofuel in 10 years' time. Production of biofuels in Sweden used to be about 50 000 tonnes. The available surplus of wheat in Sweden could in the future produce, with current yields, 500 000 m3 of bioethanol, or some 5,6 % of the total annual consumption of petrol and diesel in that country. There are around 300 ethanol-fuelled buses in Sweden, most of them in the Stockholm area, and approximately 600 cars and 100 heavy goods vehicles running on biogas.”

One on the principal aim for the European Community is to increasing the use of this energy and trying to develop and disseminate this technology in all the European countries.
5.2 Biogas and Internal European Market of Natural Gas


One of the more important politics’ choices for the biogas development in European Community was to recognize the biogas as an energy like other types of gas, which could be used in the same distribution system. I was the mean to make of the biogas an official energy resource.

For hit this mark, the European Community declared that “Member States should ensure that, taking into account the necessary quality requirements, biogas and gas from biomass or other types of gas are granted non-discriminatory access to the gas system, provided such access is permanently compatible with the relevant technical rules and safety standards. These rules and standards should ensure, that these gases can technically and safely be injected into, and transported through the natural gas system and should also address the chemical characteristics of these gases”.

So this new Directive concerning the internal market in natural gas “establishes common rules for the transmission, distribution, supply and storage of natural gas. It lays down the rules relating to the organisation and functioning of the natural gas sector, access to the market, the criteria and procedures applicable to the granting of authorisations for transmission, distribution, supply and storage of natural gas and the operation of systems.” And holds to precise that “The rules established by this Directive for natural gas, including liquefied natural gas (LNG), shall also apply to Biogas and gas from biomass or other types of gas in so far as such gases can technically and safely be injected into, and transported through, the natural gas system”.

5.3 Compost/Biogas production and animal by-products


The development of the biogas energy needs to have a legislative framework about his production and distribution. It can be found in the Regulation laying down health rules concerning animal by-products not intended for human consumption, which are the main resource for the biogas production.

First of all the principal terms are described like below:

- "biogas plant" means a plant in which biological degradation of products of animal origin is undertaken under anaerobic conditions for the production and collection of biogas;
- "composting plant" means a plant in which biological degradation of products of animal origin is undertaken under aerobic conditions;
- "digestion residues" means residues resulting from the transformation of animal by-products in a biogas plant;

The biogas and compost production and sector are regulated through the annex VI below that gives all the protocols and constraints to produce biogas and compost.
ANNEX VI : SPECIFIC REQUIREMENTS FOR THE PROCESSING OF CATEGORY 1 AND 2* MATERIAL AND FOR BIOGAS AND COMPOSTING PLANTS

CHAPTER II : Specific requirements for the approval of biogas and composting plants

A. Premises

1. Biogas plants must be equipped with:
   (a) a pasteurisation/hygienisation unit, which cannot be bypassed, with:
       (i) installations for monitoring temperature against time;
       (ii) recording devices to record the results of these measurements continuously; and
       (iii) an adequate safety system to prevent insufficient heating; and
   (b) adequate facilities for cleaning and disinfecting vehicles and containers on leaving the biogas plant.
   However, a pasteurisation/hygienisation unit is not mandatory for biogas plants that transform only animal by-products that have undergone processing method 1**.

2. Composting plants must be equipped with:
   (a) a closed composting reactor, which cannot be bypassed, with:
       (i) installations for monitoring temperature against time;
       (ii) recording devices to record the results of these measurements continuously; and
       (iii) an adequate safety system to prevent insufficient heating; and
   (b) adequate facilities for cleaning and disinfecting vehicles and containers transporting untreated animal by-products.

3. Each biogas plant and composting plant must have its own laboratory or make use of an external laboratory. The laboratory must be equipped to carry out the necessary analyses and approved by the competent authority.

B. Hygiene requirements

4. Only the following animal by-products may be transformed in a biogas or composting plant:
   (a) Category 2 material, when using processing method 1 in a Category 2 processing plant;
   (b) manure and digestive tract content; and
   (c) Category 3 material.

5. Animal by-products referred to in paragraph 4 must be transformed as soon as possible after arrival. They must be stored properly until treated.

6. Containers, receptacles and vehicles used for transporting untreated material must be cleaned in a designated area. This area must be situated or designed to prevent risk of contamination of treated products.

7. Preventive measures against birds, rodents, insects or other vermin must be taken systematically. A documented pest-control programme must be used for that purpose.

8. Cleaning procedures must be documented and established for all parts of the premises. Suitable equipment and cleaning agents must be provided for cleaning.
9. Hygiene control must include regular inspections of the environment and equipment. Inspection schedules and results must be documented.

10. Installations and equipment must be kept in a good state of repair and measuring equipment must be calibrated at regular intervals.

11. Digestion residues must be handled and stored at the plant in such a way as to preclude recontamination.

**C. Processing standards**

12. Category 3 material used as raw material in a biogas plant equipped with a pasteurisation/hygienisation unit must be submitted to the following minimum requirements:
   (a) maximum particle size before entering the unit: 12 mm;
   (b) minimum temperature in all material in the unit: 70 °C; and
   (c) minimum time in the unit without interruption: 60 minutes.

13. Category 3 material used as raw material in a composting plant must be submitted to the following minimum requirements:
   (a) maximum particle size before entering the composting reactor: 12 mm,
   (b) minimum temperature in all material in the reactor: 70 °C; and
   (c) minimum time in the reactor at 70 °C (all material): 60 minutes.

14. However, pending the adoption of rules in accordance with Article 6(2)(g), the competent authority may, when catering waste is the only animal by-product used as raw material in a biogas or composting plant, authorise the use of processing standards other than those laid down in paragraphs 12 and 13 provided that they guarantee an equivalent effect regarding the reduction of pathogens.

**D. Digestion residues and compost**

15. Samples of the digestion residues or compost taken during or on withdrawal from storage at the biogas or composting plant must comply with the following standards:

   **Salmonella:** absence in 25 g: n = 5, c = 0, m = 0, M = 0

   **Enterobacteriaceae:** n = 5, c = 2, m = 10, M = 300 in 1 g

where:

- n = number of samples to be tested;
- m = threshold value for the number of bacteria; the result is considered satisfactory if the number of bacteria in all samples does not exceed m;
- M = maximum value for the number of bacteria; the result is considered unsatisfactory if the number of bacteria in one or more samples is M or more; and
- C = number of samples the bacterial count of which may be between m and M, the sample still being considered acceptable if the bacterial count of the other samples is m or less.

*Category 2 material*

Category 2 materials shall comprise animal by-products of the following description, or any material containing such by-products:

- (a) manure and digestive tract content;
- (b) all animal materials collected when treating waste water from slaughterhouses other than slaughterhouses covered by Article 4(1)(d) or from Category 2 processing plants, including screenings,
materials from de-sanding, grease and oil mixtures, sludge and materials removed from drains from those premises;

(c) products of animal origin containing residues of veterinary drugs and contaminants listed in Group B(1) and (2) of Annex I to Directive 96/23/EC, if such residues exceed the permitted level laid down by Community legislation;

(d) products of animal origin, other than Category 1 material, that are imported from non-member countries and, in the course of the inspections provided for in Community legislation, fail to comply with the veterinary requirements for their importation into the Community, unless they are returned or their importation is accepted under restrictions laid down under Community legislation;

(e) animals and parts of animals, other than those referred to in Article 4, that die other than by being slaughtered for human consumption, including animals killed to eradicate an epizootic disease;

(f) mixtures of Category 2 material with Category 3 material, including any material destined for processing in a Category 2 processing plant; and

(g) animal by-products other than Category 1 material or Category 3 material.

Category 3 material
Category 3 materials shall comprise animal by-products of the following description, or any material containing such by-products:

(a) parts of slaughtered animals, which are fit for human consumption in accordance with Community legislation, but are not intended for human consumption for commercial reasons;

(b) parts of slaughtered animals, which are rejected as unfit for human consumption but are not affected by any signs of diseases communicable to humans or animals and derive from carcasses that are fit for human consumption in accordance with Community legislation;

(c) hides and skins, hooves and horns, pig bristles and feathers originating from animals that are slaughtered in a slaughterhouse, after undergoing ante-mortem inspection, and were fit, as a result of such inspection, for slaughter for human consumption in accordance with Community legislation;

(d) blood obtained from animals other than ruminants that are slaughtered in a slaughterhouse, after undergoing ante-mortem inspection, and were fit, as a result of such inspection, for slaughter for human consumption in accordance with Community legislation;

(e) animal by-products derived from the production of products intended for human consumption, including degreased bones and greaves;

(f) former foodstuffs of animal origin, or former foodstuffs containing products of animal origin, other than catering waste, which are no longer intended for human consumption for commercial reasons or due to problems of manufacturing or packaging defects or other defects which do not present any risk to humans or animals;

(g) raw milk originating from animals that do not show clinical signs of any disease communicable through that product to humans or animals;

(h) fish or other sea animals, except sea mammals, caught in the open sea for the purposes of fishmeal production;

(i) fresh by-products from fish from plants manufacturing fish products for human consumption;

(j) shells, hatchery by-products and cracked egg by-products originating from animals which did not show clinical signs of any disease communicable through that product to humans or animals;

(k) blood, hides and skins, hooves, feathers, wool, horns, hair and fur originating from animals that did not show clinical signs of any disease communicable through that product to humans or animals; and

(l) catering waste other than as referred to in Article 4(1)(e).

**Processing Method 1**

Reduction

1. If the particle size of the animal by-products to be processed is more than 50 millimetres, the animal by-products must be reduced in size using appropriate equipment, set so that the particle size after reduction is no greater than 50 millimetres. The effectiveness of the equipment must be checked daily and its condition
recorded. If checks disclose the existence of particles larger than 50 millimetres, the process must be stopped and repairs made before the process is resumed.

Time, temperature and pressure

2. After reduction the animal by-products must be heated to a core temperature of more than 133 °C for at least 20 minutes without interruption at a pressure (absolute) of at least 3 bars produced by saturated steam(1); the heat treatment may be applied as the sole process or as a pre- or post-process sterilisation phase.

3. The processing may be carried out in batch or continuous systems.


For a best adaptation of the different biogas and compost production’s industries in the purpose of apply the Regulation No 1774/2002, this amendment consent to transitional measures until 31 December 2006. After this date, the production of Biogas and compost will have to be in adequacy with the Regulation No 1774/2002.

So, the Commission Regulation (EC) No 809/2003 of 12 May 2003 on transitional measures under Regulation (EC) No 1774/2002 of the European Parliament and of the Council as regards the processing standards for Category 3 material and manure used in composting plants (2) provides for certain transitional measures in order to give industry time to adjust and develop alternative processing standards for Category 3 material and manure used in composting plants until 31 December 2006.

And the Commission Regulation (EC) No 810/2003 of 12 May 2003 on transitional measures under Regulation (EC) No 1774/2002 of the European Parliament and of the Council as regards processing standards for Category 3 material and manure used in biogas plants (3) provides for certain transitional measures in order to give industry time to adjust and develop alternative processing standards for Category 3 material and manure used in biogas plants until 31 December 2006.

**5.4 Conclusions for Biogas and Agricultural Waste European Regulations**

Biogas production has proved to be a suitable solution in providing the Kyoto protocol’s objectives regarding the greenhouse effect.

Furthermore, the development of this technology could be a good opportunity for the use of animal by-products in order to giving them value and taking it advantage by increasing the energy independency of the European Community.

Indeed, with the choice of recognize the biogas as an energy like other type of gas, the European Community can develop this own energy production and be more independent principally towards the fossils energy products (petrol etc.)
6 SITUATION IN BELGIUM : Walloon Region

6.1 Wastes treatment and recycling norms and incentives
The ranch effluents represent the more abundant organic materials, which are generally spread such as they are (liquid or solid manure, slurry). Concerning the sanitary aspects, many pathogens can subsist in the animal faecal materials. But it is probable that under the pressure of the European Union, a hygienisation of those materials would have to be done in the future.

The legislation concerning the biomethanation of organic wastes with ranch effluents
- Regulation 1774/2002 of the European Parliament and of the Council establishing the animal by-products no intended for human consumption: This regulation informs about the animal by-products such as manure which can be transformed in a treatment unit such as a biogas unit but some conditions must be respected.
- Decree of 11 March 1999 and Order of the Walloon Government (AGW) of 4 July 2002: Decree relative to the environment licence.
- Order of the Walloon Government of 12 January 1995 ruling the use on or into the soil of the activated sludge or the mud coming from the treatment centres of activated sludge and Order of the Walloon Government of 14 June 2001 promoting the valorisation of some wastes. Those ones induce the obtaining of a use certificate and if necessary the recording by the Walloon Public Waste Agency (OWD).
- Order of the Walloon Government of 10 October 2002 relative to the durable management of nitrogen in agriculture. If the producer of digestate is not the user then, a contract will have to be done between the two partners and this one will have to be backed by the OWD.

6.2 Authorisation procedures

6.2.1 Licences to obtain
In Walloon Region, there is a single licence, which includes the environmental licence and the town planning licence (Decree of 11 March 1999, order of 4 July 2002).
If it is a treatment of non-dangerous wastes, below 50 tons/day in settlement zone or below 100 tons/day in the other zones of the Soil Occupation Plan, the project is of class 2 and a deadline of 70 days is necessary (more 30 days is possible) after the request admissibility. And if there is an appeal, 70 days are allowed to treat it.
If it is a treatment of non-dangerous wastes, above 50 tons/day in settlement zone or above 100 tons/day in the other zones of the Soil Occupation Plan, the project is of class 1 and it is necessary to do an EIE (Environmental Impact Study). A deadline of 140 days is necessary (more 30 days is possible) after the request admissibility. This deadline does not concern the realisation of the incidence study. And if there is an appeal, 110 days are allowed to treat it.

6.2.2 Rules defined by the General Direction of the Regional Development, the accommodation and the heritage (CWATUP) for the installation of an anaerobic digestion (AD) unit
For the CWATUP, the AD installations are not related to the agriculture in the usual sense of the term. Since the 1st March 1998, the indirect agricultural activities cannot be anymore located in agricultural zone. So, it is preferable to implant those activities such as the AD units in other zones of the Soil Occupation Plan, such as residential or rural zones, with economic activity.
Then, the infrastructures collecting the ranch effluents coming from several agricultural exploitations and even the green or organic municipal wastes could not be anymore located in an agricultural zone. Only the collection and treatment installation (AD unit) of effluents of an agricultural exploitation could be located in an agricultural area, insofar as it is an agricultural accessory.

If the installations are not bound to an agricultural exploitation in an agricultural zone, it is possible to get an authorization only if the infrastructure is of benefit to the whole community and not only to the agricultural sector.

But for that, on the one hand, the proportion of inputs coming from the agricultural sector must be lower than the one coming from the rest of population and on the other hand, the outputs must be a benefit to the whole community.

6.3  **Emissions control and management**

6.3.1  **Use of digestate**

The use of digestate is allowed only if there is respect of the norms. If not, the digestate must be destroyed by incineration, co-compost or used as landfill or industrial wasteland cover. If the digestate characteristics are conform to the norm, the farmer receives a use certificate guarantying the quality of the output product and its utilisation in agriculture. Then, if the digestate characteristics are correct, its spreading on the agricultural land can be done only in respect with the Nitrogen Directive. The legislation about this certificate is in the AGW of 14 June 2001.

6.3.2  **Management of ranch effluents**

The calculation of the soil link rate for all the agricultural exploitations located in Walloon Region is realised by the Direction of soil protection (DPS). If the exploitations have a soil link rate too high, they can make a spreading contract with other farmers. In this case, Nitrawal is responsible to organise the effluent exchanges. Nitawal is a non-profit making association for Agricultural Consultancy Services that deals with the management of nitrates and water pollution.

6.3.3  **Rules related to the storage conditions of ranch effluent**

All the agricultural exploitations settled in Walloon Region have to respect minimal norms concerning the storage of ranch effluent. So, storages of 6 months are required for the liquid effluents. The solid manure storages have to be dimensioned according to the type of manure produced. The Ministry of Walloon region (DPA) imposes conditions of storage.

6.3.4  **The Nitrogen Directive**

The AGW related to the sustainable management of nitrogen in agriculture doesn’t allow the spreading of fertilisers if it is only to cover the physiological needs of nitrogen of plants, attending to limit the waste nutritive elements.

Maximum amounts of spreading nitrogen are defined. The limits are fixed in step with the type of affection of lands profited by fertiliser contributions, with the geographical situation of lands profited by such contributions and with the integration or not of farmers in a Quality Approach.

So, the amounts of nitrogen applied differ according as the contributions are intended for meadows or arable lands.
In the same way, the maximum amounts of fertilisers vary in function of the situation in a vulnerable area, in a zone which is submitted to particular environmental constraints or elsewhere in Walloon (Table 2). Indeed, to protect the waters from the pollution by nitrogen, two types of zones are defined. Inside those ones, the constraints concerning the maximum contributions are stricter. And according to the type of manure and soil cover, there are periods when fertilization is prohibited (Table 3).

**Table 2. Amount and period for fertilization (Source: Nitrawal)**

<table>
<thead>
<tr>
<th>Amount of organic N</th>
<th>Grassland</th>
<th>Arable land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal zone</td>
<td>210 kg/ha</td>
<td>120 kg/ha</td>
</tr>
<tr>
<td>Vulnerable zone</td>
<td>210 kg/ha</td>
<td>80 kg/ha</td>
</tr>
</tbody>
</table>

**Table 3. Period when fertilization is prohibited (depending on the type of manure and soil cover) (Source: Nitrawal)**

<table>
<thead>
<tr>
<th>Fast fertilising effect (slurry, poultry, droppings)</th>
<th>Slow fertilising effect (solid manure, compost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arable crops</td>
<td></td>
</tr>
<tr>
<td>From October to February</td>
<td>From July to September except</td>
</tr>
<tr>
<td>From July to September except if winter cereals, crops trapping nitrogen or straw incorporation</td>
<td>if winter cereals, crops trapping nitrogen, straw incorporation</td>
</tr>
<tr>
<td>Grassland</td>
<td></td>
</tr>
<tr>
<td>From September to November</td>
<td></td>
</tr>
</tbody>
</table>

At last, the farmers can start a Quality Approach, which aims to manage the environmental risk of the agricultural activity concerning the water pollution by nitrogen. This QA goes on a length of time of 4 years renewable and consists in an engagement of the farmer to respect some obligations and to reach some results concerning the nitrogen management. Such a nitrogen management carries out essentially by the implementation of farming practices and the follow-up of indicators based on nitrogen content into the soil.

Before the spreading of digestate, a comprehensive soil analysis must be carried out. The necessary data are the percentage of organic matter, of minerals and of heavy metals. This soil analysis costs 2,000 €.

Concerning the digestate, the analyses must be carried out twice a year and cost 1,000 €/analysis.

### 6.4 Subsidies and financial incentives promoting the production use of biogas

#### 6.4.1 Green certificate

In Walloon Region, a green certificate system is in operation since the 1st October 2002. This system is applied in order to support the production of green electricity. Indeed, the price of the green electricity production is still today a brake even if the environmental benefit is important. Therefore, this system has been put into place.
A green certificate is a transferable certificate issued to producers of green power for a number of kWh generated which is equal to MWh_e divided by the carbon dioxide saving rate. This saving rate is calculated by dividing the carbon dioxide gain achieved by the system under consideration by the carbon dioxide emissions of the traditional reference electric system (steam and gas turbine), the emissions of which are defined and published annually by the Walloon Commission for Energy. This carbon dioxide saving rate is limited to 1 for generation units producing over 5 MW, and 2 below this limit.

The carbon dioxide emissions are those generated by the green power generation as a whole and include fuel production, emissions during combustion if applicable, and waste processing if applicable. In the case of centralised codigestion transportation of external wastes or fuel consumption for energy crops are taken into account and penalize the profit making of the biogas unit (less green certificates are obtained).

The system poses higher for investors and long-term, high cost technologies (as biogas plant) are not easily developed under such a scheme. However new decisions have just been taken to favour biomethanation projects in agricultural sector as for biogas projects the price of Green Certificates will be guaranteed at a minimum price of 65 €/GC for a period of 15 years (instead of 10 years before).

At present (First middle of 2006), the average value is 92.08 €/GC but it should diminish in the future (around 80 €/GC).

The cost of the connection on the electricity grid is very high and totally in charge of the owner of the plant: around 25,000 to 50,000 € (medium voltage) for a farm unit.

Figure 1 gives a summary of the Walloon system of green certificates.

![Diagram of the Walloon system of green certificates](Source: CWaPE)
In Walloon Region, all green power generation units must submit a prior application to CWaPE for the issuance of green certificates. A certificate of origin (1) issued by an approved inspection body must be attached to this application.

Once this preliminary application for certification has been accepted by CWaPE, the producer supplies its quarterly energy metering statements to CWaPE. On the basis of these statements, CWaPE issues (2) a given number of green certificates.

Once in possession of the green certificates, producers may sell them to any purchaser (3), regardless of physical power sales (4).

Each quarter, power supplies must return to CWaPE a quota of green certificates proportional to the quantity of power supplied. A fine of 100 € per missing certificate is levied (5).

As an alternative solution to the disposal of green certificates issued to facilities generating power from renewable energies, an aid system has been set up by the Walloon Government.

A system imposing the repurchase of green certificates by the transmission system operator (Elia) at a minimum price is also imposed by the Federal Government. Green certificates purchased by the transmission system operator are then resold on the virtual green certificate market (7).

6.4.2 Improvement of the energetic efficiency and promoting of a more rational use of energy in the private sector (AMURE)

This subsidy can only be conceded for legal entities from the private sector, which exercises agricultural, industrial or service activities in Walloon Region, i.e. enterprises and non-profit-making organisations.

The supported activities are:

- The realisation of an environmental report with a view to establish the pertinence of an investment saver of energy or turning to renewable energies and/or to the quality cogeneration. This prefeasibility study determines the general technico-economical characteristics of one or several investments in a given situation, without reference to a type or a specific brand or company related to these investments.
- The realisation of an energetic report ending to a global plan of improvement of the energetic efficiency of the enterprise.

The amounts conceded are:

- For all the enterprises: 50 % of necessary services to the realisation of the prefeseability study, including the costs related to the measure of the energetic flows, without VAT.
- For each enterprise which is signatory of a declaration of preparatory intention to make a contract with the Walloon Region stipulating that the enterprise will reduce its emission of greenhouse gases or improve their energetic efficiency: 75 % of internal or external services necessary to the realisation of the study, including the costs related to the measure of the energetic flows, without VAT.

The total amount of subsidies conceded to an enterprise cannot exceed 100,000 € on a period of three years. The report must be made by an expert recognized by the Walloon Region.
6.4.3 Energy Funds 2005-2007

This subsidy can only be conceded for legal entities, which have their exploitations in Walloon Region, for free-lance workers or for building syndicates.

The supported activities are:

- All the installation works of a quality micro-cogeneration or a quality cogeneration for which the subsidy amounts to 20% of the total amount invoiced with a maximum which can not exceed 15,000 € per installation.
- The realisation of an energetic report with, eventually, a report by thermography. The subsidy for the energetic report amounts to 50% of the total amount invoiced with a maximum of 1,000 € per building and this one for the report by thermography amounts to 50% of the total amount but with a maximum of 700 € per building.

A few conditions exist to get this subsidy. One of them is that the installation must generate a minimal rate of 10% of economy of Carbon Dioxide proportional to the emissions coming from the separated production of the same quantities of heat or electricity in modern reference installations for which the annual exploitation efficiencies are defined and published by the Walloon Commission for Energy (CWAPE).

6.4.4 Fiscal Deduction

This subsidy can be conceded to the industrial, commercial and agricultural enterprises. The benefits of those last ones can be exonerated.

The tax reduction amounts to 40% for every expense invoiced, with an amount peaked by a taxable period and per habitation. For the expenses made in 2006, the maximal limit was 1,280 €.

6.4.5 Encouragements intended to promote the environment protection and the durable use of energy

The Walloon Region concedes a subsidy to the investment and an exoneration of the property deduction to the enterprises which realise an investment program intended the environment protection and the durable use of energy.

Unfortunately, this subsidy cannot be added to the subsidies of other regional legislations or regulations in effect.

The government can concede those encouragements to the enterprise, which protects the environment or uses energy in a sustainable way.

Concerning the investments made to protect the environment, the global amount of the subsidy and of the exoneration of the property deduction consists of a percentage of the allowed investments. The percentage conceded varies according to the enterprise size and to the objective followed by the investment program. The amount of the subsidy and the exoneration of the property deduction cannot exceed 1,000,000 € per enterprise for a period od 4 years if it is a medium-sized business or 2,000,000 € per enterprise for 4 years if it is a big enterprise.

And concerning the investments intending a sustainable use of energy, for the mean enterprises, it amounts to 40% for the eligible investments and for the big ones; it amounts to 20% of the eligible investments.
The minimum threshold of investments is fixed to 25,000 €.

To benefit from this subsidy, the enterprise must be located in Walloon Region and must be a physical person (commercial or freelance worker) or a legal entity (commercial society or European group with an economical interest).

The request of this subsidy must be done by the General Direction of Economy and Employment (DGEE).

7  SITUATION IN BELGIUM : Flemish Region

7.1  Wastes treatment and recycling norms and incentives

7.1.1  Animal wastes

If anaerobic digestion with animal by-products is performed, the regulation about animal wastes must be respected. This Flemish regulation gives the conditions to do an anaerobic digestion with animal wastes. The most important is the sterilisation norms for this transformation. Moreover, this transformation has also to follow the specific sector conditions of Vlarem II.

From the 1st May 2003, the Regulation 1774/2002 of the European Parliament and of the Council establishing the animal by-products not intended for human consumption must be respected.

The animal wastes considered are dead animals or fishes, bodies or parts of them, which are unsuitable for the human consumption with the exception of animal excrements, kitchen detritus and food rests.

7.1.2  Manure treatment

Flanders has one of the largest worldwide concentrations of animal raising farms in its territory, and a resulting excessive production of manure to dispose of. To address this issue, the Flanders Government has forced a reduction of hog raising from 7.5 million heads to 6.5 million between 2000 and 2003. Flanders farmers “exported” 580,000 tons of manure in 2001, mainly to nearby Walloon farmers who were pleased to fertilise their lands at no cost. However, the Walloon government has declared illegal any import of manure into Wallonia, including that from neighbouring Flanders, due to its environmental nuisance on water pollution. Flanders is also establishing protected perimeters which are defined as non-cattle raising areas in the immediate vicinity of its waterways, in order to avoid nitrate contamination of surface waters stemming from neighbouring agricultural activity.

7.2  Authorisation procedures

7.2.1  Vlarem I

Vlarem I defines who has to request for a environmental licence and stipulates in which class the AD unit will be located. According to the unpleasant activities, which will appear with the AD unit, some conditions will have to be respected. Thanks to the arrival of Vlarem I, the exploitation licence has been integrated with every other environmental licence in only one licence called “the environmental licence”.

Page 31 of 131
An enterprise must request an environmental licence if one of its activities is located in a list of unpleasant activities for people or environment.

The AD units are considered as facilities causing inconvenience linked to the wastes, animal manure, smells or cartage. So, an AD unit will be considered as a class 1 with an environmental coordinator, a unique or periodic environmental audit and in some cases, an annual report will have to be done.

The agencies which will give most of recommendations for an AD unit are: Preventive Section of the Public Health (Afdeling Preventie van de Administratie Gezondheidszorg), the Flemish Land Agency (VLM) and the Flemish Public Waste Agency (OVAM).

The environmental licence for the class 1 has to be requested to the Permanent Deputation of the province.

7.2.2 Vlarem II

Vlarem II contains, in other things, the environmental quality norms on which the government has to coordinate its licence policy, the general and sectorial conditions to which the enterprises requesting a licence will have to follow and the environmental conditions which are not considered in the activities or institutions considered in Vlarem I.

Three parts of environmental conditions in Vlarem II may be distinguished:

- General environmental conditions: considering exploitations causing inconveniences, expressing the safety-first principle and acting like a safety-net;
- Sectorial environmental conditions: specific regulations concerning particular unpleasant institutions, those ones prevail on general environmental conditions;
- Particular environmental licence conditions: can be imposed specifically for a particular exploitation place and have priority on general and sectorial conditions.

7.3 Emissions control and management

In Flemish region, a manure policy exists based on the European Nitrate Directive. According to this policy, the nitrate residue in cultural soil until a depth of 0.9 m cannot exceed the maximal marginal value from 1 October to 15 November. If the cultural soil is located in a vulnerable zone, the norms are stricter.

The general fertilisation norms appear in Table 4.

<table>
<thead>
<tr>
<th></th>
<th>P2O5 (kg/ha)</th>
<th>Total N (kg/ha)</th>
<th>N from animal or other fertilizers (kg/ha)</th>
<th>N from chemistry (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grassland</td>
<td>130</td>
<td>450</td>
<td>250</td>
<td>350</td>
</tr>
<tr>
<td>Maize</td>
<td>100</td>
<td>275</td>
<td>250</td>
<td>150</td>
</tr>
<tr>
<td>Other cultures</td>
<td>100</td>
<td>275</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>
7.4 Subsidies and financial incentives promoting the production use of biogas

7.4.1 Ecological subsidy

The ecological subsidy is a financial participation to projects, which realise ecological investments in Flemish Region. The farmers, except the ones who are self-employed, cannot have this subsidy. This subsidy is calculated according to a percentage of the ecological cost overrun and cannot be combined with other subsidies such as growing subsidy, ‘training checks’, etc.

7.4.2 Important deduction of investments

The important deduction of investments is a deduction coming from the taxable profit for the saved investments. This is a fiscal profit for which a certain percentage of acquisition costs of the investment value is exempted from taxes. All the industrial, commercial or agricultural enterprises, physical or legal persons can ask for this subsidy. The investments which are taken into account are the equipment except the equipment required for the ploughing, the storage or the substance transport, the reagent used for the chemical, thermo-chemical or biochemical transformation of the biomass, the heat exchanger, the measuring or counting apparatus, the chimney or apparatus used to purify the gases produced by the effluents. This important deduction of investments related to the energy savings amounts to 10 %. To this percentage can be added a basic deduction of 4.5 %. This fiscal measure can be cumulated to the ecological subsidy and the request must be done after the realisation of the investments.

7.4.3 Energy demonstration project

The principle of this subsidy is to promote a rational use of energy and to insure a sustainable supply of energy. All the physical or legal persons, enterprises or no commercial industries, particulars or public enterprises, can ask for this subsidy. The projects, which can be taken into account for this subsidy, are those ones, which open commercial, and cost-effectiveness prospects. Moreover, the project must be placed in the Flemish Region. The project must also contain technical elements, which are not yet in application in Flanders. The financial subsidy amounts to maximum 50 % of the costs taken into account, that is to say the costs related directly to the application of innovating part of the new technology. Unfortunately, this subsidy cannot be added to another financial assistance of the Flemish Region.

7.4.4 Growing subsidy

The growing subsidy is the participation to the financial costs for an enterprise for which the investments are realised in Flemish Region. Several conditions exist to obtain this subsidy but the most important ones are the subsidy investments which have to be at least 12,500 € for an enterprise which is not five years old, and at least 25,000 € for...
an enterprise which is more than five years old and the maximum subsidy investment for all the enterprises amounts to 8,000,000 €.

The investments have to be done during the three years following the acceptance date of the concession of the growing subsidy and cannot be cumulated to others subsidies coming from the State.

7.4.5 The Investment Funds for the Flemish Agriculture subsidy

The farmers and the horticulturists can receive a subsidy from the Investment Funds for the Flemish Agriculture.

Different conditions exist to be able to receive this subsidy. Indeed, the enterprise must have a minimum economic dimension, to respect the legislative norms related to environment, health and animal wellness. The farmer has to cultivate, to breed or to commercialise agricultural products. Fifty percent of his time has to be devoted to the enterprise and 35% of his total incomes has to come from his activities. The main activity of the enterprise must be agricultural and the secondary one must be in relation with the energy production.

The investments taken into account are those made for the biogas production and for the adjoining installations for the electricity production from raw materials of the enterprise.

The amount of the subsidy is 30 % of the investments.

7.4.6 Subsidy for energetic crops

The farmers who cultivate energetic crops can request the subsidy for energetic crops. The plants taken into account are those ones which are used to produce energetic fuel or which are used to produce electric or thermal energy. The energetic crops can be exported to an industrial installation but the farmer himself can use it in his agricultural enterprise.

The subsidy amounts to 45 €/ha.

It is important to know that the transformation has to be done in the European Union before 31 July of the second year following the harvest. Moreover, after transformation, the economic value of energetic products must be superior to the value of all the other by-products.

7.4.7 Renewable energy certificates-REC

In Flemish Region, the renewable energy certificates came into effect on the 1st January 2002. The system was implemented in support of the Flemish target to obtain a percentage of its energy supply from renewable energy sources. Flanders has set out a target of 2 % share of renewables in the energy supply for 2004, to be increased to 6 % by 2010. The system builds upon two pillars:

- On the one hand, tradable RECs are delivered to the green energy producer for the energy produced based on renewable energy sources (including biomass);
- On the other hand, electricity suppliers are under a duty to submit each year a number of REC (defined as a % of their electricity supplies in the Flemish Region) to the Flemish regulatory authority.

The electricity supplier can meet his (annually increasing) obligation to surrender RECs either by producing his own “green electricity” (in this case he will receive RECs) or by buying RECs on the market.
Non-compliance with the aforementioned duty is sanctioned by a fine. These fines put money into the Renewable Energy Fund, used by the Flemish government to promote renewable energy.

Although the market sets the price of the REC, the government provides for a minimum price. It can be noted that given the lead-time associated with the production of RECs, the start up phase of the System was characterised by a shortage of supply of RECs leading to rather high prices (nearing the amount of the fine).

7.4.8 Green and Cogeneration Certificates

In Flemish Region, the system of certificates is complex. Indeed, they distinguish the green certificate from the cogeneration certificate in opposition with the Walloon system, which considers only one green certificate. So, there are two separated systems, which are put into place, a system for the promotion of the renewable energies, and a system for the promotion of the installations of quality cogeneration. Moreover, the concession of the certificates is made monthly and the “quota return” is made annually. The concession of the cogeneration certificates is made monthly, but the installation of cogeneration has to satisfy annually to the quality criteria.

In Flanders, the producers satisfying to the criteria can get monthly certificates in relation with the net produced electricity. And the furnishers are submitted to an obligation, called “quota return”, for which they will have to return annually a number of certificates in relation to the furniture of the previous year.

Some guarantees are offered to the producers as for the certificate value:

- A validity of the certificate of five years
- A minimum price depending on the type of installation/combustible

The green and cogeneration certificates are conceded for the green electricity production and for the economy of primary energy, to the electricity producers.

An obligation, the quota return, is imposed to the electricity furnishers. If the furnisher does not return enough certificates, he must pay a penalty per missing certificate.

For a few years a market has been establishing between the furnishers and the producers.

The Green Certificate

The installation must satisfy to some criteria to get green certificates such as the production of electricity from sources of renewable energies, the production of electricity must be measured by the grid manager (excepted for the units producing less than 10,000 kWh per year), an inspection report must be made (for the units producing more than 100,000 kWh per year) and if the request concerns wastes, a notice of OVAM (Flemish Public Waste Agency) is required.

The installation of the production of green electricity gets green certificates for the net production of electricity.

The guarantees for the producers of green electricity are minimum prices guaranteed and the lifespan of a green certificate is 5 years.

The certificate has two different uses:

- The origin guarantee for the green side of the electricity furnished to the consumers
- The quota is imposed to promote the production of green electricity in Flemish Region until a certain level
The Origin Guarantee
From begin of 2006, the green certificates have also an origin guarantee.
For 1 MWh of electricity produced from renewable energies injected in the electricity grid, a green certificate is conceded with two functions: the quota return and the origin guarantee.
An installation, which produces green electricity consumed on site, cannot get an origin guarantee.
The furnishers must use origin guarantees for their green products, which are forwarded through the electricity grid.
When one origin guarantee is used, the green certificate has still a part called “quota”. This part is still usable.
However, there is a temporary restriction: as the certificate is being considered as an origin guarantee, it cannot be anymore used for transactions (sale or the use for the “quota return”). Thus the green certificate must be used to demonstrate the renewable source of the electricity before being used for the quota.

The Cogeneration Certificate
The producer of electricity coming from an installation of quality cogeneration can get cogeneration certificates. But an obligation of “return quota” is imposed to the furnishers.
The certificates are conceded for the economy of primary energy. There is no reduction of the quota for the big consumers and an installation gets cogeneration certificates for a restricted period.
The installation has to satisfy to some criteria to get cogeneration certificates such as the production of electricity from an installation of quality cogeneration, the production of electricity must be measured by the network manager (excepted for the units producing less than 200 kW), an inspection report must be made (for the units producing more than 1,000 kW), if the request concerns wastes, a notice of OVAM (Flemish Public Waste Agency) is required and the cogeneration installation must be of quality. Such an installation has to satisfy to some conditions such as it must be a cogeneration installation for which the relative economy primary energy is minimum 5 % and it disposes of necessary counters.
Concerning the minimum prices guaranteed, they are not expressed explicitly in the decree.
8 SITUATION IN LUXEMBOURG

8.1 Wastes treatment and recycling norms and incentives

According to the law of 17 June 1994 relating to the waste prevention and management, the waste valorisation or elimination can be executed but without endangering the human health or environment such as water, air, soil…

The wastes have to be used in a priority manner to be reintroduced in the economic system. Moreover, the use of wastes as an energy source is only conceivable for the wastes, which cannot be valorised by another way than by heat generation.

The organic wastes coming from the pruning in gardens, parks or along the roadsides have to be recycled by composting or by another process following to the nature waste and to the regional and local characteristics.

8.2 Authorisation procedures

The law of 10 June 1999 relating to classified premises, often referred to as the “commodo-incommodo law” requires an operation permit to be sought in respect of any industrial or commercial businesses, in respect of any plant or machinery, any related activity whose existence may represent a danger or threat to well being, for instance to the security, the health or the well-being of the public, neighbourhood or those employed by the firm or to the environment.

The permit sets restrictions and conditions for development and operation deemed necessary to protect the interests involved, taking into account the best technology available, the implementation of which should not incur excessive costs.

Moreover, an authorisation procedure has to be set up for the building of new generation plants. The Ministry in charge of energy may consider the following criteria before authorising the building of a new plant: security of supply, site issues, protection of the environment, energy efficiency of the new plant, the nature of the input fuel, the technical ability and the financial capacity of the company which will build the plant.

There is no special authorisation required if the waste used for the biomethanation is coming from the farm. But if the wastes are exogenous, it is necessary to get the authorization of the Environmental Administration.

If the digestate is sold to other exploitations, an authorisation from the Environment Ministry, Waste Section, has to be received.

8.3 Emissions control and management

In Luxembourg, some legislation exists concerning the Nitrate Directive. Prohibitions have been set up for the spreading of fertilisers. This spreading cannot be made on black fallows, on fallows for few years or on spontaneous fallows, on frozen soils…

It is forbidden to spread liquid manure or activated sludge from the 15 October to the 1st March on no covered soils. If the soil is covered with plants other than grassland then spreading is allowed from the 15th October to the 15th February.

The total amount of liquid manure or activated sludge, which can be spread from the 1st September to the 1st March cannot exceed 80 kg Nitrogen per ha.
The amount of nitrogen organic fertilisers spread per year and per ha cannot exceed more than 170 kg of nitrogen, except for the proteaginous and leguminous crops for which the limit is 85 kg of nitrogen (Table 5).

Table 5. Nitrogen application standards for certain major crops
(Source: Règlement grand-ducal du 24/11/2000)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Maximal Nitrate organic manure (kg N/ha/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>170</td>
</tr>
<tr>
<td>Colza</td>
<td>170</td>
</tr>
<tr>
<td>Proteaginous Crops</td>
<td>85</td>
</tr>
<tr>
<td>Potatoes</td>
<td>170</td>
</tr>
<tr>
<td>Mangel-wurzels</td>
<td>170</td>
</tr>
<tr>
<td>Maize</td>
<td>170</td>
</tr>
<tr>
<td>Grasslands</td>
<td>170</td>
</tr>
<tr>
<td>Temporary grasslands</td>
<td>170</td>
</tr>
</tbody>
</table>

8.4 Subsidies and financial incentives promoting the production use of biogas

8.4.1 Financial subsidy for a rational use of energy

A subsidy can be conceded if an investment is made in a cogeneration system. If the power is between 1 to 150 kW, the Minister can concede a subsidy covering 25 % of the effective investments costs, with a maximum of 62,000 € if the installation reaches a global efficiency above 80 % and operates more than 2,500 hours per year. The installation has also to be stopped during the months of July and August except to cover the rush hours, on condition that the full valuation of produced heat is guaranteed. Moreover, the recipient of financial assistance has to give a report annually with the technical data, the functioning hours and the thermal energy quantity evacuated by the secure cooler.

The investments, which are considered, are the cogeneration module with the internal combustion engine and the generator, the peripheral installations, the installation costs and the technical consultation relative to a personal installation.

8.4.2 Financial subsidy for the development of the renewable energy resources

A subsidy can be conceded by the Minister if an investment is made in a biogas system. The amount is determined in function of the installation use.

For the development of a biogas installation, a rate of 25 % of the effective investment costs can be conceded, with a maximum of 38,000 €. If the project is regional, the amount of the financial subsidy will be able to exceed the rate of 50 %. In this case, the maximal amount per project will be able to be superior to 150,000 €.

For the development of a sanitary installation, a rate of 25 % of the effective investment costs can be conceded, with a maximum of 38,000 €. If the project is regional, the same conditions above-mentioned are considered.

To concede this financial subsidy, the biogas installation cannot have other financial aids.

The junction to the electricity grid can also be eligible for a financial assistance if the installation is producing electricity from renewable energy resources. This subsidy amounts to 50 %, with a maximum of 100,000 €.

The investments, which are considered, are the biogas system with the sanitary installation, the digester, the gas tank and the cogeneration installation, the technical consultation relative to an individual installation and the installation costs.
8.4.3 Ecological incentive

This incentive is conceded to the produced electricity in Luxembourg from renewable energies such as the biomass and the biogas. This subsidy concerns the installations built and operational between the 1st January 2005 and the 31 December 2007. It can be conceded for a period of 10 years. The amount of this subsidy is fixed to 0.025 € per kWh injected into the grid. For the biogas installations, the electrical power of an individual installation cannot exceed 3,000 kW. If the power is superior to 3,000 kW, no subsidy is conceded. The request for this subsidy has to be done before the 1st March of each year.

8.4.4 Subsidy for farmers

Thanks to the plan of rural development 2000-2006, the farmers who want to install a biomethanation unit can call for a subsidy. The amount of the subsidy is 150,000 €/farmer and the assistance rate is 50 % (respectively 55 % if it is a young farmer before the next five years following the installation). An additional rate of 10 % (respectively 5 %) will be also conceded.

9 SITUATION IN NETHERLANDS

9.1 Wastes treatment and recycling norms and incentives

The main parameters affecting feasibility of biogas plants are:

- The legislation concerning introducing minerals into the soil which is very strict in the Netherlands;
- The same legislation strictly prescribing the high quality of compost, and implying import restrictions on bringing digested manure to the market;
- The main focus concerning manure policy is about ammonia reduction (Ammonia Reduction Plan-ARP. December 1995);
- Co-digestion of manure with some types of organic wastes is not allowed;
- Values of biogas and heat which are low in the Netherlands.

The main barriers for introducing biogas systems in the Netherlands, which make the large scale transition to anaerobic digestion technologies unlikely within 5 years, are assessed to be the already established infrastructure of aerobic composting of VGF (vegetables/garden/fruit), completed in 1995-1996 and the low price of natural gas.

Implementation Plan for Sludge

In implementation of action 57 of the Implementation Plan for Biological Waste the preparations for a sludge implementation plan started in 2000. The goal was to find solutions for the fate of sludge from wastewater purification plants (according to VLAREA, this can no longer be used on farmland as of December 1st, 1999) and other purification sludge from drinking-water production and sewage cleaning.
9.2 Authorisation procedures

For the construction of a biomethanation unit, it is necessary to apply to the municipality or the province in order to obtain an environmental and building authorisation. But unfortunately, those procedures take a long time.

The crop and milk producers do not have to obtain the environmental authorisation but well the authorisation for the construction of the unit. The valuation of the request for the environmental authorisation takes mainly into account the biomethanation tank for the biogas storage and the energy production. It is important to take care about the ammonia production but also odours, methane and inflammable gases. The acoustic nuisance or the soil protection is also very important.

Those requests have to be done to the municipality or the province. It depends on the case. For the environmental authorisation, if in addition to their manure the exploitation treats less than 25,000 m³ coming from other exploitations, the request has to be done to the municipality and in the other case, to the province.

In the case of the building authorisation, if the unit is placed in the agricultural propriety, this is the municipality, which can give the authorisation, and in the other case, this is the province.

9.2.1 Dung transformation, spatial organization and building

The law related to the spatial organization fixes the domains of activity that are allowed or can be developed within the regional or soil occupation plans. This soil occupation is restricting. The request for a building licence has to be confronted to the soil occupation plan. Satisfying to the soil occupation plan, the building licence cannot be refused on this point. But if the request does not reply to the conditions of the plan then, the licence is rejected unless it is agreed of a modification or an exemption of the soil occupation plan.

9.2.2 Environment impact study

Environmental impact study is obligatory for dung-based AD units if their capacity is 100 tons per day or more. That means that the competent authority for such a case stipulates that the environment impact study is necessary. There is a subsidy for the environment impact study.

Moreover, it is possible that an environment impact study has to be done for the agreement of an environmental licence for the dung (co-)digestion with more little capacities than 100 tons per day.

9.2.3 Dung transformation, Integrated Pollution Prevention and Control directive, Best Available Techniques and Reference Documents on Best Available Techniques

In relation to the Integrated Pollution Prevention and Control directive (IPPC directive), the law of the environmental management would be adjusted to many points. According to a detailed environmental management, the licence will be able to be refused in each case and if it cannot be, it will be necessary that the Best Available Techniques be applied for the installation or the pre-installation of the unit.

The Best Available Techniques for the installation are in relation to the Best Available Techniques in effect for the relative area of operations and which are to combine to the specific environmental context and to the technical characteristics of the installation.

The competent authority will have to base on the requirements on Best Available Techniques with regard to the environmental licence. The Best Available Techniques are fixed by virtue of the
individual situation of the society. There is also to add to this a number of considerations, which have been decided by the commission called Reference Documents on Best Available Techniques.

For the dung transformation, the Reference Document on Best Available Techniques for the intensive breeding is important (Reference Document on Best Available Techniques for Intensive Rearing of Pigs and Poultry, July 2003). This Reference Document means the dung treatment by a biological process such as co-digestion.

9.2.4 The dung transformation in the organization and the licence decision

The municipality is the competent authority for the work, the transformation, the storage (> 10 m³) or the animal transformation or other organic manure.

The province is competent for the work or the transformation of animal manure for which the capacity is more than 25,000 m³ per year.

If the substrates to treat are wastes, this is currently the province, which is responsible for the storage and the transformation. The province is competent if the storage capacity for the waste is more than 1,000 m³ and if the wastes are coming from abroad. And also if annually, more than 15,000 tons of wastes coming from abroad are added to the digestion process.

For the authorisation, it is important to know which wastes are coming from the exploitation because according to the waste categories, the province has to carry out an effectiveness test and can give permission for a period of maximum 10 years.

9.2.5 Law related to the odour emission in agricultural areas

For a dung AD unit, the law related to the odour emission can be applied providing that:

- The dung AD unit belongs to a husbandry installation;
- The transformation capacity does not exceed 25,000 m³ of dung per year;
- The husbandery installation is located in agricultural areas for which a rebuilding plan is known.

The law stipulates that in this case, the authorization can be accepted with regard to the aspect of odour pollution. If the project satisfies the minimal requirement, the competent authority cannot refuse only because of the aspect of odour pollution.

The decision to accept or not the unit installation is related to a minimal distance required by the law related to the odour emission. The distance has to be at least 50 or 100 m depending on the protection that must have the place against the odours. In the case of rearing exploitations for which the conversion factors are fixed, it is possible that the distance of the installation is more than 50 or 100 m because of the animal presence.

9.2.6 Financial decision for the security of the environmental protection

The 1st May 2003, the financial decision for the security of the environmental protection came into force. The aim is that the state or a third party should not participate anymore to the costs regarding soil pollution or the removal of wastes instead of the responsible (‘polluter-pays principle’). Thanks to this decision, in some cases, the municipalities and provinces can require a financial security from the enterprises. So, they have the guarantee that the enterprise is insured against the soil damages caused by the installation and the removal of stored wastes. In the case of waste transformation by co-
digestion, a financial risk could be required but as the risk is limited, the statement of a financial security will not be necessary.

9.3 Emissions control and management

The intensive agriculture in the Netherlands puts considerable pressure on their environment. New minerals regulation has come into effect in 2006. The use standard for animal manure is expressed in kg of nitrogen per hectare. The standard is either 170 kg or 250 kg. The first is laid in the European Nitrate Directive and the second number is a derogation that applies to farms with mainly grassland.

The nitrogen use standard for total nitrogen application concerns the sum of chemical nitrogen fertiliser and nitrogen in animal manure and other fertilisers. The standard differs per crop. The phosphate use standard concerns the total application of phosphate from chemical fertiliser, animal manure and other fertilisers. The standard differs for grassland and arable land. The use standards will be gradually reduced over the years.

For each crop and type of soil, an application standard for total nitrogen fertilisation will be determined (Table 6).

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grassland : with grazing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>345</td>
<td>345</td>
<td>325</td>
<td>310</td>
</tr>
<tr>
<td>Peat</td>
<td>290</td>
<td>290</td>
<td>265</td>
<td>265</td>
</tr>
<tr>
<td>Sandy and loessial soils</td>
<td>300</td>
<td>290</td>
<td>275</td>
<td>260</td>
</tr>
<tr>
<td>Grassland : 100% mowing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>385</td>
<td>385</td>
<td>365</td>
<td>350</td>
</tr>
<tr>
<td>Peat</td>
<td>330</td>
<td>330</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Sandy and loessial soils</td>
<td>355</td>
<td>350</td>
<td>345</td>
<td>340</td>
</tr>
<tr>
<td>Maize</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>Sandy and loessial soils</td>
<td>155</td>
<td>155</td>
<td>155</td>
<td>150</td>
</tr>
<tr>
<td>Consumer potatoes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>275</td>
<td>275</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Sandy and loessial soils</td>
<td>265</td>
<td>250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The manure transformation is one of the solutions concerning the manure problem because the application of the products is out the agriculture. The government stimulates the initiatives on different manners and tries to avoid the obstructions.

Since the 1st March 2006, the Ministry of Agriculture, Nature and Food Quality has put in place a rule for the promotion of the hog and the poultry manure transformation. If the conditions are followed, per extension of the livestock, a partial dispensation can be received.

9.4 Subsidies and financial incentives promoting the production use of biogas

The main driving force for encouraging renewable energy uptake in the Netherlands has been the 1997 White Paper on renewable energy.
Tax structure is favourable towards renewable energy because companies and firms that invest in energy-saving projects (including renewable energy) can be exempted from taxation, and can benefit from claiming accelerated depreciation of investment in energy conservation equipment. Individuals benefit from income tax exemption for investments in “green” funds.

Subsidies are available both from NOVEM (the Netherlands’ energy and environment agency) and from local authorities to support energy-efficient technologies, including renewable energies. In addition, public utilities are obliged to invest in energy conservation or renewable energy schemes, with the result that many public utilities own and operate renewable energy projects. The Netherlands also has a number of domestic banks, which are supportive of environmental, and community initiatives, including renewable energy schemes, and want to invest small amounts of finance towards these kinds of projects at favourable rates.

The Municipal authorities are responsible for implementing spatial planning, including location of renewable energy systems.

9.4.1  Energy Investment Deduction 2006

A deduction of 44% of the energetic invested costs can be obtained on the taxable profit if an investment is done in order to save energy or to produce/use renewable energy. So, there will be fewer taxes to pay for one year. The considered means are the building, the equipment and the process, the simultaneous production of heat and strength, the transport means and the application of renewable energies. To benefit from this deduction, the mean has to be on a list, which is renewed every year. The request has to be done during the three months following the obligation engagement.

9.4.2  No Cure No Pay Regulation of Friesland

If an enterprise wants to launch into the prevention of emissions or waste production, this subsidy can be conceded to be able to make a quick-scan. The payment has to be done only when the scan will indicate that the financial advantage is enough. The scan consists in being careful about the tax on the waste pollution and the polluted water as well as the way to use the raw materials. Several conditions have to be satisfied to get this subsidy such as an agreement with the environmental adviser or the liberation of data necessary to the scan.

This scan can only be done for an enterprise of less than 250 employees and only for the Friesland. This fund can be conceded for investments in renewable energy techniques. Those techniques have to consist in the decrease of greenhouse gases especially. The projects are for example systems for the energy storage, the bio-energy, the heat pumps, the solar boiler and the photovoltaic techniques (solar panels).

The investments have to be done in the province of Limburg.

9.4.3  Subsidy regulation for energetic projects of Drenthe

A subsidy can be conceded for the projects relative to the energetic economy and the renewable energy if the investments are done in the province of Drenthe. This province wants to contribute to the decrease of greenhouse gases effects.

The condition to get this subsidy is that the project is innovating and constituting an example for the others.

9.4.4  Regulation on the unique chances

If it is desired to contribute to the transition towards renewable energy use then, a subsidy for this purpose may be obtained. The energetic transition is specific to the raw materials processed such as the
biomass, the alternative fuels or the sustainable electricity. Subsidies for the extra investment costs can be requested, which can achieve a high level of environmental protection. Those costs can be the site purchase or the building, the machines or the equipment, the maintenance, the inspection, the progressive starting of the project. The agricultural enterprises are also considered for this subsidy.

9.4.5 Production of environmental electricity subsidy

The production of environmental electricity subsidy by kWh is fixed every year. This subsidy is assigned once and then is guaranteed for ten years. On the 1st January 2005, the subsidy amounted to 9.7 eurocent per kWh produced for biomethanation installations of a 50 MW capacity. An indemnity for the enterprises, which produce electricity by environmental process, can be added to this subsidy. Then, the amount would be from 0.11 to 0.14 € per kWh.

9.4.6 Subsidy Decision Energy Programs

The programme “Energy extracted from waste and biomass” takes part in the Subsidy Decision Energy Programs of the Ministry of Economical Affair. The aim of this subsidy is to stimulate the energy saving, the durable energy and the energy techniques. The subsidizing is possible for the feasibility study, for R&D projects and for practical experimentations. The amount of the contribution depends on the degree of the importance of the project results and the degree of the contribution of the project to the Energy Programs objective. The support attribution is including other state or European subsidies. The subsidy amounts are:

- For R&D projects, the maximal subsidy amounts to 50 % of the project costs. In particular cases, a percentage more important is possible.
- For the demonstration project, the maximal subsidy amounts to 40 % of the project costs until 1,000,000 gulden (or 25 % of the project costs if it is more than 1,000,000 gulden).
- For a market introduction project, the maximal subsidy amounts to 25 % of the project costs.

9.4.7 Green Certificate

The government has introduced production certificates to enable the distinction between electricity produced in an ecologically sound manner and “standard” electricity. These certificates constitute a “guarantee of origin” and serve as proof that electricity was produced in an ecologically sound manner. The certificate system enables registration and hence monitoring of the entire path from production of renewable electricity or electricity generated by combined heat and power (CHP) units all the way to ultimate use by the final consumer. This is done by means of certificates representing the green value or CHP value of the electricity. The system distinguishes between three types of certificates, Guarantees of Origin, RECS certificates and CHP certificates. To be qualified for a certificate, the electricity must be generated in a plant designated as renewable or by a CHP unit. Generating units are eligible for production certificates only if the grid administrator can unequivocally measure the amount of electricity generated. Only units generating electricity based on wind, solar, biomass or hydropower are eligible for both green and RECS certificates.

In 2006, if the unit capacity is inferior to 10 MW and use only biomass, the price for one green certificate amounts to 97 €/MWh. On the contrary, if it is not just biomass, the price amounts to 25 €/MWh. If the power of the unit is between 10 and 50 MW, the price is 97 €/MWh with only biomass, and the price amounts to 25 €/MWh if biomass is mixed with another energy source.
10 SITUATION IN SWEDEN

10.1 Legislation and Governmental support

10.1.1 Biogas plant

A biogas plant needs several permits from governmental organizations to be built and commence operation. The relevant laws guiding the construction and continuous operation are:

- "Lagen om brandfarliga och explosive varor" (SAIF 1997:3), legislation regulating handling and storage of flammable and explosive materials.

- "Plan- och bygglagen, PBL" (SFS 1987:10), legislation about building and construction regulation.


- “Arbetsmiljölagen”, AML (SFS 1977:1160), legislation about work environment.

After operation has started there are regularly occurring control procedures. Each plant will be granted individual emission permits depending on location of the plant and type of emission. These permits are to be monitored by the plant and reported yearly. In addition the regional government may do their own surveys and inspections. The permits are to be updated regularly and can then be changed in light of new findings or changed circumstances.

10.1.2 Investment support

a) Agricultural production support

EU common agricultural policy (CAP) guides how the agricultural support should be implemented on the national level. CAP contains guidelines for environmental, regional and logistical governmental support actions for a more sustainable production.

“Miljö- och landsbygdsprogrammet” (LBU), environmental and rural development program includes economical support for actions changing the agricultural production to a more ecological, economical and socially sustainable countryside.

In the CAP there is also possible to apply for investment support, start up funding and funding of projects. Biogas plants using agricultural products have been receiving funding from this source.

b) LIP/KLIMP

The Swedish parliament reserved money for local investment support with the goal being to support local projects in increasing recycling and an ecological sustainable society. The projects started during 1998-2002 and all projects are to be finished by the end of 2006. This program was succeeded by an economical support program for climate improving investments. Several of these projects have been related to biogas production.
10.2 Energy consumption related support

10.2.1 Green electricity certificate

As of the 1st of May 2003 there is a system in operation with the aim to support production of electricity from sustainable energy sources. All users of electricity (with exceptions of some electricity intense industry) have to buy certificates equal to a share of the total electricity consumption. This system is implemented to internalise the energy effects of electricity production and thus produce environmental related competition on the electricity market. The share of consumption to buy certificates for is to be gradually increased over time, 2004 it was 8.1 %. The energy sources benefiting from the green certificates is wind and solar power, geothermic and wave energy, some biofuels (including peat and biogas) and some types of hydro electrical power.

10.2.2 Vehicle related taxes

As from October 1, 2006 is introduced a carbon dioxide based road tax for light vehicles. It comprises of a basis amount with an addition depending on CO emissions (grams CO over 100 g/km) for petrol-fuelled car. For diesel car the addition is multiplied with a factor 3.5. For cars that can to be run with alternative fuel (such as ethanol, E85, fossil natural gas or biogas) is the addition is lower.

As from July 1, 2006 a new system is introduced with tax exemptions for cars in certain environment classes. In addition, according to this system, diesel cars with low particle etc. (in practice particle filters) get a lowered road tax.

For heavy vehicle with motors fulfilling certain demands will also receive tax exemptions (from 1st Oct. 2006). Currently has all alternatives fuel (except electricity) tax exemptions in Sweden. Existing outright tax exemptions for biofuels had been extended to 2012 (Table 7).

10.2.3 Energy tax

June 2, 2006, the parliament decided to grant the government's bill about taxation of MSW that are incinerated for energy production. The tax means that the as commercial incineration of fossil carbon is obliged to pay energy tax. This means that it is more economic efficient to source sort MSW and use the organic fraction for biogas production.

10.3 Other legislation

10.3.1 Animal related substrates

"Animaliska biprodukts förordningen” (EG nr 178/2002) is the Swedish implementation of the EG directive comprise actions to stop spread of bovin spongiform encefalopati (BSE) and related problems.
This legislation restricts what kind of slaughterhouse waste a biogas plant can use and how the allowed substrates should be treated. The directive establish the lowest levels of protective measures that has to be taken and the individual country can take actions that are more strict if the needs to.

10.3.2 Municipality responsibility for refuse collection

Each Swedish municipality is responsible to collect and transport the household waste to treatment facilities, including similar waste from restaurants, kitchen, offices and such.

10.4 Important governmental organizations

Naturvårdsverket, Swedish Environmental Protection Agency, (www.naturvardsverket.se), responsible for coordinating the research in the environmental area and for the implementation of the environmental legislation.

Energimyndigheten, Swedish Energy Agency, (www.stem.se), responsible for coordinating the research in the energy area and implementation of energy related legislation.

Jordbruksverket, The Swedish Board of Agriculture, (www.sjv.se), responsible for coordinating the research in the agricultural area and for implementation of agricultural legislation.

11 SITUATION IN DENMARK

11.1 Wastes treatment and recycling norms and incentives

In 1999, the Danish Government published its waste strategy “Waste 21”. It outlined, which new measures could be implemented in order to ensure a more efficient and sustainable waste management in the future. Utilisation of agricultural by-products and production of biogas is integrated in the waste strategy. Waste producing industries were imposed to characterise the waste according to the Statutory Order on waste (no. 299 of 30th of April 1997). (Waste 21- the Danish Strategy, 1998-2004).

The highest priority for treatment of organic waste is given to anaerobic digestion, i.e. biogas production. The knowledge basis concerning digestion of organic municipal waste is still under development and requires some effort, before it can be fully implemented in the waste treatment system. Especially degradation of xenobiotics is given much attention. Biogas is mainly produced at wastewater treatment plants and at centralised biogas plants, co-digesting domestic animal slurry and suitable organic industrial wastes.

The Danish Government’s "Waste Strategy 2005-2008" outlines a number of targets for treatment of waste until 2008. The amounts of waste that are disposed in landfills are decreasing. In 1994, 24% of the waste was landfilled; in 2004 this figure was 8%. The 2008 landfill target is 9%. (Waste 21- the Danish Strategy, 1998-2004).

Since 2005 landfilling of organic waste has been banned in Denmark, because it was not considered sustainable. Hence, other treatment methods were considered. Anaerobic co-digestion and incineration have been implemented, where appropriate. (Al Seadi T. et al., 2000).
Incineration of waste is subjected to a tax of EUR 44 per tonne. In addition, the residue from the incineration plant is subjected to a tax of nearly the same amount, when landfilled. Recycling of organic waste is not subject to any tax. (Videnscenter for affald; Ministry for Taxation).

11.2 Specific norms related to agro-forestry residues utilisation


The Danish co-digestion plants are allowed to mix animal manure with a maximum of 25% organic industrial biomass (digestible wastes from industries and municipalities). It offers opportunities for extra income from gate fees and greatly enhances the biogas production in the co-digestion plants compared to digestion of raw manure only. In addition, co-digestion of organic wastes is considered as an environmental sound way of recycling these residues. Meanwhile, the presence of persistent organic compounds, heavy metals, and other hazardous chemicals in the organic waste can give rise to accumulation in the agricultural chain. Hence, a thorough characterization of the biomass is demanded by legislation in order to keep unsuitable, toxic biomass away from the biogas plants. At the same time, these quality demands ensure that the digestate is free of unwanted compounds and encourage the crop farmers to apply the digestate on their land instead of traditional chemical fertilisers. (Al Seadi T. et al., 2000).

11.3 Danish legislation related to biogas production

The legislative push for promotion of biogas production in Denmark can be summarised as follows:

- Requirement of 6-9 months slurry storage capacity and a concomitant restriction of the season for slurry application.
- The harmony rules, restricting the amount of manure applied per hectare
- Control and regulation of the application of waste products for agricultural purposes.
- Interdiction to landfill any organic wastes.
- Heavy taxation of waste incineration, and exemption of recycling.
- Power companies obliged to purchase electricity produced on biogas at prices according to the law.

One of the key issues in Danish legislation is to protect the environment. Especially prevention of pollution of the ground water resources have gained increased attention over the last decades due to quite a few environmental scandals. Hence, the legislative power seeks to establish a foundation that takes care of the environment to the maximum extent.

Via agro-environmental legislation, Danish farmers are being motivated to supply centralised biogas plants with animal slurry. The biogas plants then processes the slurry and distributes the digestate containing among other things nutritious nitrogen and phosphorous. Limits for application of nutrients to farmland exist. They are referred to as the harmony rules. In short, the harmony rules regulate the amount of nitrogen that can be applied to the land without stressing the environment. By utilising the centralised biogas plant concept, animal slurry suppliers are able to receive back just the amount of digestate they are allowed to spread on their fields. The remaining amount of digestate is distributed among crop farmers, who have arable land or other purchasers. (Al Seadi T. et al., 2000).
11.4 Authorisation procedures

Joint biogas plants are covered by the statutory order on approval of so-called list companies. The authorising authority is the local authority. The Environmental Protection Agency has the authority to issue standard requirements for biogas plants. The application has to describe the plant, expound for pollution, and suggest a method for self-supervision. Normally it takes three months to consider the case. Then, an additional four weeks before the construction work can begin. (Danish Agricultural Advisory Service, 2005).

A pre-project (desk study) is organised in order to shed light on important aspects like for instance the environmental impact and consequences of the establishment of the biogas plant. The findings of this desk study are important, since they form the basis for the applications that have to be submitted to various authorities. Furthermore, the study deals with the economical feasibility of the project. If it turns out to be unfavourable, the plans are oftentimes abandoned.

11.5 Emissions control and management

11.5.1 Gaseous emissions

The Departmental Order concerning limitation of emission of nitrous oxides, non-combusted carbon hydrides, and carbon monoxide etc. from engines and turbines takes effect, when biogas is to be utilised for production of heat and power by combustion in gas engines. The order is only applicable for biogas systems that have engines with an effect of more than 120 kW_{el} and a total system capacity below 1 MW_{el}.

Concerning regulations related to emissions from the combustion, the order states that biogas engines with a capacity of 1 MW_{el} put into operation after the 1st of November 2005 have to live up to certain emission levels before the 1st of January 2013 (Table 8).

<table>
<thead>
<tr>
<th>NOx</th>
<th>UHC</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>mg/Nm³</td>
<td>mg/Nm³</td>
<td>mg/Nm³</td>
</tr>
<tr>
<td>Biogas engines</td>
<td>1.000</td>
<td>1.500</td>
</tr>
<tr>
<td>Biogas turbines</td>
<td>200</td>
<td>-</td>
</tr>
</tbody>
</table>

The limit value marked with a * is valid for energy conversion efficiencies equal to 30 %

UHC: gaseous un-burned hydrocarbons

11.5.2 Liquids

Rinsing of tanker vehicles results in waste water generation. This is often led to the pre-storage, where it is mixed with animal slurry and organic industrial waste and thus included in the digestion process. Rainwater and surface water from the premises is collected and led to the public sewer system without any treatment. (Danish Agricultural Advisory Service, 2005).

11.5.3 Noise from the plant and traffic nuisance

In general, the plants have to live up to the requirements set by the Working Environment authorities. Efficient noise reduction can be realised by thorough planning of the infrastructure and the daily routines, e.g. by planting trees around the biogas plant, installing isolating material in the most noisy
machine rooms, close doors and other openings, when machinery is in operation etc. (Danish Agricultural Advisory Service, 2005).

11.5.4 Location

The location of the plant has to be in accordance with the district plan and not give rise to any disputes with the neighbours. In practise, the plans for the biogas plant are presented to the public in advance enabling parties to lodge a complaint if they feel that their interests are violated. A distance of 500 m to the nearest built-up area is considered the ‘limit of decency’. In the countryside, however, no written limit exists regarding the minimum distance to detached housing. 300 m is often considered an appropriate minimum distance in this case. (Danish Agricultural Advisory Service, 2005).

11.5.5 Odour

Implementation of biofilters and incineration of collected air from receiving facilities has been realised at several plants. Creating a minor low-pressure in the buildings prevents the ‘bad smell’ from reaching the neighbours, since air is sucked into the buildings and the odour emissions are thus avoided.

Certain bad smelling biomasses have been refused admission to biogas plants because of the negative impact of the reputation. Especially, outdoor tipping used to facilitate struggles with the surrounding communities. Hence, this method is not used anymore. (Danish Agricultural Advisory Service, 2005).

11.6 Subsidies and financial incentives for promoting the production use of biogas

The development of the Danish biogas sector has gone through a period of stagnation the last couple of years due to uncertain electricity sale prices. Meanwhile, the Danish Parliament has signalled that there is a wish to further develop the biogas sector from the existing 3.7 PJ per year up to 8 PJ per year, by offering price guarantees for the electricity produced on biogas, up to the 8 PJ. The transmission system operator is able to sell the electricity production on the market. The sum of the subsidies and the spot market price for electricity produced at biogas plants add up to a tariff of DKK 0.60 pr. kWh (ct€ 8.0) for the first 10 years, then DKK 0.40 pr. kWh (ct€ 5.3) for the next 10 years after connection to the public electricity grid. The arrangement applies for biogas plants put into operation in the period from the 22nd of April 2004 to the 31st of December 2008. (Biowaste Directive; Hort-Gregersen K., 2002).

11.7 European legislation and regulations

The Commission planned to present a directive on biological treatment of biodegradable waste for agricultural applications in 2004. From preliminary work on the directive it was clear that the Commission was considering mandatory source separation of organic domestic waste throughout the European Union. The Commission was also considering whether the directive should be a minimum requirements directive or whether member states would have to use the limit values in the directive. Meanwhile, Denmark did not believe that the requirements for the collection of organic domestic waste should be regulated at the EU level, but instead believed it was important that minimum standards were set for the content of hazardous substances in treated waste. Therefore, Denmark would work towards the directive being a minimum requirements directive, and the requirement for source separation being excluded. In the meantime, the directive on biowaste was abandoned by the Commission. (The Danish Waste Strategy 2004-2008).
11.8 National organisations that are dealing with biogas issues

1) The Danish Working Environment Authority (Arbejdstilsynet)
Landskronagade 33
DK-2100 København Øe
Denmark
Web: http://www.at.dk
The Danish Working Environment Authority is an agency under the auspices of the Ministry of Employment. The Danish Working Environment Authority is the authority which contributes to the creation of safe and sound working conditions at Danish workplaces. This is done by:
- carrying out inspections of companies
- drawing up rules on health and safety at work
- providing information on health and safety at work.

The Danish Working Environment Authority has authority to penalise enterprises, which do not comply with the working environment rules. As regards clear violations of the substantive rules of the Working Environment Act, the Danish Working Environment Authority has the power to issue administrative fines. In cases of extreme danger, the Danish Working Environment Authority may also order the work to be suspended. The responsibilities of the Danish Working Environment Authority are based on the Working Environment Act and related Executive Orders.
[Source: www.at.dk]

2) The Danish Plant Directorate (Plantedirektoratet)
Skovbrynet 20
DK-2800 Lyngby
Denmark
Web: http://www.plantedir.dk
E-mail: pdir@pdir.dk
The Department of Feedingstuffs and Fertilisers checks the quality of, e.g., non-organic fertilisers, soil improvers, and growing media. The laboratory checks samples for content of both nutrients and cadmium content. Furthermore, they check the quality of sewerage sludge used on farmland. In this way, the Danish Plant Directorate helps to ensure the quality of the fertilisers used on farmland.
[Source: www.plantedir.dk]

3) Others relevant organisations, companies, and authorities:

Pre- and post-treatment technologies:
Kemira Miljoe, http://www.kemira-miljoe.dk
Xergi, http://www.xergi.dk

Complete AD plant suppliers:
Xergi, http://www.xergi.dk
Bioscan, http://www.bioscan.dk
Burmeister & Wayne Scandinavian Contractor, http://www.bwsc.dk/
Hoejme Teknik, http://www.hoejme-teknik.dk/
12 SITUATION IN SWITZERLAND

12.1 Wastes treatment and recycling norms and incentives

The Swiss regulation like all the European Countries, has implemented an equivalent norm to EC 1774/2002 (Annex 1.1, Ref 2) on the use and handling of animal by-product waste for the protection of human health and of the environment. Among a great deal of detail on the specification of categories, of collection, storage, labeling, control of pathogens, plant regulations, etc. there was the more relevant mention of composting operational parameters i.e. should take place at 70 C, particles no greater than 12 mm.

This regulation is completed by other norms about:

- use and treatment required for water and waste water which puts into place all law regarding the protection of water, specifying chemical volumes permitted. It discusses the treatment, pollution prevention, handling, storage, elimination of sewage and the facilities required to treat and purify. It has specific requirements for the usage of waste water from manure for agricultural purposes. Some financial aid from the Federal government is given for treatment and facility costs, this may be relevant for biogas plants who can use waste water relieving a treatment burden for local authorities (Annex 1.1, Ref 3).

- protection of humans and the environment from waste. It describes the treatment of waste, with specific relevance to soil and composting. A number of sections deal with the treatment of compost which will have some parallels with biogas production as the digestate material is used as a fertilizer. It regulates the permitted dischargeable materials from any waste which may be relevant to biogas plants where the digestate is not suitable as a fertilizer (Annex 1.1, Ref 4).

About the biogas production, Swiss Legislation has implemented a very important regulation for the storing of animal waste and liquid manure– Relevant to biogas fuel material. The release of ammonia occurs if the waste is exposed to oxygen. So, this law is about preventing exposure to air of liquid manure to prevent the formation of Ammonia, a poisonous compound formed by aerobic decomposition of animal waste. Ammonia (NH3) is very poisonous to the environment, to soils though
the acidification and lack of nitrogen due to NH3 being taken away in this cycle. 90% of NH3 is produced by agriculture (Annex 1.1, Ref 5).

Furthermore, documents about agricultural waste uses like Regulations for the application of compost on the land can be found. Although not the law itself, this leaflet, written by the federal government departments determines the use of wood products and wood or agricultural waste for production of energy in a stove or boiler. It documents additional laws governing the application of compost in land specifying the volume per unit area (Annex 1.1, Ref 6).

12.2 Subsidies and financial incentives promoting the production use of biogas

The Swiss Energy Programme: “Energy 2000” established two objectives for renewables, namely to increase hydroelectric generation by 5% between 1990 and 2000, and to increase the contribution of non-hydro renewables in electricity generation to 0.5% and in heat production to 3%. Heat production from renewables increased by only 2.1%, while the objective for hydroelectric generation was almost met. The objective for non-hydro generation was clearly exceeded; its proportion in power generation increased to 0.7%, principally as a consequence of augmentation in municipal waste incineration.

SwissEnergy established two objectives for renewables for 2010, namely to generate 0.5 TWh of additional electricity and 3 TWh of additional heat compared to 2000 levels. These are equal to a 60% increase in electricity generation and a 40% increase in heat production from renewables. There are no fixed targets for individual renewable energy sources but the government has made some estimates on the possible future use of each renewable energy source (see Table 9).

<table>
<thead>
<tr>
<th>Table 9</th>
<th>Potential Increases in Renewable Energy Use by 2010 Compared to 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable energy</td>
<td>Potential increases in use by 2010 compared to 2000</td>
</tr>
<tr>
<td>Solar thermal</td>
<td>By 15% per annum (similar to the last 10 years)</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>By at least 15 MW per annum</td>
</tr>
<tr>
<td>Wood</td>
<td>To the level of 4 million m² per annum (compared to 2.5 million m² per annum today)</td>
</tr>
<tr>
<td>Other biomass</td>
<td>To the level of 0.5 TWh per annum (total for heat and electricity)</td>
</tr>
<tr>
<td>Ambient heat (heat pumps)</td>
<td>To the level of 0.5 TWh per annum</td>
</tr>
<tr>
<td>Geothermal</td>
<td>To the levels of 5 MW, and 10 MW</td>
</tr>
<tr>
<td>Wind power</td>
<td>To the level of 50-100 GWh per annum</td>
</tr>
<tr>
<td>Waste (renewable fraction)</td>
<td>By 30% in electricity generation</td>
</tr>
</tbody>
</table>

Three laws or regulations govern or will govern the energy policy in Switzerland: the CO2-law, the law on the liberalisation of the electricity market and the programme "SwissEnergy". The CO2-law was introduced in 1999. The goal is to reduce the CO2-production by 10% when compared to 1990. The target is separated into fuels (minus 8%) and heat production (minus 15%). The law incorporates two phases: a voluntary phase until the end of 2003 where industry can proof that they can reduce CO2 without governmental measures and a mandatory phase starting in April 2004 in case the voluntary actions were not good enough. Until the end of 2001 the CO2-emission has been increasing by 1.1% even though heat production was reduced by 2.7%. The SwissEnergy program started in 2000. The target of the program is to reduce the consumption of fossil fuels by 10% until 2010. At the same time electricity consumption should increase by less then
5% and the renewable energies should continue to grow by 1% (0.5 TWh) for electricity and by 3% (3 TWh) for heat production.

Unfortunately, the support for renewable energies has been delegated to the Cantons (see Table 10). The success of SwissEnergy will therefore depend to a great extent on obtaining the best possible cooperation between the three levels of government - federal, cantonal and local. This means the program must be planned and implemented on the basis of partnerships. To ensure the success the cantons have been actively involved in all program levels and fully integrated into the decision-making process. Public sector activities and public buildings are being given a great amount of priority. Most of the Cantons subsidise solar energy but only 3 support biogas plants except the construction of Pilot and demonstration units.

An extremely important law will be the introduction of the controlled liberalisation of the electricity market, which will have to pass public referendum in June 2002. The law regulates the ownership of the net, i.e. it will remain under the control of the government, which guarantees reasonable prices for the electricity transport. But even more important, the transport of renewable energy up to 1 MW will be free of charge.

Table 10
Cantonal Renewable Energy Programmes, 2000

<table>
<thead>
<tr>
<th>Field</th>
<th>Canton(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood energy</td>
<td>ZH, UR, ZG, FR, SO, BL, SH, AR, GR, AG, TG, TI, YD, VS, NE, GE, JU</td>
</tr>
<tr>
<td>Solar thermal</td>
<td>UR, NW, FR, SO, BS, BL, SH, AR, GR, TG, VS, NE, GE, JU</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>FR, SO, BS, BL, SH, AR, AG, YD, VS, CE</td>
</tr>
<tr>
<td>Heat pumps</td>
<td>UR, BS, BL, SH, VO, NE</td>
</tr>
<tr>
<td>Small hydropower schemes</td>
<td>UR</td>
</tr>
<tr>
<td>Heat recovery</td>
<td>BS, BL</td>
</tr>
<tr>
<td>Geothermal energy</td>
<td>BS</td>
</tr>
<tr>
<td>Waste heat</td>
<td>AG</td>
</tr>
</tbody>
</table>


Furthermore, in the general aim of reducing CO2 emissions through the encouragement of cleaner burning fuels, the 01.3690 – Motion (of 22.11.2001) has been implemented to provide a favourable 50 centimes (swiss francs) reduction of tax for biogas. It has been declared by CREATE-CE the Commission of the Environment, Territory management and Energy (Annex 1.1, Ref 1). In the same will to assure the production and distribution of electricity is done in an economically and environmentally friendly way, the Swiss government has implemented the Lene (La Loi sur l’Énergie du 26 Juin 1998; Legislation about Energy) (Annex 1.1, Ref 8). It also aims to ensure the rational consumption of electricity as well as to promote renewable energies. In this vein, electricity suppliers are obligated to provide access of their distribution network to renewable energy suppliers and they are also obligated to pay at a price set by the Federal Government, currently 15 ct CHF per kWh, even if supply is intermittent. The Cantonal governments have the power and responsibility to intervene in contract negotiations if there is a disagreement between the distributor and the RE supplier.
13 SITUATION IN GERMANY

13.1 Wastes treatment and recycling norms and Emissions management

About 50% of the German land surface is agriculturally utilised area. A high proportion of the German pig and poultry production is concentrated in the north-west of the country, where also dairy and beef production is intensive. This causes high regional nutrient surpluses with resulting environmental problems such as groundwater pollution and high ammonia emissions. The main negative environmental impacts ascribed to agriculture in Germany are:

- Groundwater pollution by nitrates and pesticides;
- Surface water pollution by nutrients and pesticides, as well as structural impacts of intensive land use adjacent to water streams and lakes;
- Air pollution by ammonia and greenhouse gas emissions;
- Decline of species and biotope variety and increasing uniformity of landscapes due to intensive agricultural land use and the elimination of landscape elements.

In Germany, agriculture contributes to about 66% of nitrogen and 56% of phosphorus emissions into the surface water. About 90% of ammonia emissions and 7-8% of greenhouse gas emissions are caused by agricultural production.

The German law consists of framework legislation as well as exclusive and competing legislation. The framework legislation describes the fundamentals of a law which has to be enacted by the federal states (Länder) through specific laws. There is no single document combining all relevant agri-environmental regulations but a wide range of environmental and agricultural legislation which has or can have implications for Good Farming Practice (GFP). A selection of the respective national laws and ordinances (Table 11) shows the extent of legislation containing elements that contribute to the definition of GFP, but also the restricted coverage with respect to the control of GFP.

In Germany codes of good farming practice are defined for agriculture in general, but also for specific activities (plant protection, fertilisation) or media (soil protection). Codes of GFP can be set-up by the state (BMVEL, 1998) or its agencies (Bundesamt für Naturschutz, 2001) the federal states or by advisory services, research agencies (BBA, 1999) as well as farmers- (Deutscher Bauernverband, 2000) or environmental lobby (NABU, 1999). They can either be legally binding or formulated as recommendations or requirements (even if published by the national government). There is thus a wide range of codes of GFP, which are not necessarily legally binding for the farmer (Bergschmidt, 2003).

<table>
<thead>
<tr>
<th>Table 11. Environmental legislation relevant for agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Production Facilities</strong></td>
</tr>
<tr>
<td>Fertilisation</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Plant protection</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Construction</td>
</tr>
</tbody>
</table>
13.2 Authorisation procedures and incentives

Legislation covering agricultural, environmental and energy issues all affect the implementation of anaerobic digestion. Germany has a strong political tendency to support renewable energy, especially after the Kyoto agreement. He is interested in using biogas for combined heat and power (CHP) production in order to increase the supply of "green" electricity. In general, there is a lack of appropriate legislation regarding limit values of heavy metals in digestate derived from organic waste. However, there is a significant amount of regulation such as the waste, nitrate, fertiliser and sewage sludge directives that potentially have an impact on the use of these products.

The main driver for the development of biogas utilization in Germany is the Renewable Energy Act (EEG). The following are the prices guaranteed by the Renewable Energy Act for electricity generated by biogas plants in 2006 (Table 12).

<table>
<thead>
<tr>
<th>Size</th>
<th>Basic remuneration</th>
<th>Raw material bonus</th>
<th>Cogeneration Bonus</th>
<th>Innovation Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All plants</td>
<td>All plants</td>
<td>Only plants put operating since 1.1.2004</td>
<td>Only plants put operating since 1.1.2004</td>
</tr>
<tr>
<td>&lt; 150 kW</td>
<td>11,16 Ct/kWh</td>
<td>6 Ct/kWh</td>
<td>2 Ct/kWh</td>
<td>2 Ct/kWh</td>
</tr>
<tr>
<td>&lt; 500 kW</td>
<td>9,61 Ct/kWh</td>
<td>6 Ct/kWh</td>
<td>2 Ct/kWh</td>
<td>2 Ct/kWh</td>
</tr>
<tr>
<td>&lt; 5 MW</td>
<td>8,51 Ct/kWh</td>
<td>4 Ct/kWh</td>
<td>2 Ct/kWh</td>
<td>2 Ct/kWh</td>
</tr>
<tr>
<td>&gt; 5 MW</td>
<td>8,03 Ct/kWh</td>
<td>0</td>
<td>2 Ct/kWh</td>
<td>0</td>
</tr>
</tbody>
</table>

The bonuses are cumulative and are added to the base prices. The price structure is set for 20 years. The base prices are reduced by 1.5% per annum. The rates for the bonuses remain constant over the 20 year period (For details see: http://www.erneuerbare-energien.de/inhalt/6465/36043/).
So, the Renewable Energy Act has a great importance to incentive the Biogas production development in Germany. It principally based on remuneration for the volume of renewable energy produced.

### 13.3 Subsidies and financial incentives promoting the production use of biogas

In Federal Germany, regional and local authorities are promoting the use of renewable energy sources with many programmes that are modified frequently, and often applied for a short time and with little money. However, the Federal government adopted a 5.1 Mil € programme for the period 1995-98 aimed at providing a direct investment grant for the installation of plants including biogas facilities. The investment subsidies vary from one region to another within a range of 10-25%. In addition, investors in biogas technology receive a 4% unit reduction on the interest rate.

The Act *Stromeinspeisegesetz* of 1991, which obliges utilities to take electricity from renewables at a premium price, has had a significant impact on new capacity from RES. Renewable energy production is financed through fixed buybacks and paid for by local consumer levy. In addition, the Electricity Feed Law offers favourable electricity buy-back rates to renewables. The sale price of electricity per kWh is approximately 0.08 €/kWh, which corresponds to 80% of the consumer price. The sale price is independent of peak-hours (the same during night and day). However, recently published regulations and high approval conditions, decreased subsidies and the constant uncertainty with the law of supplying renewable energy to the grid, makes growth difficult.

So there have been several programs on federal level. But in the most cases at present there are no recourses to finance new projects or the duration of these programs has ended so that no applications can be filed. If the programs will be continued depends mainly on the budgetary position next year and the political volition.

Up to 2006 in the scope of the plan of rural development 2000-2006, farmers who wanted to install a biogas plant, could have request for a subsidy via the Agrarinvestitionsförderprogramm (AFP). But in summer this year it became clear, that biogas utilization an energy generation will – concerning to the taxation regulations – no longer be an agricultural activity. At present it is toss-up weather and how the taxation regulations will change the situation for farmers regarding appliance for subsidies from agricultural programs.

The main national program is the “Marktanreizprogramm” based on the “Guideline to promote the utilisation of renewable energies” (12.06.2006) Link. For biogas plant > 70 kW installed electric power the interest charges on bank loan is reduced. Plants with am maximum installed electric capacity of 70 kW can get additional contribution of 15. 000 Euro to the investment costs.

This year so many applications were filed, that there is no possibility to extend the budgetary position sufficiently. Actually even already filed applications must be denied by the responsible organisation Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA) this program ends on the 31.12.2006. The program will be continued in 2007 but with changed conditions.
14 SITUATION IN AUSTRIA

14.1 Wastes treatment and recycling norms and incentives

The Legislation and quality standards for biogas fermentation end products used as fertilisers are principally delimited by some norms on environmental factors describe below. (Except from “The appropriate application of biogas fermentation end products as fertilisers” published by the Advisory Council for Soil fertility and Soil Production, AGES Austria.

14.1.1 Heavy Metals

The dry matter is reduced by the biogas fermentation process and therefore nonbiodegradable substances as heavy metals are concentrated in the present dry matter. Biogas fermentation end products used as fertilisers should not exceed the permitted maximum limit or heavy metals (DMVO 2004).

If fermentation end products of household waste of animal and vegetable origin collected separately should be used as fertilisers for organic farming, the limits of the EU regulation 2092/91 have to be observed (Table 13).

Table 13. Limits for heavy metals in fermentation end products used as fertilisers.

<table>
<thead>
<tr>
<th>Unit</th>
<th>DMVO 2004</th>
<th>EU-VO 2092/91</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg/kg DM</td>
<td>mg/kg DM</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>150</td>
<td>45</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>3</td>
<td>0,7</td>
</tr>
<tr>
<td>Chromium (Cr) total</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>60</td>
<td>25</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>1</td>
<td>0,4</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>-</td>
<td>200</td>
</tr>
</tbody>
</table>

1DMVO 2004  Fertiliser regulation 2004
2EU-VO 2092/91  EU regulation 2092/91

Table 14. Limits of heavy metal loads in g ha⁻¹ per 2 years.

<table>
<thead>
<tr>
<th>Metal</th>
<th>g/ha in 2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pb</td>
<td>600</td>
</tr>
<tr>
<td>Cd</td>
<td>10</td>
</tr>
<tr>
<td>Cr</td>
<td>600</td>
</tr>
<tr>
<td>Cu</td>
<td>700</td>
</tr>
<tr>
<td>Ni</td>
<td>400</td>
</tr>
<tr>
<td>Hg</td>
<td>10</td>
</tr>
<tr>
<td>Zn</td>
<td>3000</td>
</tr>
</tbody>
</table>

14.1.2 Organic pollutants

Organic pollutants can disturb the biogas fermentation process itself. If they are persistent, they are accumulated in the fermentation end product and in the agricultural soil after fertilisation.
Table 15. Guidelines for organic pollutants according to the EU Sewage Sludge Directive 86/278/EEC:

<table>
<thead>
<tr>
<th></th>
<th>mg/kg DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAH(^1)</td>
<td>6</td>
</tr>
<tr>
<td>AOX(^2)</td>
<td>500</td>
</tr>
<tr>
<td>LAS(^3)</td>
<td>2600</td>
</tr>
<tr>
<td>NPE(^4)</td>
<td>50</td>
</tr>
</tbody>
</table>

1) Σ of following PAHs (Polycyclic Aromatic Hydrocarbons): Acenaphtene, Phenanthren, Fluorene, Fluoranthene, Pyrene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Benzo(ghi)perylene, Indeno(1,2,3-c,d)pyrene
2) AOX: adsorbable organic halogen compounds
3) Alkylbenzosulphonate (tenside)
4) Σ Nonylphenol & Nonylphenolethoxylates (1,2) ethoxygroups

14.1.3 Hygienic aspects

Fermentation end products according to group 3 have to be controlled for hygienic parameters regularly (Table 17).

Table 16. Groups of fermentation residues.

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Fermentation end products of Group 1</th>
<th>Fermentation end products of Group 2</th>
<th>Fermentation end products of Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance</td>
<td>Substrates of agricultural and silvicultural origin, e.g. foul seeds, feedstuff, windfalls, …</td>
<td>Residues from agricultural production, e.g. oilseed, residues from dairy, brewery, fruit processing, …</td>
<td>Other biogenic residues</td>
</tr>
<tr>
<td>To analyse</td>
<td>Nutrients</td>
<td>Nutrients, heavy metals and organic pollutants</td>
<td>Nutrients, heavy metals and organic pollutants and hygienic parameters</td>
</tr>
</tbody>
</table>

Table 17. Frequency of controls for fermentation end products according to group 3.

<table>
<thead>
<tr>
<th>Amount of fermentation end products taken over per year [m³]</th>
<th>Fermentation end product of Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 300</td>
<td>1 examination every 2 years</td>
</tr>
<tr>
<td>300 - 4000</td>
<td>1 examination per year</td>
</tr>
<tr>
<td>&gt; 4000</td>
<td>One additional examination every new used 4000 m³, however max 12 examinations per year</td>
</tr>
</tbody>
</table>

Animal By-Products (ABP) of category 1 (EC regulation 1774/2002) are not allowed to be used for biogas fermentation!

ABPs of category 2 - with the exception of liquid manure, paunch-, stomach-, intestine-content and milk - have to be sterilised (particle size: < 50 mm, temperature: ≥ 133°C, vapour pressure: 3 bar, duration: 20 min) before applying to biogas fermentation.
### Table 18. Hygienic parameters for fermentation end products

<table>
<thead>
<tr>
<th>Biogas fermentation end products and liquid manure products</th>
<th>Hygienic parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogas fermentation end products from livestock manure and substrates of group 1 and 2</td>
<td>-</td>
</tr>
<tr>
<td>Biogas fermentation end products with ABPs&lt;sup&gt;1&lt;/sup&gt;</td>
<td>No salmonellea in 5 samples (25g each) (EC regulation 208/2006)</td>
</tr>
<tr>
<td>Biogas fermentation end products from other substrates of group 3 without ABPs (exception: scraps of food)</td>
<td>No salmonellea in 25 g fresh material</td>
</tr>
<tr>
<td>Products from liquid manure (dried and pelletised)</td>
<td>Have to be pasteurised and must not contain salmonellea in 5 samples of the product (25 g each)</td>
</tr>
</tbody>
</table>

<sup>1</sup> ABP: Animal By-Products

### 14.1.4 Nitrogen

The nitrogen limit for livestock manure is 170 kg nitrogen/ha/year (national implementation of the Directive 91/676/EEC). This limit also has to be applied for biogas fermentation end products from substrates containing animal excretions.

For fermentation end products containing ABPs and used as fertilisers, a prohibition of grazing for 21 days after fertilisation has to be observed (EC regulation 181/2006). Grass for feeding must not be harvested earlier than 21 days after the fertilisation either.

### 14.2 Subsidies and financial incentives promoting the production use of biogas

#### 14.2.1 Amendment of the Austrian green electricity law 2006

Since this year there exists an amendment of the green electricity law (BGBl. I No. 149/2002). The essentials are:

1. Aim: The amount of electricity generated from renewable energy sources, with the exception of water power, should be 10 % of the total annual electricity supply to the Austrian public mains by the year 2010.

2. In comparison with the green electricity law 2002 (BGBl. I 149/2002), there is a fixed spending cap of grants of + 17 €/year for new plants from 2007 to 2011, whereof 30% is spent for biogas plants.

3. The new electricity tariffs are not known yet, but there will be a degressive arrangement: Obligation to take delivery of the fixed tariff at 100% 10 years after the start-up of the plant, at 75% in the 11th year and at 50% in the 12th year. The obligation to take delivery ends 24 years after the start-up for all plants.

[Tariffs according to the Austrian Green Electricity Regulation 2002 (BGBl. II 508/2002) for biogas plants, which were started up until 30th June, 2006 (in force for 13 years from the date of the start-up):

For plants with a maximum continuous supply of electric power of $\leq 100$ kW…………… 16,50 Cent/kWh
For plants with a maximum continuous supply of electric power of $100 \leq x \leq 500$ kW….. 14,50 Cent/kWh
For plants with a maximum continuous supply of electric power of $500$ kW $\leq x \leq 1$ MW. 12,50 Cent/kWh
For plants with a maximum continuous supply of electric power of $> 1$ MW…………… 10,30 Cent/kWh]
For cofermentation biogas plants (co-fermentation of different substrates as livestock manure, renewable primary products, organic residues from agriculture, households, industry, …) the tariffs are 25% lower.

4.) Subsidies should be assigned to the most efficient plants (criteria of efficiency as utilisation of the waste heat, efficiency of the location, … should be worked out).

5) Subsidies for investment costs have been matter of the federal states up to now, e.g. plants in Lower Austria got max. 30% total investment costs, but not more than 150.000 €. Additional subsidies could be assigned to plants with an external utilisation of heat of 50% electricity generated. The subsidy was paid once and amounted 10% of the total investment costs, but not more than 50.000€.

There are several changes concerning the Austrian Green Energy law at the moment, but a worsening of the situation for plant carriers and investors in new plants (fix spending cap) is expected.

There’s an Austrian Institution who is dealing with these topics which is ARGE Kompost & Biogas (schramm@kompost-biogas.info).
15  SITUATION IN FRANCE

15.1 Wastes treatment and recycling norms and incentives

France has developed various legislations about emission of gases and anaerobic digestion production of gas. For example, the Arrêté of 25th July 1997 (Annex I.2, Ref 1), gives specific emission standards for energy facilities in the combustion of fossil fuels and biomass fuelled plants. Detailed document giving specifications, depending on the fuel type and capacity on the setting-up, the operation, risks such as fires, usage of water and permitted effluents in discharge water, air odours and minimum height of chimneys, wastes and noise of the facility.

France follows European Directive No 1774/2002 (Annex I.2, Ref 2). It provides the cornerstone legislation on the use of animal by-products not intended for human consumption. It specifies requirements for the processing of different types of material for biogas and composting plants, as well as the more managerial aspects of premises and equipment required for the safe processing and storage of animal waste. The detail of the regulations goes down to specifications on particle size and bacteria threshold.

On another part a decree is found, which gives some constraints in the use of the waste products like the Decree in Annex I.2, Ref 3, which provides legislation on the treatment of waste water and sewage. The legislation is applicable to urban areas where it is sufficiently economically clustered and that produces above 120kg of organic material per day, for collecting and putting the waste water through a purification plant. It describes a system (la demande biochimique en oxygène sur cinq jours (DBO5)) whereby oxygen content gives an indication of the pollution levels in the water which may be treated or discharged. The Decree No. 96-540 of 12 June 1996 (Annex I.2, Ref 4) regulates the spreading of outflow waste on agricultural land and stipulates fines if these conditions are not met. The Decree No. 97-1133 (Annex I.2, Ref 5) relates to the spreading of sewage and waste water for agricultural or forestry lands. It specifies regulations governing the treatment of waste water and sewage concerning, for example, the CO2 content. Chapter 4 gives the precise figures permitted for CO2 and for total dry material of sewage allowed before a treatment plant is required.

French standard NF ISO 11634 puts into context the usefulness of biogas as a measurement tool. In this norm (Annex I.2, Ref 6), biogas is measured as an indication of biodegradability of organic materials in water under anaerobic conditions. Its function is to evaluate the risks of chemicals on the human environment. Although loosely related to biogas production in plants it may give guidelines for measuring biogas for operational monitoring. Purchase of the norm is necessary to ascertain this example, the CO2 content. Chapter 4 gives the precise figures permitted for CO2 and for total dry material of sewage allowed before a treatment plant is required.

In the French legislation, the French standard XP P16-603 (Annex I.2, Ref 7) can be found, which documents the norms for treating domestic waste water with an anaerobic and aerobic treatment and purification. It may prove important for sequestering of waste water that can be used for biogas production.
15.2 Subsidies and financial incentives promoting the production use of biogas

For using the development of renewable energy, the French government have a obligatory system of the Price of Purchase (l’obligation d’achat) for RES for a sustained period of between 15 and 20 years, differing for each type of RE, biogas being 4,5 à 5,72 c€/kWh and for a contract of 15 years. The maximum capacity of a production facility that can benefit from the guaranteed price of purchase is set at 12 MW for the moment. The Industry Minister made a call for RE projects to come forward to be aided by central government with an average selling price of 86 €/MWh for either biomass or biogas plants of a capacity of more than 12MW from the 1st of January 2007 and onwards. These prices are set by DGEMP (La Direction Générale de l’Énergie et des Matières Premières) the French government department for energy.

16 SITUATION IN UNITED-KINGDOM

16.1 Wastes treatment and recycling norms and incentives

The Renewable Obligation Order 2002 set a target for the UK to obtain 10% of its electricity from renewable sources by 2010. Under this order each designated electricity supplier will annually increase the supply of electricity generated from eligible renewable sources. Targets start at 3% of total supplies in 2002/2003 and increase to 10.4% in 2010/2011. The mechanisms for attaining these targets are currently being developed. Existing Non-Fossil Fuel Obligation (NFFO) contracts will be honoured through purchase of the energy generated by the Non-Fossil Purchasing Agency (NFPA). The NFPA will organise periodic auctions of the energy from each project, selling it to the highest bidding licensed supply company (Annex I.3).

There are estimated to be 300,000 tonnes of non-natural wastes produced on agricultural holdings in England and Wales each year. These include a wide range of material such as waste packaging, silage plastics, metal, tyres, oils and animal health products that arise from various activities such as feeding of livestock, pesticide, application to crops, and use of machinery. Many are seasonal arising in line with the farming year. In addition, there are currently an estimated 600,000 tonnes of scrap metal, tyres and asbestos roof sheeting being stored on farms with no plans for disposal. Although these quantities are small in comparison with other industries, some of the waste can have adverse effects on the environment, amenity and public health.

16.2 Authorisation procedures

New regulations were set to extend waste management controls to agriculture by 2005. These controls implement EU legislation and already apply to other industrial and commercial sectors. As currently drafted, the Regulations mean that uncontrolled burning of waste on farm and use of farm tips will no longer be possible. The Regulations that apply to farming are the same controls that have applied to all other sectors for many years. This change is a real opportunity to develop a practical system for minimising and managing agricultural waste. Other potential benefits include reduced costs and time input for farmers and growers and an improved industry image. Also, the Government is keen to encourage waste recovery because it means less waste is disposed of in licensed landfill sites. With the introduction of Agricultural Waste Regulations it is no longer possible to dispose of waste in an