Implementing a bioenergy plant

Guideline for farmers
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EXCLUSION OF LIABILITY

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1 INTRODUCTION

Biomass - as output of agricultural production processes and from forest management - can be used as renewable energy sources. Renewable energy sources available on the farm comprise e.g.

- organic residues and side products from agricultural production (e.g. manure from cattle, straw from corn harvesting)
- organic residues and side products from forestry (e.g. thinning material)
- woody and herbaceous energy crops which have been cultivated on farmland (e.g. maize, sugar beet, short rotation coppice).

Additional side products, residues and organic wastes may result e.g. from processing industries (e.g. sawdust, vegetable wastes).

Different types of Bioenergy plants exist to provide energy from the various renewable energy sources. An important role for farmers play biogas plants (using e.g. manure, energy crops, vegetable wastes) and wood combustion plants (using e.g. thinning wood material or poplars from short rotation coppices). But also other types of plants e.g. for straw burning or biofuel (bioethanol and biodiesel) production are of interest.

1.1 Bioenergy options on the farm

Following the focus will be on biogas technology and wood combustion.

**Biogas production.** In the absence of oxygen, organic matter is partially degraded by the combined action of several types of micro-organisms. Different biological reactions lead to the formation of biogas and digestate.

Typically, biogas consists of about 50-75 Vol.-% methane ($\text{CH}_4$), 25-45 Vol.-% carbon dioxide and 2-7 Vol.-% water (FNR, 2010). Additional components are hydrogen sulphide, nitrogen, oxygen and hydrogen (trace gases). Biogas can be used for producing electricity and heat in a combined heat and power plant normally installed on or near the farm. As another option, biogas can be upgraded to natural gas and fed in the gas grid.

The digestate which results from the anaerobic digestion process is a decomposed substrate, rich in macro and micro nutrients and therefore suitable to be used as plant fertilizer.

Anaerobic digestion is perfectly eligible for agricultural activities since energy crops (e.g. maize, whole grain crops.), organic residues (e.g. manure), side products (e.g. fruit pomace, oil seed leftover) and organic wastes are efficient substrates available or produced on farms.
Wood combustion. Using wood for heating is a very traditional way of energy provision. Today, a broad range of wood combustion plants are available on the market using different wood types and conversion technologies. Additionally, the plants are available in different sizes. Examples are wood boilers with about 10 - 30 kW for residential heating or combined heat and power plants with about 20 MW to provide a community with heat and electricity\(^1\).

Wood for energy purposes results from forest management (i.e. wood thinning, residues from timber harvesting) or from wood processing industries (e.g. sawdust). Additionally, woody biomass can be cultivated on agricultural land by short rotation forestry (e.g. poplar and willow). Wood is available as wood logs, wood chips, pellets, sawdust etc.

The use of wood for energy provision may be an alternative to the energy provision with fossil fuels especially if the wood is directly available on the farm.

1.2 Aim and content of the implementation guide

Realizing a bioenergy plant successfully requires among others long-term view, organization and fulfilled technical conditions. To make sure that the bioenergy plant is profitable in the long term it has been deeply studied and planned. The present implementation guide was created to support farmers interested in implementing a biogas or a wood combustion plant on their farm. The main focus is set on bioenergy plants up to 2 MW\(_{el/th}\).

The implementation guide gives an overview on the main steps that the farmers have to follow to make their project becoming real, profitable and lasting (see Figure 1). Following the five main steps of project implementation are listed, documented and depicted. Each part includes a general description of the step, presents the mains aspects which have to be dealt with and the output of the step.

Annex 1 provides general schemes, data and checklists valid for all EU countries. Annex 2 provides country specific information on legal forms of companies practicable for bioenergy projects, on proceeding of permits, on emission regulations, on subsidy regulations and on relevant addresses and institutions.

The implementation guide presents the main steps for realization of bioenergy projects. It makes no claim to be complete. Additionally, certain frame conditions may demand modifications from the proceedings presented in this guide. For certain countries as e.g. for Germany detailed guidelines are available for biogas plants as well as for small and large scale wood and energy crop combustion plants (www.fnr.de).

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\(^1\) Ludger Eltrop, Renewable Energies in Germany and Europe – Potentials, Current Utilization and Technologies, for the BioEnerfy Farm Project’s Training Session at IER, Stuttgart, 23\(^{\text{rd}}\) Mai 2011

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<td>Project concept &amp; business plan</td>
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Figure 1: Steps and central questions for implementing a bioenergy plant.
2 PROJECT IDEA

I would like to build a bioenergy plant. What are the first questions I have to make up my mind with regard to biomass provision, bioenergy plant type, and size and energy production? Is it worthwhile to go on planning?

2.1 General description of the step

This first step embraces all the basic questions the farmer should have during his first reflection to decide if he wants to go on planning. As it is the first step of action, mainly general data collection, qualitative assessments and rough quantitative calculations can be done by the farmer.

The farmer has to care about the following subjects (see Figure 2): the availability of substrates for bioenergy use and the options for transport and storage, first settings on plant type and on categories of size, information on plant location and on the options for use of bioenergy. Preliminary cost calculations will provide preliminary information on the economic feasibility of the planned project. Additionally, it is recommended that the farmer visits bioenergy plants to get up-to-date and well-based information on the realization and operation of bioenergy plants.

![Figure 2: Subjects to be considered within the step “project idea”](image)

2.2 Main aspects

Following, the main aspects for the first project overview will be described in more detail. Annex 1 provides a checklist on the main aspects introduced below.

- **Substrate potentials and logistics.** The farmer has to specify and pre-estimate the substrates available on his farm for running a wood combustion plant (e.g. wood logs, wood from thinning) or a biogas plant (e.g. manure from cattle, energy crops like maize). Additionally, he has to think of substrate provision from nearby farmers or industries. The following main questions are of relevance:

  o Which kind of substrates (e.g. wood, maize, manure) - and in which pre-estimated quantity - can the farmer provide from his farm in long term for running a bioenergy plant?
  o Does the farmer have some suppliers in the neighbourhood who can provide him regularly with substrates in the long term (e.g. farmers in the neighbourhood to provide him with manure)? If yes:
- Which nature of substrates?
- Which pre-estimated quantity of substrates?
  - Is the infrastructure in this area good? Will the farmer and/or supplier be able to transport the substrates easily?

- **Bioenergy plant type, category of size and location.** The substrate potential determines for a wood combustion plant or a biogas plant type. Based on the pre-estimated substrate data the farmer can assess the category of the bioenergy plant size (plant capacity in kW\textsubscript{el} or MW\textsubscript{el}, kW\textsubscript{th} or MW\textsubscript{th}). Information on plant size will contribute to think about the adequate and acceptable location for the bioenergy plant. The website www.bioenergyfarm.eu provides online calculation tools to get a first assessment on the size and the energy output but also on the economic feasibility of the bioenergy plant.

- **Energy output and residues.** In parallel, the farmer should think about how he will use the produced bioenergy:
  - For **biogas** typically electricity and heat will be produced in a combined heat and power plant on the farm. Electricity can be fed-in the electricity grid, heat can be used on the farm but also delivered to other heat customers (e.g. neighbouring houses, schools, business enterprises). As an alternative option, biogas can be upgraded to natural gas and fed-in the gas grid and delivered to the customers.
  - **Wood** is burned in small scale wood combustion plants - e.g. pellet boilers or wood chip boilers - to provide heat for single households or single farms. For larger scaled plants techniques are available to provide heat and electricity in combined heat and power plants.

In this context the following questions are of relevance:
  - Which form(s) of energy will be produced (heat, electricity, gas)?
  - Is it for private consumption?
  - Does the farmer want to sell this energy? To (a) customer(s)? In the networks?
  - What opportunities of post-fermentation waste management are available?
  - Regarding the post-fermentation waste management, is it going to be an additional cost or income?

- **Expected costs & income.** Based on the calculations tools available for wood burning and biogas provision and utilisation the farmer can get general costs calculations (see www.bioenergyfarm.eu). This comprises information on demanded total investment costs, yearly costs (also for operation and maintenance) and yearly income from selling the produced energy. This allows the farmer a general estimation of the costs and income of a bioenergy plant on a yearly basis. Additionally, he can match the data with his personal and operative financial situation.
Note:

➢ It’s important to be aware that besides costs for operation and maintenance there will be costs for the waste disposal of ashes. These costs are established depending on the yearly amount of ashes produced and the specific costs for use or rather disposal and they depend on the type of use and the regional conditions, too. Generally these costs are between 0,1 – 0,5 %/ year of the initial investment costs (FNR 2007, Leitfaden Bioenergie, S. 205).

• **Type of company for bioenergy project.** Furthermore, the farmer should think in parallel about the nature/structure he’d like to give to his enterprise. Annex 8.1 gives a country specific overview on legal forms of companies typical for bioenergy plants. The following main questions may be of interest:
  
  o Does the farmer want to run the bioenergy plant on his own?
  o Does the farmer want to work with several partners (who are not necessarily farmers)?
  o Which pros and cons (e.g. with regard to liability, tax payments, participation of partners) are characteristic for the different legal forms of companies?
  o Which legal form of company and which statute for the farmer himself and each partner is most promising?

• **Field reports.** Contact to other farmers running a bioenergy plant is a very important aspect from the beginning. It is very helpful to visit bioenergy plants and to ask the farmers and operators about their personal experience, about their steps for project realizations as well as about bottlenecks.

2.3 **Output**

At the end of the first step “project idea”, the farmer will have a better and clearer idea of his project thanks to first qualitative and rough quantitative calculations regarding the substrate provision, the plant capacity and the produced energy. The farmer will decide to stop the project or to go on and specify his project idea in more detail.
3 FEASIBILITY ASSESSMENT STUDY

I want to make my project more precise. I can ask experts for support. Which biomass potential is available on my farm and which options for energy provision are feasible from a technical, economic, environmental and social point of view?

3.1 General description of the step

The farmer wants to go further in his bioenergy project. He must define his project in a more precise way, analysing the different technical options and details for substrate provision, bioenergy production and utilisation. Additionally, he will study them to know if they are profitable in long-term and environmentally and socially acceptable.

Annex 7.1 shows that with growing level of project detail and establishment the opportunities for technical and structural changes decrease. At the same time, with growing level of project detail and establishment the costs are increasing if changes are necessary. Thus, a well-structured and thorough planning is essential for (economically) successfully realizing a bioenergy plant.

For this purpose the farmer may ask a suitable association or a professional bioenergy consultant to give him support. They will ask the farmer for detailed information on the purpose of his project, his farm (agricultural production, livestock), the surrounding area, etc. They will provide the farmer with technical and practical information and will give him good advices to optimize his bioenergy plant. They will make detailed calculations on the substrate potentials, plants size, energy output and utilisation as well as of the demanded yearly costs and yearly income.

Figure 3: Subjects to elaborated in detail within the step “feasibility assessment study”

3.2 Main aspects

Following, the main aspects for the step “feasibility assessment study” will be described in more detail.

- **Substrates amount and logistics.** The farmer together with the expert or consultant will make a detailed quantification and specification on the substrates available for the wood combustion or biogas plant on the farm. Additionally, substrates available on neighbouring farms or industries will be considered in the quantification if willingness on participation has been announced by other parties. Information is necessary on which substrates are available regularly and which substrates are available seasonally, on transport distances and means as well as on storage facilities.
• **Bioenergy plant technique, parameter, size and location.** The technical details of the bioenergy plant need to be specified (e.g. type, size, material of the fermenter, type of CHP-plant, options for heat utilisation). In this context, different technical options/solutions for substrate provision and bioenergy production and utilisation have to be elaborated. Additionally, an appropriate location for the whole bioenergy plant (including storage, additional rooms or installations, etc.) has to be identified. It has to optimize the transportation/logistics of substrates.

• **Yearly energy output and use.** The farmer together with the expert or consultant will calculate the amount of electricity, heat or gas resulting from the different solutions identified above. The energy demand of the farm as well as the energy demand of other customers will be identified. This allows for an assessment of supply and demand of bioenergy and the market situation.

• **Yearly costs and income.** For the different bioenergy solutions the total investment costs will be identified including the costs for the bioenergy plant as well as additional relevant buildings and installations. With the help of calculation programmes ([www.bioenergyfarm.eu](http://www.bioenergyfarm.eu)) the yearly costs for the bioenergy plant will be quantified. These include the yearly investment based costs and the costs for operation, maintenance, personnel etc. Additionally, the yearly income from bioenergy supply will be identified (i.e. avoided costs of fossil fuels or payments for fed-in electricity in the grid...). With the help of a balance sheet, an overview on a 12-20 year basis and information on the payback period of the project will be given.

• **Type of company and role of the farmer.** The expert will help the farmer (and possible partners) to evaluate the pros and cons of the different types of companies and to decide for the best options. Additionally, the farmer and expert will evaluate the impact the different assess bioenergy solutions will have on the farmer’s current activities as e.g. working time, available manpower, dedicated fields, etc.

• **Identification of bottlenecks and approaches for solution.** For successfully realizing a bioenergy project bottlenecks have to be identified in an early projects stage and solutions have to be discussed. In this context, it is helpful to meet the local authorities in an early project stage to check if it is realistic to build a bioenergy plant in the chosen area etc. Moreover, it is necessary to evaluate the risks of each analysed bioenergy solution, i.e. the effects of higher yearly costs, lower income, neighbourhood problems, security aspects etc.

### 3.3 Output

Different bioenergy options for the farmer have been deeply studied during this step (scans). Those options are all well-described and feasible (profitable and respectful of social/ecological aspects in the long-term). At this time the farmer should be very aware about everything which deals with realizing and running a biomass plant – such as the theory of the reaction, the substrates, the different types of companies he can create for the plant, how to make a detailed overview on costs and incomes, the required building conditions regarding environmental and social aspects, demands for the plant operation, etc.
4 PROJECT CONCEPT AND BUSINESS PLAN

Together with the expert I have to choose the most feasible concept for me in the long term and write a business plan. Which legal form of company, which substrate provision, which technical option, which size of project and which economic analysis offers the most promising concept?

4.1 General description of the step

The step “feasibility assessment study” has provided different solutions for the bioenergy plant that are known to be feasible from an economic, environmental and social point of view. The solution can be different e.g. in terms of substrate quantity and quality, plant location and size, technical details, amount and type of produced bioenergy, way of provision and utilisation.

The farmer and the expert have to decide which bioenergy solution will be kept and taken as project concept to be realized. Then they will have to sum up all relevant details of the bioenergy project solution in a (kind of) business plan which can be considered as the ID card of the project. As this document will contribute to convince the authorities and the bank to provide permits and financial supports afterwards, it must be very clear and complete.

Figure 4: Subjects within the step "project concept and business plan"

4.2 Main aspects

Following, the main aspects for the step “project concept and business plan” will be described in more detail:

- **Comparison of the different bioenergy solutions.** The farmer and the expert will make comparisons between the different bioenergy plant solutions by evaluating the pros and cons of each of them. This means the pros and cons with regard to technical aspects, environmental and social conditions, the role of the farmer and expected bottlenecks. The comparison can be carried out with the help of a SWOT analysis. The farmer together with the expert will answer the following questions which can be summed up in a short table for each bioenergy solution:

  o **“Strengths”:** What strengths are characteristic for the bioenergy project?
  o **“Weaknesses”:** Are there any weaknesses which have to be taken into account?
  o **“Opportunities”:** Which special opportunities are offered by project realization?
  o **”Threats” of a project:** Are there any threats especially from the economic or technical point of view?
### Table: Exemplary overview of a SWOT-table:

<table>
<thead>
<tr>
<th>POSITIVE FACTORS</th>
<th>NEGATIVE FACTORS</th>
<th>INTERNAL INFLUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strength</strong></td>
<td>Weaknesses</td>
<td>(FACTORS INFLUENCED BY THE FARMER OR PERSONS/INSTITUTIONS THAT BELONG TO THE BIOENERGY PROJECT!)</td>
</tr>
<tr>
<td>• Technique state of the art.</td>
<td>• …</td>
<td></td>
</tr>
<tr>
<td>• …</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
<td>Threats</td>
<td>EXTERNAL INFLUENCE</td>
</tr>
<tr>
<td>• New source of income.</td>
<td>• Substrate costs clearly determine economic feasibility.</td>
<td>(FACTORS THAT CAN'T BE INFLUENCED BY THE FARMER OR PERSONS/INSTITUTIONS THAT BELONG TO THE BIOENERGY PROJECT!)</td>
</tr>
<tr>
<td>• …</td>
<td>• …</td>
<td></td>
</tr>
</tbody>
</table>

- **Decision for the project concept.** The farmer, supported by the expert, has to make a decision on the bioenergy project concept he wants to realize. The decision will be based on the SWOT analysis results but also on e.g. financial or personal preferences.
- **Elaboration of the business plan.** The business plan will sum up all the details of the selected project concept. It refers to all the details elaborated within “the feasibility assessment study” step. The business plan comprises about 10 pages and contains:
  
  - A short project overview (initial situation, farmer’s motivation and short project description).
  - A description of non-technical aspects (e.g. form and legal status of company, location, market analysis, social and ecological aspects).
  - An overview on technical aspects and dimensioning of the bioenergy plant (technical description of the plant, demand on amount, quality, transport and storage of substrates and fuels, demand on manpower for operation).
  - Tables with economic data (investment plan; on a 12-20 year basis: yearly cost plan, plan on yearly revenues and plan on profitability).
  - A conclusive assessment. Here the SWOT analysis table will be listed. Special reference will be given to economic and financial aspects as these are of main interest for banks.

### 4.3 Output

This step is the most important and difficult to do as it contains the final decision on the bioenergy project concepts detailing each aspect of the select project. The business plan will allow the farmer to present efficiently his bioenergy project, especially to the authorities and the banks.
5 PROJECT REALIZATION

What proceedings and documents are demanded to achieve acceptance for the project from my neighborhood, to get the relevant permits and funding? Which company will I choose for plant building and how can I make sure that the project will be finished in time without additional money?

5.1 General description of the step

The step “project realization” comprises all activities from getting permits and funding for bioenergy project realization up to the start of plant operation. The farmer - supported by an expert or consultant - has to get into contact with different authorities and institutions, as e.g. consultancy firms for detailed planning, banks, local communities or companies which build the bioenergy plant. Additionally, the farmer has to provide all the data and plans relevant for successful project realization.

The complexity and time frame of this step among others depends on bioenergy plant type and size. Whereas in Germany e.g. the data and permits demanded for small wood combustion plants (e.g. household wood pellet boilers) may be not very detailed and complex, the step of project realization is more complex for e.g. biogas plants installed on a farm. Additionally, the proceedings for e.g. getting permits may differ for each country and also within the various countries (e.g. for each federal state within Germany).

Figure 5: Tasks within the step “project realization”

5.2 Main aspects

Following, the main aspects for the step “project realization” will be described in more detail.

- **Permits.** The farmer has to get the required permits for bioenergy plant building and operation from the relevant institutions and authorities. It may be necessary to realize a detailed technical plan of the bioenergy plant location and construction to have those permits. Annex 8.2 gives an overview on the proceedings for permit for wood combustion plants and biogas plants for each country. Annex 8.4 gives an overview on the country specific emission regulations.

- **Funding.** Depending on bioenergy plant size high investments are demanded to realize a bioenergy project. Therefore, farmers may need funding to realize a project. An overview on different options for financing is given in the guide “How to finance bioenergy projects”. The business plan e.g. may serve as a basis for presenting the bioenergy project, the relevant data and the bioenergy project benefits to a bank. The professional biomass consultant can help him to choose the most suitable credit and answer to specific questions from the bank.
- **(Social) acceptance.** The farmer should get into contact with his neighbours to present them the bioenergy project and discuss it together (visiting existing biomass plants would be an ideal). Experience proves that it’s always better to involve them in an early stage to make them understand the benefits of the project, so they don’t feel betrayed and complained at the end.

- **Contracts.** For wood combustion plants and biogas plants it may be necessary that substrates are provided by neighboured farmers or companies / industries. To ensure a long-term substrate provision under fixed conditions and prices it is necessary to elaborate and sign contracts on substrate provision before start of plant operation. Examples and drafts for those contracts exist. Additionally, contracts have to be elaborated with energy customers (e.g. heat customers in the neighbourhood).

- **Tendering procedure.** The farmer should do a tendering process to choose the best factory for building the biomass plant and have several offers. It’s very important not to take into account only the prices, but also the quality, the experience and the services the factory proposes. A plus would be to meet old customers to know their opinions/feelings about it.

- **Building the plant and start of operation.** A good project management needs organization. It’s important that the farmer - supported by an expert or consultant - has an overview on the plant building phase. Unexpected events and costs must be avoided to ensure that the project will be finishes successfully.
  
  o **Schedule:** The farmer has to make a detailed schedule with the expert and the factory since it’s the best way to have an overview on the whole process of plant building and installation, to deal with bottlenecks and avoid interruption. Each step must be presented in terms of resource requirements, budget and duration and they must follow a logical order. This schedule has to be updated frequently thanks to regular reports.
  
  o **Controlling:** During the construction, farmer and expert have to check scrupulously three points:
    
    - **Quality:** does the farmer really receive what he expected/ordered? Do the pieces have any faint? Is the job under control and professional? It’s important since the security of a bioenergy plant is a very important aspect.
    
    - **Financial aspects:** are there any unexpected expenditures? If yes, why weren’t they anticipated?
    
    - **Deadline:** is the building operation on time regarding the time-schedule?
  
  o **Start of operation:** After bioenergy plant building and installation the plant starts operation, it will be tested and approved (failures will be reported).

### 5.3 Output

At the end of the step, the bioenergy plant has started operation and the start-up phase has been successful.
6 PLANT OPERATION

The bioenergy plant has been built and has started operation. Which daily, monthly, yearly measures are necessary for bioenergy plant control and maintenance, and for securing substrate and fuel provision?

6.1 General description of the step

The bioenergy plant has started operation. From now on the farmer has to do regular controls and maintenance to assure security, safety (especially concerning emission standards) and efficiency. Moreover, he has to care about amount and prices for substrate provision.

Figure 6: Subjects for the step “plant operation”

6.2 Main aspects

Following, the main aspects for the step “plant operation” will be described in more detail.

- **Control.** The required measures/tests (either on a day to day basis or in case of problems) should have been listed and detailed by the company which built and installed the bioenergy plant. There are several aspects depending on type and size of the biomass plant which should be dealt with such as e.g.:
  
  o Mechanical dangers and fire prevention.
  o Avoidance of air polluting emissions, poisoning prevention.
  o Avoidance of pollutants release during waste disposal.
  o Hygienic and veterinary safety.
  o Quality controls of the substrates and the process.

Most of the controls may be done continuously by control and monitoring systems (like the temperature of the reaction, the amount of substrates, the quantity of gas/electricity/heat produced for biogas plants, etc.) but others can require experts or can be done by the farmer himself (e.g. disposal of ashes from wood combustion plants).

- **Maintenance.** The farmer has to ensure maintenance of the bioenergy plant. Maintenance can be done by the farmers himself or by certain service providers.
• **Contracts.** The contracts concluded with other farmers or industries for substrate and fuel provision have to be prolonged if demanded. Additionally new contract partners for substrate delivery may become of interest. The farmer has to be aware of the time frame of the contracts and of the substrate and fuel prices. Ensuring good financial conditions for substrate and fuel provision is very important for bioenergy plant cost effectiveness. Additionally, the contracts with energy customers (e.g. for heat delivery) have to be updated regularly.

### 6.3 Output

If the farmer pays attention on control, maintenance and contracts, then his bioenergy plant will always be fully optimized from a technical and economic point of view. Especially for a biogas plant, a small defect can have important undesirable effects on the process (from a loss in the plant efficiency to risks for the security), so it’s crucial to be vigilant on this point.
Bioenergy projects for energy production require a high initial investment. That is why it is so important to plan such kind of project very well and specially to proof the economic sustainability of it before checking the technical feasibility. In this case it is necessary to make project changes at the beginning to have bigger positive influences in comparison to make them later in an advanced stage of the project. Another advantage of doing this early is that costs and time are less than in advanced staged projects. For a successful and expected course of project this means, the sooner you act in an early project stage against wrong decisions, the more influence it has on the general costs of the project and it will cost less to do these changes. For this reasons it is extremely important to do an initial project evaluation even before a sustainability study.

Figure 7: Level of detail, opportunities for changes and demanded cost for changes within the process of bioenergy project implementation
7.2 Bioenergy project structures and organisation

Figure 8 gives an overview on the main components of a bioenergy system. Additionally main questions of interest for bioenergy project planning and realization are presented which focus on the responsible persons (“who”), on the technical demands (“technical concepts”, “technical details”) and on the costs relevant for energy provision.

![Figure 9: Components of bioenergy systems and main questions of interest (Fichtner in FNR, 2007).](image)

The main components of a bioenergy system comprise “substrate provision”, “energy production” and the “distribution and utilization of energy”. Bioenergy systems can be very simple or very complex structured which will be explained below.

- Provision of biomass substrates can be realized by the farmer himself (e.g. for his small wood chip combustion plant). Especially for bigger wood combustion plants and biogas plants it may be necessary that the substrates additionally are provided by other suppliers (e.g. neighbored farmers, other forest owners). In this case, the farmer has to deal with other suppliers and to ensure a proper delivery of biomass by contracts.

- For energy production different bioenergy plant types and conversion techniques are available depending on kind and quality of available biomass substrates, planned bioenergy plant size and on planned type of bioenergy output (e.g. heat and/or electricity or bio methane).

- The distribution and utilization of the produced bioenergy can differ clearly for various bioenergy projects. For small wood combustion plants the produced heat may be used exclusively by the farmer himself (his residential building and stables). For bigger wood combustions plants other neighbored houses may be connected via a heat grid. Biogas plants produce electricity and heat in a combined heat and power plant. The electricity may be fed in the electricity grid. For the heat specific and often complex concepts for heat utilization on the farm and in the neighborhood (e.g. heat utilization in an official building, a swimming bath or hospital) have to be developed.
Following examples on bioenergy project structures and organisation are given:

<table>
<thead>
<tr>
<th>Small bioenergy plants up to 900 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project structure</strong></td>
</tr>
<tr>
<td>Project structure as simple as possible for example for the own supply with only a few partners (householders, farms and forestry companies).</td>
</tr>
<tr>
<td><strong>Substrate provision</strong></td>
</tr>
<tr>
<td>Own biomass is used or supplied from the fuel market (usually Pellets/disadvantage: higher price in comparison to wood chips). Own fuel processing is only recommended if there are machines available and they are used for other purposes too. If this is not the case, it makes sense to hire a partner for the fuel supply and processing.</td>
</tr>
<tr>
<td><strong>Plant operation</strong></td>
</tr>
<tr>
<td>Operated by the general energy customer (it is advisable to plan the supply for other nearby energy customers). It is an advantage to found an operation society. In the last years this kind of projects are operated as contracting plants.</td>
</tr>
<tr>
<td><strong>Case example</strong></td>
</tr>
<tr>
<td>In the public area in the year 2000 a heat plant of a school building (Albert-Schweitzer-school and Herwig-Banertz-school) in Hofgeismar was exchanged for a wood chip heat plant (forest residues and sawmill by-products) with 750 kW thermal power. This plant provides around 82% of the yearly needed heat. As peak load reserve boiler there are two natural gas boilers available. The plant is operated by the school itself and the fuel supply undertaken by a regional service company (Maschinenring Kommunalservice GmbH). (Source: Hessenenergie 2002/ FNR 2007, Leitfaden Bioenergie, S. 283 ff).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bioenergy plants from 900 kW to 5 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>(without local heat grid)</td>
</tr>
<tr>
<td><strong>Project structure</strong></td>
</tr>
<tr>
<td>For the supply of local objects, smaller commercial and industrial companies.</td>
</tr>
<tr>
<td><strong>Substrate provision</strong></td>
</tr>
<tr>
<td>Integration of different biomass producers with the help of individual contracts or producer societies. Own fuel processing only recommended if there are machines available and they are used for other purposes too.</td>
</tr>
<tr>
<td><strong>Plant operation</strong></td>
</tr>
<tr>
<td>Operated by the general energy customer. With an increasing power of the plant there have to be considered society solutions of all the participating project partners.</td>
</tr>
<tr>
<td><strong>Case example</strong></td>
</tr>
<tr>
<td>An example of a contract model is the Muelle-Buer plant that is working with 900 kW since a few years. This plant provides a school center with a gym and a kindergarten. Because of low finances the city council includes</td>
</tr>
</tbody>
</table>
OVE GmbH (a regional energy service company) into the project financing and implementation. Forest residues supply, chipping and transport of wood chips to the heat plant is guaranteed by an association, founded by farmers („Interessengemeinschaft für nachwachsende Rohstoffe e.V.“), and local forest wardens. The maintenance (heating-up, assumption and handling of troubles, boiler cleaning and ash evacuation) is also done by them. Afterwards the association renders an account of the wood chip delivery depending on the energy output with the contractors and also with the farmers for chipping and transport. (Source: BMU 2003/ FNR 2007, Leitfaden Bioenergie, S. 283 ff).

<table>
<thead>
<tr>
<th>Bioenergy plants above 5 MW for production of electricity and long-distance heating (without local heating)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project structure</strong></td>
</tr>
<tr>
<td>With the legal validity of the EEG since 2000 this kind of plants became economically attractive. But the problem is the produced heat amount generally has not adequate customers. Because of it, it is optimal if industrial customers with a regular heat and process steam demand are supplied with it or are included on a big supply concept.</td>
</tr>
<tr>
<td><strong>Substrate provision</strong></td>
</tr>
<tr>
<td>Logistics of fuel supply are complex because of the high biomass demand and the big area of which it has to be taken from. To include various partners is recommendable, especially because of the transport and the long time stocking of the biomass. The supply of the fuel is provided by various companies thereby the supply security is guaranteed.</td>
</tr>
<tr>
<td><strong>Plant operation</strong></td>
</tr>
<tr>
<td>Due to the attractive compensation rates of the EEG this kind of plants were built and operated by supra regional and national energy providers. Also contracting solutions are of great significance because of the high capital demand. The integration of a separate management company has to be considered because the management of this kind of plants requires a lot of human resources, time and know-how.</td>
</tr>
<tr>
<td><strong>Case example</strong></td>
</tr>
<tr>
<td>A wood fired CHP in Pfaffenhofen that start running in 2001, was built and operated by the operation company „Biomasse Heizkraftwerk Pfaffenhofen GmbH“. This company was founded in 1997 by five local companies. The thermal power of the plant is around 23 MW. It produces about 6 MW electricity that is fed into the regional electricity grid and it is paid considering EEG. Peculiarities of the plant are that the biomass used is natural wood chip and untreated wood residues. It also uses a big heat network for long-distance heating (grid length 12 km) and process steam (own steam grid) to provide 150 private, communal or rather industrial customers with heat. The heat is not only used for heating but also for air conditioning in the summer and for the cooling process of a brewery. Half of the yearly fuel demand (70.000 tons) came from the farmers and forestry wardens. The other half came from regional wood treatment companies. (Source: FNR 2007, Leitfaden Bioenergie, S. 283 ff).</td>
</tr>
</tbody>
</table>
## 7.3 Checklist for the first step “project idea”

<table>
<thead>
<tr>
<th>Main steps</th>
<th>Sub-steps</th>
<th>Checked</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of the agricultural potential</td>
<td>Your fields and farm. Clearly identify the available substrates and estimate the quantity in tons per month/year for each of them</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energy crops -&gt; e.g. maize, Sudan grass, millet, white sweet clover, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Landscaping -&gt; e.g. grass, lawn cuttings, flowers and leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animal waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Household waste -&gt; e.g. papers/cardboard, food/kitchen wastes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the neighbourhood. Who could be interested in giving/selling their waste? Which quantity and how often?</td>
<td>Identify the potential sellers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools/companies’ kitchen -&gt; food/kitchen wastes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agro-industrial company -&gt; organic industrial waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others -&gt; Landfills dedicated to organic wastes, sewage sludge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consider the conditions</td>
<td>Identify the kind of substrates they propose</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ask for the quantity and the frequency of the deliveries</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How much will it cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First (preliminary) calculations of the farm’s biomass potential and the costs for the plan</td>
<td>Go to the website <a href="http://www.bioenergyfarm.eu">www.bioenergyfarm.eu</a> to use online tools for a first assessment of the economic feasibility of your planned bioenergy project</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check the results which will describe the different costs (equipment, fuel consumption, logistic costs, etc.) and the net incomes. Of course you can try different scenarios by changing data</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>You also may get in contact with national experts; addresses are available on the website <a href="http://www.bioenergyfarm.eu">www.bioenergyfarm.eu</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of transportation</td>
<td>Quality of the infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is there a good infrastructure (quantity and quality) between my planned biomass plant and the fields/suppliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can trucks freely use those roads?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation optimized</td>
<td>Are all my collect points closed enough to the biomass plant for them being worthy? (normally less than ca. 15 kilometres ensures profitability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can I organize a &quot;substrates pick-up route&quot; to reduce the costs?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private consumption</td>
</tr>
<tr>
<td>Determine the nature (gas, heat, electricity) and the quantity of energy which is required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selling purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public institutions</td>
</tr>
<tr>
<td><em>Inform yourself about the prices and the conditions (period, gas quality, quantity of energy that can be sold, etc.)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nature/Structure of the company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the persons who may take part in your project. Discuss with them about their involvement and their responsibilities</td>
</tr>
</tbody>
</table>

| Inform yourself about the most common forms of company and their specificities (see chapter 8.1) |
8 ANNEX 2: COUNTRY SPECIFIC DATA AND INFORMATION
8.1 Types of legal forms of companies

8.1.1 Germany

Characterization of the most relevant legal forms of company for bioenergy projects in Germany (source: FNR 2007, Leitfaden Bioenergie, p 262; updated)

<table>
<thead>
<tr>
<th></th>
<th>Open Trade Society (Offene Handelsgesellschaft, OHG)</th>
<th>Limited Liability Company/ Business Company (Gesellschaft mit beschränkter Haftung, GmbH/Unternehmergesellschaft, UG)</th>
<th>Cooperative Association (Genossenschaft)</th>
<th>Limited Partnership (Kommandit-gesellschaft, KG)</th>
<th>Owner-operated (Eigenbetrieb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>shareholder</td>
<td>At least two natural or legal persons.</td>
<td>One or several natural or legal persons.</td>
<td>Foundation possible with at least three members that sign a partnership agreement (statute).</td>
<td>At least two persons, one general partner and another limited partner.</td>
<td>Municipality.</td>
</tr>
<tr>
<td>capital deposit</td>
<td>Amount is not stipulated.</td>
<td>At least € 25.000 (valid for GmbH) At least € 1 (valid for UG)</td>
<td>Amount is stipulated in the agreement.</td>
<td>Amount is not stipulated.</td>
<td>Amount is determined in the statutes.</td>
</tr>
<tr>
<td>liability</td>
<td>Total capital: All partners are liable with their whole capital for all obligations of the society.</td>
<td>Limited Liability Company is liable with the whole capital of the company. Liability of the society is limited to the share capital, meaning that partners only are liable with their deposit/investment.</td>
<td>The cooperative association is totally liable with their capital. Personal liability can be limited in the statute to the deposit.</td>
<td>General partner is totally liable, limited partner is only liable with the amount of his deposit.</td>
<td>Total capital of the municipality.</td>
</tr>
<tr>
<td></td>
<td>Open Trade Society (Offene Handelsgesellschaft, OHG)</td>
<td>Limited Liability Company/ Business Company (Gesellschaft mit beschränkter Haftung, GmbH/ Unternehmergesellschaft, UG)</td>
<td>Cooperative Association (Genossenschaft)</td>
<td>Limited Partnership (Kommandit-gesellschaft, KG)</td>
<td>Owner-operated (Eigenbetrieb)</td>
</tr>
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<td>------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>legal capacity</td>
<td>Available.</td>
<td>Legal person.</td>
<td>After the registration in the association register the registered cooperative society turns into a legal person and is therefore independent with a legal capacity.</td>
<td>Available.</td>
<td>Not available.</td>
</tr>
<tr>
<td>management/representation</td>
<td>All members of the society are legitimated and obliged to represent. The representation form (single or general representation) is determined by the society.</td>
<td>Is represented by one manager or more. Members of the society have no right of representation. The manager can be a member of the society or someone from outside.</td>
<td>Management by board members. Only association members are board members. The general meeting can give binding instructions to board members.</td>
<td>Only the general partner is entitled and obliged to manage. In case of a contract agreement the management could be transferred to one or more general partners.</td>
<td>Plant management for several company areas by managers and treasurers.</td>
</tr>
<tr>
<td>taxation</td>
<td>Only commercial taxation. Members of the partnership are taxable with their profit share.</td>
<td>Fundamentally double taxation: Commercial taxation, obliged income taxation and corporate income taxation because of legal person. Mitigation by middle income process.</td>
<td>Like Limited Liability Company.</td>
<td>Like in Open Trade Society partners are income taxable. Limited Partnership is only responsible for commercial taxation. There is no corporate income tax.</td>
<td>Like Limited Liability Company.</td>
</tr>
<tr>
<td>Open Trade Society (Offene Handelsgesellschaft, OHG)</td>
<td>Limited Liability Company/ Business Company (Gesellschaft mit beschränkter Haftung, GmbH/ Unternehmergesellschaft, UG)</td>
<td>Cooperative Association (Genossenschaft)</td>
<td>Limited Partnership (Kommandit-gesellschaft, KG)</td>
<td>Owner-operated (Eigenbetrieb)</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td></td>
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<tr>
<td>Assessment/ important criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• For commercial transactions with a partner.</td>
<td>• Simplest form of corporation.</td>
<td>• The association has no profit prospects. Profits are split between the members.</td>
<td>• For entrepreneurs that are looking for further initial capital, but want to stay with sole responsibility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without minimum capital.</td>
<td>• Entrepreneurs want to limit liability.</td>
<td>• The association is completely liable with all its capital.</td>
<td>• General partner manages businesses alone.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Liability risk (members of the society are liable with social capital and private capital).</td>
<td>• Offers tax advantages when the income is high.</td>
<td>• The association is completely liable with all its capital.</td>
<td>• Limited partner is financially involved with the company.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• High reputation because of personal liability.</td>
<td>• Comparatively high efforts for foundation and bookkeeping.</td>
<td></td>
<td>• The total liability of the general partner involves also his private capital.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Company is liable with the whole company capital.</td>
<td></td>
<td>• Limited partners are liable only with their investment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Liability of members is limited to their own investment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• In case of credits, members are liable with further private safeties.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 8.1.2 The Netherlands

Characterization of the most relevant legal forms of company for bioenergy projects in the Netherlands (sources: national chamber of commerce [www.kvk.nl](http://www.kvk.nl) and [www.inzakengaan.nl](http://www.inzakengaan.nl))

<table>
<thead>
<tr>
<th>Shareholder</th>
<th>Sole trader (eenmans zaak)</th>
<th>General partnership (VOF)</th>
<th>Limited partnership (CV)</th>
<th>Professional partnership (maatschap)</th>
<th>Private limited company (BV)</th>
<th>Co-operative society (cooperatie)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One natural or legal person</td>
<td>At least two natural or legal persons.</td>
<td>At least two natural or legal persons.</td>
<td>At least two natural or legal persons.</td>
<td>One or several natural or legal persons.</td>
<td>At least two natural or legal persons.</td>
<td></td>
</tr>
<tr>
<td>Capital deposit</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>At least €18,000</td>
<td>None</td>
</tr>
<tr>
<td>Liability</td>
<td>Owner is 100% liable (business and personal)</td>
<td>Each partner is liable for obligations. Silent partners are liable for the amount they invest.</td>
<td>Each partner is liable for the obligations of the partnership but not for the individual obligations of the partners.</td>
<td>Each shareholder has a maximum liability as large as its participation in the BV</td>
<td>The cooperation is liable; its members are equally liable. Exclusion of personal liability is possible with specific subtypes 'cooperation with limited liability' or cooperation without liability.</td>
<td></td>
</tr>
<tr>
<td>Legal capacity</td>
<td>No legal form</td>
<td>No legal form</td>
<td>No legal form</td>
<td>No legal form</td>
<td>Legal form</td>
<td>Legal form</td>
</tr>
<tr>
<td>Management/representation</td>
<td>Owner</td>
<td>All partners represent the VOF or dependent on the VOF contract.</td>
<td>Management by the active partners</td>
<td>All partners represent the partnership</td>
<td>Board of directors</td>
<td>Management chosen by the members</td>
</tr>
<tr>
<td></td>
<td>Sole trader (eenmans zaak)</td>
<td>General partnership (VOF)</td>
<td>Limited partnership (CV)</td>
<td>Professional partnership (maatschap)</td>
<td>Private limited company (BV)</td>
<td>Co-operative society (cooperatie)</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>taxation</strong></td>
<td>Income tax, turnover tax</td>
<td>Income tax on each person’s share of the profit. Turnover tax.</td>
<td>Income tax, turnover tax, Active partners: on their share of the profits. Silent partners: on renumeration received</td>
<td>Income tax on each person’s share of the profit. Turnover tax.</td>
<td>Wealth tax on the capital, corporation tax on the profit, turnover tax.</td>
<td>Income tax, Turnover tax</td>
</tr>
<tr>
<td><strong>Assessment/important criteria</strong></td>
<td>• No minimum capital</td>
<td>• No minimum capital</td>
<td>• No minimum capital</td>
<td>• No minimum capital</td>
<td>• Minimum capital required</td>
<td>• No minimum capital</td>
</tr>
<tr>
<td></td>
<td>• Offers tax advantages when the income is low</td>
<td>• Offers tax advantages when the income is low</td>
<td>• High reputation because of personal liability.</td>
<td>• High reputation because of personal liability.</td>
<td>• No personal liability</td>
<td>• Offers tax advantages when the income is high.</td>
</tr>
<tr>
<td></td>
<td>• High reputation because of personal liability.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.1.3 Belgium

Characterization of the most relevant legal forms of company for bioenergy projects in Belgium (sources: FOD Economie, [http://economie.fgov.be](http://economie.fgov.be), [http://www.abe-bao.be](http://www.abe-bao.be), [http://www.eunomia.be](http://www.eunomia.be) and [http://www.notaris.be](http://www.notaris.be)).

<table>
<thead>
<tr>
<th>Shareholder</th>
<th>One person</th>
<th>One person private limited liability company (besloten éénpersoonsvennootschap met beperkte aansprakelijkheid/BVBA)</th>
<th>Private limited liability company (Besloten vennootschap met beperkte aansprakelijkheid/BVBA)</th>
<th>General partner-schip (Vennoot-schap onder firma/VOF)</th>
<th>Cooperative company with limited liability (Coöperatieve vennootschap met beperkte aansprakelijkheid/CVBA)</th>
<th>Cooperative company with unlimited liability (Coöperatieve vennootschap met onbeperkte aansprakelijkheid/CVOA)</th>
<th>Public limited company (Naamloze vennootschap/NV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital deposit</td>
<td>None</td>
<td>€ 18.550 (€ 12.400 deposit)</td>
<td>€ 18.550 (€ 6.200 deposit)</td>
<td>Amount as stipulated by the articles of association.</td>
<td>€ 18.550 (€ 6.200 deposit)</td>
<td>Amount as stipulated by the articles of association.</td>
<td>€ 61.500</td>
</tr>
<tr>
<td>Liability</td>
<td>Owner is 100% liable (business and personal)</td>
<td>The person has a maximum liability as large as his or her participation in the EBVBA</td>
<td>Each shareholder has a maximum liability as large as their participation in the BVBA</td>
<td>Each partner is unlimited joint and several liable</td>
<td>Each partner has a maximum liability as large as his or her participation</td>
<td>Each partner is unlimited joint and several liable</td>
<td>Each partner has a maximum liability as large as his or her participation</td>
</tr>
<tr>
<td>Legal capacity</td>
<td>No legal form</td>
<td>Legal form</td>
<td>Legal form</td>
<td>Legal form</td>
<td>Legal form</td>
<td>Legal form</td>
<td>Legal form</td>
</tr>
<tr>
<td>Sole trader (één-mans-zaak)</td>
<td>One person private limited liability company (besloten éénpersoonsvennootschap met beperkte aansprakelijkheid/BVBA)</td>
<td>Private limited liability company (Besloten vennootschap met beperkte aansprakelijkheid/BVBA)</td>
<td>General partner-schip (Vennoot-schap onder firma/VOF)</td>
<td>Cooperative company with limited liability (Coöperatieve vennootschap met beperkte aansprakelijkheid/CVBA)</td>
<td>Cooperative company with unlimited liability (Coöperatieve vennootschap met onbeperkte aansprakelijkheid/CVOA)</td>
<td>Public limited company (Naamloze vennootschap/NV)</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------</td>
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<td>---------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>management/ representation</td>
<td>Owner</td>
<td>Manager(s) a selected by the shareholders</td>
<td>Manager(s) a selected by the shareholders</td>
<td>Presumption of mutual proxy between the partners</td>
<td>Manager(s) as selected by the shareholders or board of directors.</td>
<td>Manager(s) as selected by the shareholders or board of directors.</td>
<td></td>
</tr>
<tr>
<td>taxation</td>
<td>Income tax</td>
<td>Corporation tax on turnover</td>
<td>Corporation tax on turnover</td>
<td>Profits of a VOF are taxed with the partners for their share in the profits</td>
<td>Corporation tax on turnover</td>
<td>Corporation tax on turnover. Advance levy on income derived from securities</td>
<td></td>
</tr>
<tr>
<td>Assessment/ important criteria</td>
<td>- No minimum capital</td>
<td>- Minimum capital required</td>
<td>- Minimum capital required</td>
<td>- Solidarity between the partners</td>
<td>- Minimum capital required</td>
<td>- No minimum capital required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Offers tax advantages when the income is low</td>
<td>- Separation of the own income with the business.</td>
<td>- Special regulation for starters</td>
<td>- The amount of capital attributed by the partners may vary in size.</td>
<td>- No personal liability</td>
<td>- Separation of the own income with the business.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- High reputation</td>
<td>- No personal liability</td>
<td>- Separation of the own income with the business.</td>
<td>- Risk of liability for other partners</td>
<td>- Offers tax advantages when the income is high</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- No division between the business profit and the owners income sometimes resulting in overall higher tax</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Separation of the own income with the business.</td>
<td></td>
</tr>
</tbody>
</table>
8.1.4 Italy

Characterization of the most relevant legal forms of company for bioenergy projects in Italy (source: Ownership, pyramidal groups and separation between ownership and control in Italy, 1997).

<table>
<thead>
<tr>
<th>Legal Form</th>
<th>Limited Liability</th>
<th>Minimum Capital (thousands of euros)</th>
<th>Smallest number of owners</th>
<th>Smallest number of managers</th>
<th>Degree of imperativeness of the legal rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Società semplice</td>
<td>Only for partners not participating in the management of the company, if (a) the partnership contract so provides, and (b) creditors are informed of the existence of such clause.</td>
<td>No</td>
<td>2</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>Società in nome collettivo</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>Società in acc. semplice</td>
<td>Unlimited for &quot;soci accomandatari&quot;; limited for &quot;soci accomandanti&quot;</td>
<td>No</td>
<td>2</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>Società per azioni</td>
<td>Yes, unless the Co. has a single owner</td>
<td>100</td>
<td>2 at foundation, 1 thereafter</td>
<td>1</td>
<td>High</td>
</tr>
<tr>
<td>Società in accomandita per azioni</td>
<td>Unlimited for &quot;soci accomandatari&quot; and limited for &quot;soci accomandanti&quot;.</td>
<td>100</td>
<td>2 at foundation, 1 thereafter</td>
<td>1</td>
<td>High</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------</td>
<td>-----</td>
<td>-------------------------------</td>
<td>---</td>
<td>-----</td>
</tr>
<tr>
<td>Società a responsabilità limitata</td>
<td>Yes</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>Medium</td>
</tr>
<tr>
<td>Società cooperative</td>
<td>Cooperatives can be founded either as companies with limited liability or as companies with unlimited liability.</td>
<td>No</td>
<td>3</td>
<td>1</td>
<td>High</td>
</tr>
</tbody>
</table>

The farm partnership should carry out just farming activities or equivalent following the art. 2135 of Codice Civile. Practically, there are connected activities with the agricultural one, on which there is a tax exemption. Among them, there is electricity and heat production from renewable energies, including biogas, biofuels and chemicals, if more than 50% is being produced from materials coming from the land cultivated by the farmer (Law n. 266 del 23/12/2005). The percentage is made comparing the value or the energetic content of the material coming from farming activities of the owner of the renewable energy production system.

- **The ESCo**

An energy service company (acronym: ESCO or ESCo) is a commercial business providing a broad range of comprehensive energy solutions including designs and implementation of energy savings projects, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management. A newer breed of ESCO evolving in the EU now focusses more on innovative financing methods. In all instances, The ESCO starts by performing an in-depth analysis of the property, sometimes at risk, designs an energy efficient solution, installs the required elements, and maintains the system to ensure energy savings during the payback period. The savings in energy costs are often used to pay back the capital investment of the project over a five- to twenty-year period, or reinvested into the building to allow for capital upgrades that may otherwise be unfeasible. If the project does not provide returns on the investment, the ESCO is often responsible to pay the difference.
8.1.5 Poland

Below the characterization of the most relevant legal forms of company for bioenergy projects in Poland is presented.

**Table 8-1**: Overview on legal forms of enterprises for bioenergy projects – in Poland.

<table>
<thead>
<tr>
<th>legal forms of enterprises</th>
<th>General Partnership (spółka jawna, sp. j.)</th>
<th>Limited Partnership (spółka komandytowa, sp. k.)</th>
<th>Partnership Limited by Shares (spółka komandytowo-akcyjna, S.K.A.)</th>
<th>Limited Liability Company (spółka z ograniczoną odpowiedzialnością, sp. z o.o.)</th>
<th>Joint-Stock Company (spółka akcyjna, S.A.)</th>
<th>Cooperative (spółdzielnia)</th>
<th>Partnership (spółka cywilna, s.c.)</th>
<th>Individual entrepreneur (indywidualny przedsiębiorca)</th>
</tr>
</thead>
<tbody>
<tr>
<td>shareholder</td>
<td>At least two natural or legal persons.</td>
<td>At least two persons, one general partner and another limited partner.</td>
<td>At least two persons, one general partner and another passive investor.</td>
<td>One or several natural or legal persons or organizational units without legal personality, but no one–man Limited Liability Company.</td>
<td>One or several natural or legal persons or organizational units without legal personality, but no one–man Limited Liability Company.</td>
<td>At least ten natural or legal persons or three legal persons (in case of agricultural production cooperative at least five natural persons).</td>
<td>Two or three natural or legal persons.</td>
<td>Natural person.</td>
</tr>
<tr>
<td>capital deposit</td>
<td>Amount is not stipulated.</td>
<td>Amount is not stipulated.</td>
<td>At least PLN 50,000. (the minimum value of the share is PLN 50).</td>
<td>At least PLN 100,000 (the minimum value of the share is PLN 0.01). The capital deposit is divided into shares of equal value. These shares can be traded on the stock market.</td>
<td>Amount may be stipulated in the agreement.</td>
<td>Amount is not stipulated.</td>
<td>No capital deposit.</td>
<td></td>
</tr>
<tr>
<td>Legal forms of enterprises</td>
<td>General Partnership (spółka jawna, sp. j.)</td>
<td>Limited Partnership (spółka komandytowa, sp. k.)</td>
<td>Partnership Limited by Shares (spółka komandytowo-akcyjna, S.K.A.)</td>
<td>Limited Liability Company (spółka z ograniczoną odpowiedzialnością, sp. z o.o.)</td>
<td>Joint-Stock Company (spółka akcyjna, S.A.)</td>
<td>Cooperative (spółdzielnia)</td>
<td>Partnership (spółka cywilna, s.c.)</td>
<td>Individual entrepreneur (indywidualny przedsiębiorca)</td>
</tr>
<tr>
<td>---------------------------</td>
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<td>------------------------</td>
<td>--------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Liability</td>
<td>All partners are liable with their whole capital for all obligations of the company.</td>
<td>General partner is totally liable, limited partner is only liable with the 'sum of the partnership' specified in the text of the agreement of Limited Partnership.</td>
<td>General partner is totally liable. Investor is liable only in case when his name will be placed in the name of the company, and when he makes a legal action on behalf of the company without proxy.</td>
<td>Limited Liability Company is liable with the whole capital of the company. Liability of the company is limited to the invest, meaning that partners only are liable with their deposit/investment (if execution against the company proves to be ineffective, for the liabilities of the company may be responsible members of the Board).</td>
<td>Joint-Stock Company is liable with the whole capital of the company. Liability of the company is limited to the share capital, meaning that partners only are liable with their investment.</td>
<td>Liability of the cooperative is limited to the share capital, meaning that members only are liable with their investment.</td>
<td>All partners are liable with their whole capital for all obligations of the company.</td>
<td>Total capital of the entrepreneur.</td>
</tr>
<tr>
<td>Legal capacity</td>
<td>Organizational unit without legal personality.</td>
<td>Organizational unit without legal personality.</td>
<td>Organizational unit without legal personality.</td>
<td>Legal person.</td>
<td>Legal person.</td>
<td>Legal person</td>
<td>Partnership does not have legal personality – is the construction regulated by the law of obligations.</td>
<td>Natural person.</td>
</tr>
<tr>
<td>legal forms of enterprises</td>
<td>General Partnership (spółka jawna, sp. j.)</td>
<td>Limited Partnership (spółka komandytowa, sp. k.)</td>
<td>Partnership Limited by Shares (spółka komandytowo-akcyjna, S.K.A.)</td>
<td>Limited Liability Company (spółka z ograniczoną odpowiedzialnością, sp. z o.o.)</td>
<td>Joint-Stock Company (spółka akcyjna, S.A.)</td>
<td>Cooperative (spółdzielnia)</td>
<td>Partnership (spółka cywilna, s.c.)</td>
<td>Individual entrepreneur (indywidualny przedsiębiorca)</td>
</tr>
<tr>
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<td>-------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
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<td>--------------------------------------------------</td>
</tr>
<tr>
<td>management/ representation</td>
<td>All members of the society are legitimated and obliged to manage without additional compensation (the company can be managed by one or more shareholders if it will be decided in agreement or a subsequent resolution of the company’s shareholders).</td>
<td>Only the general partner is entitled and obliged to manage and represent. Limited partner may represent the company only as a proxy.</td>
<td>Is represented by the management of one or more members who are natural persons. Members of the society have no right of representation. The member of the management can be a member of the society or someone from outside.</td>
<td>Is represented by the management of one or more shareholders if it will be decided in agreement or a subsequent resolution of the company’s shareholders.</td>
<td>Is managed by the management of one or more members. The management is controlled by the Board.</td>
<td>All members of the society are legitimated and obliged to manage without additional compensation.</td>
<td></td>
<td>Individual entrepreneur is manager and representative of the company.</td>
</tr>
<tr>
<td>taxation</td>
<td>Only commercial taxation of members – they are taxable with their profit share. There is no company income tax.</td>
<td>Only commercial taxation of members – they are taxable with their profit share. There is no company income tax.</td>
<td>Double taxation: income tax from legal person and tax on dividends paid to shareholders.</td>
<td>Income tax from legal person.</td>
<td>Tax on dividends paid to shareholders.</td>
<td>Only commercial taxation of members – they are taxable with their profit share. There is no company income tax.</td>
<td>Commercial taxation of individual entrepreneur.</td>
<td></td>
</tr>
<tr>
<td>Legal forms of enterprises</td>
<td>Assessment/important criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| General Partnership (spółka jawna, sp. j.) | • Without minimum capital.  
• Liability risk (members of the company are liable with partnership capital and private capital).  
• High reputation because of personal liability.  
• Relatively low costs of bookkeeping (the partnership does not have to keep full cost accounting). |
| Limited Partnership (spółka komandytowa, sp. k.) | • For entrepreneurs that are looking for further initial capital, but want to stay with sole responsibility.  
• General partner manages business alone.  
• Limited partner is financially involved with the company.  
• The total liability of the general partner involves also his private capital.  
• There is no liability risk for investor.  
• Relatively high costs of bookkeeping (the necessity of keeping full cost accounting). |
| Partnership Limited by Shares (spółka komandytowo-akcyjna, S.K.A.) | • For entrepreneurs that are looking for further initial capital, but want to stay with sole responsibility.  
• General partner manages business alone.  
• Limited partners are liable only with the specified earlier 'sum of the partnership'.  
• Relatively high costs of bookkeeping (the necessity of keeping full cost accounting). |
| Limited Liability Company (spółka z ograniczoną odpowiedzialnością, sp. z o.o.) | • Company is liable with the whole company capital.  
• Liability of members is limited to their own investment.  
• Relatively high costs of registration and bookkeeping (the necessity of keeping full cost accounting and the preparation of financial statements at year-end). |
| Joint-Stock Company (spółka akcyjna, S.A.) | • Company is liable with the whole company capital.  
• Liability of members is limited to their own investment.  
• Relatively high costs of bookkeeping (the necessity of keeping full cost accounting and the preparation of financial statements at year-end and audit). |
| Cooperative (spółdzielnia) | • The association has no profit prospects. Profits are divided between the members.  
• Liability of members is limited to their own investment.  
• Relatively high costs of registration and bookkeeping (simplified).  
• Entrepreneur himself makes all decision. |
| Partnership (spółka cywilna, s.c.) | • Without minimum capital.  
• Liability risk (members of the company are liable with partnership capital and private capital).  
• High reputation because of personal liability.  
• Low costs of registration and bookkeeping (simplified).  
• Entrepreneur himself makes all decision. |
| Individual entrepreneur (indywidualny przedsiębiorca) | • Without capital deposit.  
• Liability risk (entrepreneur is liable with capital and private capital).  
• High reputation because of personal liability.  
• Low costs of registration and bookkeeping (simplified).  
• Entrepreneur himself makes all decision. |
### 8.1.6 Estonia

Characterization of the legal forms of company for bioenergy projects in Estonia.

<table>
<thead>
<tr>
<th>Types of incorporated entity</th>
<th>Sole Proprietor</th>
<th>Private Limited Company</th>
<th>Public Limited Company</th>
<th>Commercial Association</th>
<th>Non-profit Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum capital for start of the business, Euro</td>
<td>0</td>
<td>2 500</td>
<td>25 000</td>
<td>2 500</td>
<td>0</td>
</tr>
<tr>
<td>Management body/legal representative</td>
<td>None (except the person him-/herself)</td>
<td>General meeting of shareholders and management board. In the case of more than two member of the board the chairman of the board is elected. If there is provided so in the statutes, also supervisory board is elected. The same person can not be at the same time in the management board and in the supervisory board. The member of the management board may not be shareholder.</td>
<td>General meeting of shareholders, supervisory board and management board. Including the law the structure of the management is always with two step – the supervisory board (at least with three members) and the management board</td>
<td>General meeting of members, supervisory board and management board. If the commercial association has more than 200 member or if the share capital is more than 25 000 Euro or if there is provided so in the statutes, the supervisory board is elected by the general meeting of shareholders. Also management board is elected by the general meeting of shareholders, but if the supervisory board is elected, also the management board is elected by the supervisory board.</td>
<td>General meeting of members, management board and other organs if there is provided so in the statutes</td>
</tr>
<tr>
<td>Minimum number of shareholders or members</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Liability of shareholders or members</td>
<td>Sole proprietor assume responsibility with whole his/her own personal property</td>
<td>Limited liability. The shareholders assume responsibility only in proportion to his/her share capital</td>
<td>Limited liability. The shareholders assume responsibility only in proportion to his/her share capital</td>
<td>In the statutes there can be provided full personal liability of the members or additional liability of the members</td>
<td>In the statutes there can be provided additional liability of the members</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Requirements, duties and restrictions</td>
<td>Additional to income tax (21%) also social security charge (33%) must be paid up by the sole proprietor him-/herself</td>
<td>Compared with sole proprietor more complicated accounting, management and reporting.</td>
<td>Compared with sole proprietor and private limited company more complicated accounting, management and reporting. Shares must be registered in the central securities depository</td>
<td>The word &quot;association&quot; and reference to the field of activity must be included in the business name. State can not be the member of the commercial association</td>
<td>Received income can be used only for attainment of an objectives provided in the statutes. Received income can not be distributed among the members</td>
</tr>
<tr>
<td>Opportunities and rights</td>
<td>No need for statutes, no need for pay up equity capital, simple management</td>
<td>If the founder(s) of private limited company is(are) natural person(s), no need for pay up equity capital. The received income can be distributed to the shareholders by withdraw dividends, in that case only income tax should be paid. The possibility to be a publicly traded company. More simple trading with shares compared with the same case of private limited company</td>
<td>The received income can be distributed to the shareholders by withdraw dividends, in that case only income tax should be paid. The possibility to be a publicly traded company.</td>
<td>The members of association should be treated equally. In the decision making process there is one equal vote for each member.</td>
<td>The members of association should be treated equally. In the decision making process there is one equal vote for each member.</td>
</tr>
<tr>
<td>Other differences</td>
<td>Cash-based method of accounting, if yearly turnover do not exceed 16 000 Euro</td>
<td>The most popular type of incorporated entity</td>
<td>Audit is binding in every year, even if there was no business activities in this year</td>
<td>If there are aspects which are not provided in the Commercial Association Act, there should be guided from Commercial Code the provisions of private limited company. The commercial association can not be transformed to private limited company or public limited company.</td>
<td>The activities of non-profit associations are regulated by Non-profit Associations Act. The non-profit association can not be transformed to other type of incorporated entity</td>
</tr>
</tbody>
</table>
### 8.2 Proceeding of permits

#### 8.2.1 Germany

The proceedings of permit will be documented separately for wood combustion plants and biogas plants.

**Wood combustion plants**

The construction and operation of bioenergy plants require an approval for protection against pollution depending on their firing thermal capacity and fuel type. Approvals, depending on fuel type and efficiency, take place in a simplified way (without public participation) or in an official procedure (FNR 2007, Leitfaden Bioenergie; updated).

The following diagram gives a view of regulations of the BImSchG law approval duty for protection against pollution for bioenergy plants:

<table>
<thead>
<tr>
<th>Fuel description</th>
<th>Fuel assignment according to appendix 4. BImSchV</th>
<th>No duty of approval § 22 BImSchG 1. BImSchV</th>
<th>Duty of approval 4. BImSchG Simplified procedure § 19. BImSchG</th>
<th>Duty of approval 4. BImSchG Formal procedure § 10. BImSchG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural wood in pieces and complete, pressed natural wood</td>
<td>1.2 a</td>
<td>&lt; 1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1 - 50</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1.1</td>
<td>-</td>
<td>-</td>
<td>≥ 50</td>
</tr>
<tr>
<td>Wood, painted, varnished, laminated, plywood, chipboard, fiberboard as well as its remnants without halogen organic coating and wood protective substances</td>
<td>8.2 a or 8.2 b</td>
<td>&lt; 1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1 - 50</td>
<td>≥ 50</td>
</tr>
<tr>
<td>Other materials&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.3</td>
<td>&lt; 1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1 - 50</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup> For emission boundary limits and minimum efficiency values look at 1. BImSchV

<sup>b</sup> Not further specified in 4. BImSchV

You can find more information within the bioenergy manual (“Leitfaden Bioenergie”), published by the Fachagentur Nachwachsende Rohstoffe (FNR), [www.fnr.de](http://www.fnr.de).
Biogas plants

For the approval of biogas plants there have to be considered a lot of laws and orders. These legal demands consider various regulations such as project planning rights, building regulations, protection against pollution regulations, water, nature, garbage, fertilizer and hygiene regulations and laws to examine their environmental compatibility. Beside this, the epizootic diseases act laws could play a roll, if there are used animal by-products in the plant. It has to be considered that the action of approval is different for each federal state. The abundance of laws for the approval procedure and the different specific federal state bases clearly show that it is advisable to consult an expert for the approval process (FNR 2010, Leitfaden Biogas, p. 165).

For the approval of a biogas plant two procedures can be distinguished: The building regulation procedure or the lavish procedure of the federal law of protection against pollution (BImSchG) (FNR 2010, Leitfaden Biogas, S. 165). Enclosing the approval process under consideration of the building law and the BImSchG (FNR 2010: Leitfaden Biogas, S. 242)

<table>
<thead>
<tr>
<th>Approval according building law, if….</th>
<th>Approval according BImSchG, if….</th>
</tr>
</thead>
<tbody>
<tr>
<td>The firing thermal capacity of the motor for conversion of biogas into electricity is smaller than 1 MW.</td>
<td>The firing thermal capacity of the motor for conversion of biogas into electricity is 1 MW and more and/or</td>
</tr>
<tr>
<td>Slurry that is used in the biogas plant is less than 10 tons per day, and/or</td>
<td>Slurry that is used in the biogas plant is more than 10 tons per day, and/or</td>
</tr>
<tr>
<td>Ferment material depot (slurry depot) is less than 6.500 m³ and/or</td>
<td>Ferment material depot (slurry depot) is 6.500 m³ and more and/or</td>
</tr>
<tr>
<td>The biogas plant is not on a farm/land under determinations of the BImSchG.</td>
<td>The biogas plant is legally on a farm/land under determinations of the BImSchG.</td>
</tr>
</tbody>
</table>

You can find more information on the biogas manual ("Leitfaden Biogas"), published by the Fachagentur Nachwachsende Rohstoffe (FNR), (www.fnr.de).
8.2.2 The Netherlands

Biogas plants

For the approval of biogas plants a lot of laws and orders have to be considered. The InfoMil “Handreiking (co-)vergisting van mest” is a guideline (no law) which is often used by local governments in the permit procedure for biogas plants.

Zoning (Bestemmingsplan)

The first step in planning a biogas plant is to find or “create” a location on which a biogas plant is allowed in the zone. Often a “bestemmingsplan” change is needed to include a biogas installation in the “bestemmingsplan”. To prepare a request change takes about 3 to 4 months. The time plan of the local government after receiving the request is different from municipality to municipality. Often a reasonable amount of costs are charged to the entrepreneur who makes the request. Before requesting the change it is often helpful to arrange a meeting with the officials who will assess the request. For industrial scale projects it is advised to start with a principle request (“principe verzoek”) to the municipality. By doing this you demand the town council “gemeentenaad” to give their opinion about your plans. Based on this opinion you can decide how much chance you have in a positive outcome of the request and if it is wise to put a lot of effort and costs in the request. For industrial scale projects some provinces like “Zuid-Holland” created searching zones in which they believe industrial scale biogas installations fit best.

As mentioned the local governments often follow the InfoMil “Handreiking (co-)vergisting van mest” quit strictly when they receive a request to add a biogas installation to the “bestemmingsplan”. In the “handreiking Bedrijven en milieuzonering” from the VNG it is advised to have a distance to neighbouring houses of at least 100m for smells, 50m for dust and 30m for safety. This is category 3.2 in the list. For the zoning of different biogas plants a categorisation is made. For this categorisation two questions need to be answered:

1. Can the digestate be treated as manure according the manure law?
2. Is the activity of digestion a company related activity

Question 1: For co-digestion it is demanded that the manure law “meststoffenwet” is followed. To be able to treat the digestate as manure this law demands that a least 50mass% of the digester input is manure and that only co-product from the positive list (appendix Aa from the law) are added. If the digestate cannot be seen as manure, the biogas installation is an industrial installation which belongs to category D.

Question 2:
Category A: The biogas installation threats own manure and adds own co-substrates or co-substrates from third parties. The digestate is used on ground which belongs to the company.
Category B: The biogas installation threatens own manure and adds own co-substrates or co-substrates from third parties. The digestate is used on ground which belongs to the company or disposed to third parties.

Category C: The biogas installation threatens manure from third parties and adds own co-substrates or co-substrates from third parties. The digestate is used on ground which belongs to the company.

Category D: The biogas installation threatens manure from third parties and adds own co-substrates or co-substrates from third parties. The digestate is disposed to third parties.

Category A, B and C are treated as an company related activity. They fit the standard activities of a farm and are allowed next to the farm. However often the “bestemmingsplan” does not include the biogas installation so it needs to be changed. The definition of “own” is not very strict. For category A, B and C often the 50% rule is used. So for example for category A 50% of the manure should come from the own farm.

Category D cannot be seen as an company related activity. Then the installation is called a industrial scale biogas installation for which a special location is needed. To find a proper location the Infomil gives search criteria which are often strictly followed by the provinces and local governments. Often the first option in which the biogas installation is located on a company area is demanded by the authorities. Note: This is often a problem in the exploitation because the exploitation subsidy (SDE) is not sufficient to account for the much higher costs for land on industrial ground compared to farm ground.

**WABO Environmental permit “Omgevingsvergunning (milieu en bouwvergunning)”**

Only the “bestemmingsplan” is not sufficient to start building the biogas installation. Also the environmental permit needs to be available. This procedure can be done in parallel with the request of changing the “bestemmingsplan”. For the environmental part of the permit of a biogas installation the extended procedure is followed which takes in total 32 weeks. For this procedure no additional costs are demanded by the local authorities. The building part of the permit is done via the regular procedure and takes 14 weeks. It can be started in parallel with the environmental part but is often done after the environmental permit is received. For the building part it is advised that the builder of the installation is know so it can have influence on the building permit. For the building permit the authorities request building fees which are a percentage of the total installation costs. Due to the every year changing SDE subsidy rules it is advised to include as many options for the energy delivery like a CHP installation and gas upgrading installation in the permit so the most profitable option can be choses when the SDE subsidy is requested.

**M.E.R.**

In the past it was necessary for large scale (category D) biogas installation to do an M.E.R. (Environment Effect Report). Due to a law change this MER is not requested automatically anymore for large scale installations. However in special cases it can still be requested by the province. If this will be done depends on the province. Provinces like Gelderland and Overijssel already decided not to request the M.E.R. for biogas installation.
Wood combustion (plants)
The permits needed for wood combustion depend on the type and size of the installation and the type of wood burned. In case the heat is directly transferred to the air and no waste wood is used no environmental permit (omgevingsvergunning) is needed. In case waste wood is used then the installation needs an environmental permit according “besluit omgevingsrecht”. In the Netherlands a lot of wood is treated as waste wood so in most cases a permit is needed.

In case the heat is transferred to water or steam the installation is named a “houtgestookte ketel”. In this case the permit required are based on the category 1.4a from appendix 1, part C of the BOR. For companies, the wood combustion installation needs to be added to the existing environmental permit. Wood burning boilers with a capacity lower than 20kW do not need permits. Boilers with a nominal capacity smaller than 1 MW are part of the “besluit typekeur verwarmingsinstallaties” and need a permit as well as larger boilers.

Future developments
The ministry of infrastructure and environment has plans to change the rules for smaller boilers. The BEMS (emission law) will only account for installations with a nominal thermal capacity of 400kW and larger. Smaller boilers will need to fulfill the ECO design guideline.

Please see the InfoMil website for further information.
8.2.3 Belgium

The proceedings of permit will be documented separately for wood combustion plants and biogas plants, but both have the same basis. In Belgium every project for building a business premise of noisy or noxious trade has to obtain two important permits: an environmental permit and a building permit. Since 1 January 2010 these two permits can be applied for at the same place.

Environmental permit

The VLAREM I legislation states the conditions for which type of business permits or notifications are required. An environmental permit integrates different kind of permits like an exploitation permit, license for maximum admissible discharges, license for the destruction of toxic waste, license to dispose waste ...

The full procedure is described in the VLAREM I legislation and divides businesses premise of noisy or noxious trade into three classes. Businesses with a large polluting potential are classified under class 1. Those in class 2 are less troublesome, and those in class 3 the least. Class 1 businesses have to file an application for a permit with the province, whereas class 2 businesses have to do so with the college of Aldermen. Class 3 businesses do not have to apply for a permit, only a notification is required. All the possible types of businesses of noisy or noxious state are described in different sections.

Wood combustion plants

Installations for processing of waste are categorized in section 2. Combustion engines are categorized in section 31 and burning installations are categorized in section 43.

For section 2

- \( \leq 5 \text{ MW}_{th} \): Class 2
- \( > 5 \text{ MW}_{th} \): Class 1

For section 43

- \(< 300 \text{ kW}_{th} \): free of licensing
- \( 0,3 \text{ MW}_{th} - 0,5 \text{ MW}_{th} \): Class 3
- \( 0,5 \text{ MW}_{th} - 5 \text{ MW}_{th} \): Class 2
- \( 5 \text{ MW}_{th} \): Class 1

(Sources: [http://www.enerpedia.be/nl/energieproduceren/houtverbranding](http://www.enerpedia.be/nl/energieproduceren/houtverbranding) and “Beste Beschikbare Technieken (BBT) voor verbranding van hernieuwbare brandstoffen”, L. Goovaerts, A. Van der Linden, I. Moorkens en K. Vrancken (2008))
Biogas plants

Because of the complex nature of digester plants many criteria of the VLAREM 1 legislation are in order. These headings of VLAREM 1 have to be taken into account: 2, 3, 9, 16, 28, 31 and 39. Practically every biogas installation will reside under class 1. The whole permit procedure takes about 339 days to be completed for a class 1 business and 280 days for a class 2.

Building permit

Larger project with significant impact who are obliged to make an environmental effect study or need two or more advices have to make a project study and apply for a project meeting. This meeting brings all involved parties together in order to harmonize the permit procedures. The members of such a meeting are the appropriate authorities, the advisory bodies and of course the project’s representatives. A project study composes of:

- administrative data of the initiative takers;
- the goals of the project;
- a description of the location and state of the involved landscape;
- a description of the financial implementation of the project;
- a description of the added value of the project socially, regionally and environmentally;
- a timeframe for the realisation of the project;
- an overview of the permits, licences and approvals needed.

(Sources: www.ruimtelijkeordening.be and http://www.agentschapondernemen.be)

Biogas plants

To establish a new biogas plant specific legislation has to be taken into account. One important document is the ministerial circular RO/2006/01. This circular is a guideline for the implanting of manure treatment plants and digesters in agricultural areas. The legal strength of this circular is rather limited because there has never been a conversion into a decree or law. According to the circular, installations which process more than 60,000 ton input cannot be build on land designated for agriculture. In some vulnerable area’s building is not permitted because of the fragile environment. Plants that process more than 60,000 tons have to be built on land designated for industrial purposes. Also the circular states that a 60/40 ratio of agricultural related and non-agricultural related input material is acceptable. Other preconditions like mobility and spatial planning are judged by commissions during the permit procedures.
Other licenses

The decree of 22 December 2006 (Mestdecreet) states that manure processing plants which handle more than 300 kg P₂O₅ /y must be registered at the Vlaamse Landmaatschappij (VLM) and receive an accreditation reference. Registration of incoming and outgoing nutrients is obliged. All processed processes materials from animal origin need to be registered at the Openbare Vlaamse afvalstoffenmaatschappij (OVAM). Traceability is an important issue in this matter. At end of construction the biogas exploitation has to pass the inspection of the Vlaamse compostorganisatie (VLACO)

(Sources: [www.vlm.be](http://www.vlm.be) and [www.ovam.be](http://www.ovam.be))
8.2.4 Italy

The authorisation procedure for the production of electricity from renewable energy sources currently in force was introduced by Legislative Decree No 387/2003, implementing Directive 2001/77/EC. Article 12 of this regulation provides that the construction and operation of electricity production plants powered by renewable sources, and modification, expansion, total or partial reconstruction, and reactivation operations and connected works, as well as those connected to infrastructure essential for the construction and operation of the same plants are subject to a single authorisation. This document concludes a procedure lasting a maximum of 180 days. This value was reduced to 90 day by Legislative Decree No 28/2011.

The main aim of introducing this procedure was the rationalisation and simplification of the authorisation procedure for production plants using renewable sources. In fact, the single authorisation is issued in accordance with the current regulations for the protection of the environment, landscape and historical / artistic heritage within a single procedure in which all the authorities concerned participate. Where necessary, the plant and connected infrastructure must comply with environmental impact assessment regulations.

The single authorisation grants the right to construct and operate the plant in accordance with the approved plans and, where necessary, with the declaration of public interest, necessity and urgency. The single authorisation is in itself a change to the urban planning instrument. The requirements of countryside protection plans remain mandatory.

The authorisation cites any conditions applicable to the construction and operation of the plant; it also defines the procedures to be followed for the rehabilitation of the site once the plant is decommissioned (or, for hydroelectric plants, procedures for fulfilling the obligation to take environmental recovery and reintegration measures).

The single authorisation sets deadlines for the start and end of works, and once these have passed the authorisation ceases to be effective, unless it is extended.

Article 12 of Legislative Decree No 387/2003 provides for a simplified procedure; this simplified procedure applies to plants with a generation capacity below the thresholds indicated in table A included in an annex to Legislative Decree No 387/2003 and reproduced below:

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>THRESHOLD (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>60</td>
</tr>
<tr>
<td>Solar photovoltaic</td>
<td>20</td>
</tr>
<tr>
<td>Hydraulic</td>
<td>100</td>
</tr>
<tr>
<td>Biomass</td>
<td>200</td>
</tr>
<tr>
<td>Landfill gas, residual gases from purification processes and biogas</td>
<td>250</td>
</tr>
</tbody>
</table>
For plants which do not exceed the thresholds indicated above, the enabler simplified procedure requirement applies in accordance with Legislative Decree No 28/2011. A decree from the Ministry for Economic Development, in consultation with the Ministry for the Environment, Land and Sea and in agreement with the Unified Conference, could define higher generation capacity thresholds and additional installation site characteristics to which the same commencement notice requirement would apply. The Community Law of 2009 made the Italian Government responsible for extending the use of commencement notices to renewable energy plants with a capacity below 1 MW.

According to the specific type of works to be carried out, some of the authorization procedures indicated in the table above and described in more detail below could also foresee the completion of the environmental impact assessment procedure. More specifically, these are the types of operation covered by Legislative Decree No 152/2006:

Projects subject to environmental impact assessment for which the State is responsible:

- power plants and other combustion plants with a heating capacity of at least 300 MW;
- off-shore wind power installations;
- hydroelectric power plants with installed capacity greater than 30 MW;
- installations to be used to hold back, regulate and accumulate water in a sustainable way for energy purposes, of a height greater than 10 m or which have a storage volume greater than 100,000 m³;
- overhead electric power lines with nominal operational voltage above 150 kV and longer than 15 km;
- electric power lines in buried AC cables, and longer than 40 km.

Projects subject to environmental impact assessment for which the region is responsible:

- power plants for the production of electricity, steam and hot water with total heat capacity greater than 150 MW;
- on-shore wind power installations. A representative of the Italian Ministry for Cultural Heritage and Activities must be involved in the procedure for such projects;
- incineration plants for non-hazardous waste, with capacity greater than 100 t/day.
- overhead electric power lines with nominal voltage above 100 kV and longer than 10 km;
Projects subject to applicability screening for which the region is responsible:

- power plants for the production of electricity, steam and hot water with total heat capacity greater than 50 MW;
- non-thermal industrial installations for the production of electricity, steam and hot water with total capacity greater than 1 MW;
- industrial installations for the transportation of gas, steam and hot water which supply pipes with a total length greater than 20 km;
- wind power installations with total capacity greater than 1 MW;
- hydroelectric power plants with installed capacity greater than 100 kW;
- incineration plants for non-hazardous waste, with total capacity greater than 10 t/day.
- overhead electric power lines with nominal voltage above 100 kV and longer than 3 km.

For the implementation of plans and schemes which may have a significant environmental impact (including, for example, the Electricity Network Development Plan), Legislative Decree No 152/2006 also provides for screening for the applicability of the Strategic Environmental Assessment (SEA) defined under Directive 2001/42/EC.

Connection to the electricity network

Legislative Decree No 79/1999, transposing European Directive 96/92/EC, establishes the obligation for distribution companies to connect all parties which request it to their own networks, without compromising the continuity of service.

For renewable energy plants, Legislative Decree No 387/2003, transposing European Directive 2001/77/EC, deals with issues relating to the connection of plants to the electricity network.

For high-efficiency cogeneration plants, the legislative reference for the connection service is Legislative Decree No 20/2007.

The regulation in force (AEEG Decision No ARG/elt 99/08 - Compendium of Rules for Active Connections (TICA)) defines the procedural methods and technical / financial conditions for connection to the electricity networks, with the obligation to connect third-party production plants.

With regard to low and medium voltage networks, the TICA specifies connection charges based on the distance from the connection point to the network, the capacity of the connection and the type of connection. These charges only apply to plants using renewable energy sources (RES) and high-efficiency cogeneration (HEC). Conventional plants refer to the conditions published by each operator and must pay the TICA charges or the operator’s charges, whichever is higher.

For connections to high and very high voltage networks, the TICA does not set specific charges but requires the application of a reduction in the payments due for RES and HEC plants.

The contractual terms and conditions (CTCs) for the provision of this service are defined and published by each individual network operator. The CTCs define the conventional technical solutions adopted by the network operator to create the connection, the arrangements and response times,
payments terms for the connection charges, and criteria for establishing the charges in order to cover the costs incurred by the network operator in managing the authorisation procedure. The regulation also covers the resolution of disputes between producers and network operators, specifically relating to the connection of RES plants. Technical rules for the connection service The reference technical rules for connection differ according to whether the connection is to a low voltage network (up to 1 kV) or to a higher voltage network. For network voltages above 1 kV, AEEG Decision No ARG/elt 33/08 “Technical conditions for connection to electricity distribution networks with a nominal voltage above 1 kV: Single technical rule for medium / high / very high voltage connections” recognises standard CEI 0-16 as the standard to which all network operators must refer when defining the connection project. The anticipated maximum values for connection capacity, depending on the network voltage, are the following:

<table>
<thead>
<tr>
<th>Network voltage</th>
<th>Plant capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (&lt; 1 kV)</td>
<td>&lt; 100 kVA</td>
</tr>
<tr>
<td>Medium (&lt; 35 kV)</td>
<td>&lt;6000 kVA</td>
</tr>
</tbody>
</table>

The local network operator will manage the connection procedure for the producer up to a connection capacity of 10 MVA. New energy producers intending to be connected to the electricity network can refer to the TICA. For low and medium voltage connections, the deadlines for preparing the connection estimate, starting from the date on which the connection request is received, are the following:

- 20 working days for feed-in capacities up to 100 kW;
- 45 working days for feed-in capacities between 100 kW and 1,000 kW;
- 60 working days for feed-in capacities higher than 1,000 kW.

The estimate is valid for 45 working days and gives a list of the works which are strictly necessary in order to physically create the connection, which the applicant must make available at the connection point. The estimate must indicate the payment due for the connection, highlighting the portion, equal to 30% of the total, which the applicant must pay when it accepts the estimate, and the remaining portion which the applicant must pay after the completion of the necessary works to prepare the network installation infrastructure for the connection at the connection point. The timeframe for completing the connection is 30 working days for simple works and 90 working days for complex works, increased by 15 working days for each kilometre of power line to be constructed at medium voltage, after the first kilometre.
When the connection installation has been completed, the distributor company announces this and declares that the connection can be brought into operation. If, in order to create the connection, it proves necessary to carry out operations on the high voltage network, the timeframe for completing the connection is indicated by the distributor company in the connection estimate.

**RES-E (“IAFR”) qualification of plants**

**About**

The qualification of plants as plants using renewable energy sources (“IAFR” – RES-E) is a pre-requisite to obtain green certificates or the all-inclusive feed-in tariff.

**Eligible plants**

Eligible plants include:

- new, upgraded/repowered, totally/partially renovated and reactivated plants that have been commissioned after 1 April 1999;
- co-firing plants that have been commissioned before 1 April 1999 and have operated as hybrid plants after such date.

Apart from for a few exceptions specified in the Ministerial Decree of 18 Dec. 2008, photovoltaic plants are not eligible for these forms of support, as they only benefit from the support referred to in the Ministerial Decree of 19 Dec. 2007 (PV feed-in scheme).

Starting in 2009, under the Ministerial Decree of 18 December 2008, plant owners are required to pay a contribution (based on the average yearly capacity of their plant) to the costs incurred by GSE for the qualification procedure.

**How to apply for the RES-E qualification**

The producer must submit an appropriate application, accompanied by the required technical documents, to GSE.
8.2.5 Poland

The construction and operation of bioenergy plants require obtaining a number of decisions. Some of them are common for biogas and wood combustion plants, some refer to a specific type of plant. Therefore below permits are included in one table with the determination of plant’s type. In the table also is posted which law is regulated the permit.

**Table 8-2: Overview on permits for construction and operation wood combustion and biogas plants.**

<table>
<thead>
<tr>
<th>Permits</th>
<th>Plant’s type description</th>
<th>Law</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permits connected with environmental protection</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| decision on the environmental conditions | • for wood combustion plants where amount of energy introduced to the system fuel is at least 10 MW  
• for biogas plants where amount of energy introduced to the system fuel is at least 25 MW | • Act of Parliament of the 27th April, 2001 Environmental Law (OJ No 62, item 627 as amended)  
• Regulation of the Council of Ministers of November 11, 2010 on projects which are likely to have a significant effect on the environment (OJ No 213, item 1397) |
| decision to permit release of gases or dust into the air | • for wood combustion plants where amount of energy introduced to the system fuel is greater than 10 MW  
• for biogas plants where amount of energy introduced to the system fuel is greater than 15 MW | • Act on Waste of the 27th April, 2001 (OJ No 62, item 628 as amended)  
• Regulation of the Minister for the Environment of the 2nd July, 2010 on cases when release of gases or dust into the air from installation does not require permit (OJ No 130, item 881) |
| application due to the release of gases or dust into the air | • for wood combustion plants where amount of energy introduced to the system fuel is greater than 1 MW and lower or equal to 10 MW  
• for biogas plants where amount of energy introduced to the system fuel is greater than 1 MW and lower or equal to 15 MW | • Act on Waste of the 27th April, 2001 (OJ No 62, item 628 as amended)  
• Regulation of the Minister for the Environment of 2nd July, 2010 on installation types which requires application for operation (ON No 130, item 880) |
| decision to permit the waste recovery by R10 | • for biogas plants where waste are spreading on the ground for fertilization or soil improvers | • Act on Waste of the 27th April, 2001 (OJ No 62, item 628 as amended) |
| decision to permit the waste recovery by R3 | • for biogas plants | • Act on Waste of the 27th April, 2001 (OJ No 62, item 628 as amended) |
### Permits connected with construction

<table>
<thead>
<tr>
<th>Building permit decision</th>
<th>For wood combustion plants</th>
<th>Act of Parliament of the 7th July, 1994 Construction Law (OJ No 89, item 414 as amended)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For biogas plants</td>
<td>Act of Parliament of the 27th April, 2001 Environmental Law (OJ No 62, item 627 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 21st December, 2000 on the Technical Inspection (OJ No 122, item 1321 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulation of the Council of Ministers of 16th July, 2002 on the kinds of devices subjected to the technical inspection (OJ No 120, item 1021 as amended)</td>
</tr>
<tr>
<td>Decision of the Technical Inspection on operation of pressure (closed) boilers and tanks</td>
<td>For pressure boilers in wood combustion plants</td>
<td>For pressure boilers and tanks in biogas plants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 7th July, 1994 Construction Law (OJ No 89, item 414 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td>Entry in the register of energy companies involved in the production of agricultural biogas</td>
<td>For agricultural biogas plants</td>
</tr>
<tr>
<td></td>
<td>For wood combustion plants</td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td>For biogas plants</td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td>Concession for electricity production</td>
<td>For wood combustion plants</td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td></td>
<td>For not agricultural biogas plants</td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
<tr>
<td>Concession for heat production</td>
<td>For wood combustion and biogas plants of installed thermal power greater than 5 MW</td>
<td>Act of Parliament of the 10th April, 1997 Energy Law (OJ No 54, item 348 as amended)</td>
</tr>
</tbody>
</table>
8.2.6 Estonia

As the regulations and requirements can change in the period of time only the links to the regulations of proceeding of permits are presented:

For development of renewable energy it is important to know, that in Estonia the electricity market is regulated by Electricity Market Act (in Estonian available in [https://www.riigiteataja.ee/akt/112122011009](https://www.riigiteataja.ee/akt/112122011009)) and the district heating market is regulated by District Heating Act (in Estonian is available in [https://www.riigiteataja.ee/akt/13349182](https://www.riigiteataja.ee/akt/13349182)). Energy or fuel production and sales might be subject to either taxation or excise duties. General principles of the taxation are defined in the Taxation Act (in Estonian is available in [https://www.riigiteataja.ee/akt/122122011038](https://www.riigiteataja.ee/akt/122122011038)), excise duties on fuel or electricity are set out in the Alcohol, Tobacco, Fuel and Electricity Excise Duty Act (in Estonian is available in [https://www.riigiteataja.ee/akt/123122011005](https://www.riigiteataja.ee/akt/123122011005)), pollution charges are applied according to the Environmental Charges Act (in Estonian is available in [https://www.riigiteataja.ee/akt/114032011040](https://www.riigiteataja.ee/akt/114032011040)) and Liquid Fuel Act (in Estonian is available in [https://www.riigiteataja.ee/akt/115032011019](https://www.riigiteataja.ee/akt/115032011019)) ensure the quality of widely used motor fuels and to ensure that the fuel excise duty can be collected.

The purpose of the **Electricity Market Act** is to regulate the generation, transmission, sale, export, import and transit of electricity as well as the economic and technical management of the power system. The act prescribes the principles for the operation of the electricity market based on a) the need to ensure an effective supply of electricity at reasonable prices; b) meeting environmental requirements and the needs of customers; and c) on the balanced, environmentally clean and long-term use of energy sources. For the producers of renewable energy it is important to know the provisions regarding production. Sellers of renewable energy must follow the requirements for the sellers of the electricity. There are no special requirements for the sellers of electricity from renewable energy sources. Producers are engaged in the generation of electricity using one or more than one generating facilities. Sellers are engaged in the sale of electricity.

The **District Heating Act** regulates activities related to the connection, production, distribution and sale of heat in district heating networks. Any operation that produces, distributes or sells heat must follow the requirements of the act. The act prescribes the methodology for heat pricing. A detailed methodology for the determination of the maximum heat price is published on the web-page of the Competition Authority ([http://www.konkurentsiamet.ee](http://www.konkurentsiamet.ee)). If the annual sales volume of the operation is higher than 50 GWh, the maximum heat price within each network area is determined by the Competition Authority. For smaller operations, the maximum heat price may be determined by the local municipality.

Fuel producers must follow the requirements of the **Alcohol, Tobacco, Fuel and Electricity Excise Duty Act**. The Act establishes simplified requirements for biofuel producers. The main purpose of the Liquid Fuel Act is to establish handling procedures for the liquid fuel. Handling of the liquid fuel does not include production of the fuel. The requirements of the act must be considered when the fuel is sold, transported or stored.
Legal basis and specific rules on planning, construction and operation of renewable installations

Administration of planning activities within the territory of a rural municipality or city is the responsibility of the local government. The local government establishes the building regulations for the municipality, establishing the general principles and rules for land use planning and building in the municipality. A local government makes decisions on acceptance of a plan.

Upon preparation of a detailed plan, a strategic environmental assessment must be organised in cases provided for in the Environmental Impact Assessment and Environmental Management System Act (in Estonian available in [https://www.riigiteataja.ee/akt/121122011015](https://www.riigiteataja.ee/akt/121122011015)). In such cases, the results of the strategic environmental assessment must be taken into account in the preparation of the detailed plan. This Environmental Impact Assessment and Environmental Management System Act provides the legal basis and procedures for the assessment of the likely environmental impact, organisation of eco-management and audit scheme, and legal basis for awarding an eco-label in order to prevent environmental damage. It also establishes criteria for assessing liability upon violation of the requirements of the act. The act specifies activities with significant potential environmental impact, including construction of a thermal power station or other combustion plant with a nominal thermal input equal to or greater than 300 Mwth, installation of wind farms in bodies of water, installation or reconstruction of hydro-electric stations, dams or other types of artificial barriers in rivers, or reservoirs in a sensitive receiving body of water.

For development a project of renewable energy, the developer must get permit from the local municipality. A development approval is:

- a building permit or a permit for the use of the building;
- an integrated environmental permit, a permit for special use of water, an ambient air pollution permit;
- an extraction permit for mineral resources, a geological exploration permit or a permit for general geological survey;
- any other document permitting activities with potentially significant environmental impact.

The Building Act provides the requirements for construction works, building materials, construction products, building design documentation and as-built drawings of construction works. It also provides the basis and procedure for the design, building and use of construction works, and for the registration of construction works, liability for violations of this act, and the organisation of state supervision and construction supervision. The Building Act also outlines the requirements for structures of different types, for the building and use thereof and for the persons building them. A building permit is an approval granted by a local government.
### 8.3 Emission regulations

#### 8.3.1 Germany

To protect the environment and the human beings health, various emissions have to be limited and controlled. Those limitations are defined by the national law and are part of the required conditions to get construction permits. The following table gives an overview on the approval regulations according to the Bundesimmissionsschutzgesetz (BImSchG) and on the corresponding emission threshold values relevant for natural wood and straw firing plants.

**Table 8-3:** Overview on regulations for approval (BImSchG) and on emission threshold values for firing natural wood and straw and for different plant sizes (source: FNR 2007, Leitfaden Bioenergie; FNR 2012, Feste Biobrennstoffe, updated).

<table>
<thead>
<tr>
<th>fuel</th>
<th>Plant efficiency</th>
<th>Approval process</th>
<th>Relevant regulation</th>
<th>(O_2)-relative value Vol.-%</th>
<th>emission threshold values</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>dust</td>
<td>CO</td>
</tr>
<tr>
<td>Natural wood</td>
<td>FTC &lt; 1 MW</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>NTC 4 - ≤ 500 kW</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>NTC 4 - ≤ 500 kW</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>FTC 1 - 50 MW</td>
<td></td>
<td>There is no need for approval</td>
<td>1. BImSchV</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>FTC &lt; 2.5 MW</td>
<td></td>
<td>Simplified procedure</td>
<td>(§ 19 BImSchG)</td>
<td>TA air</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>FTC 2.5 - &lt; 5 MW</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>FTC ≤ 5 MW</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>FTC ≥ 50 MW</td>
<td>Official procedure</td>
<td>(§ 10 BImSchG)</td>
<td>13. BImSchV</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>FTC ≤ 100 MW</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>1000</td>
</tr>
<tr>
<td>Straw</td>
<td>FTC 4 - &lt; 100 kW</td>
<td></td>
<td>There is no need for approval</td>
<td>1. BImSchV</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>FTC 0.1 - 50 MW</td>
<td></td>
<td>Simplified procedure</td>
<td>(§ 19 BImSchG)</td>
<td>TA air</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>FTC 0.1 - &lt; 1 MW</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>FTC L 1 - &lt; 50 MW</td>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>FWL ≥ 50 MW</td>
<td>Official procedure</td>
<td>(§ 10 BImSchG)</td>
<td>13. BImSchV</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

FTC: Firing thermal capacity  
NTC: nominal thermal capacity
### 8.3.2 The Netherlands

**Wood combustion**

New wood fired boiler have to fulfill the BEMS requirements. In case the installation is smaller than 1MW the BEMS does not demands requirements to the emissions. In this case the boiler needs to fulfill type requirements. Boilers > 1MW need to fulfill the BEMS requirements. The BEMS gives emission limits to NOx, SO2 and small particles.

Note: in determining the power of the installation the sum of the power of all “boilers” present at the location is used.

The allowed emission are presented in the table below:

<table>
<thead>
<tr>
<th>Boilers with a nominal power &gt; 1MWth</th>
<th>NOx</th>
<th>SO2</th>
<th>Total particulate matter</th>
<th>CxHy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
</tr>
<tr>
<td>Biomass &lt; 5MWth</td>
<td>200</td>
<td>200</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>Biomass &gt; 5 MWth</td>
<td>145</td>
<td>200</td>
<td>5</td>
<td>-</td>
</tr>
</tbody>
</table>

**Biogas installations**

CHP engines used in biogas installations also have to fulfill the BEMS according the numbers below:

<table>
<thead>
<tr>
<th>Boilers with a nominal power &gt; 1MWth</th>
<th>NOx</th>
<th>SO2</th>
<th>Total particulate matter</th>
<th>CxHy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
<td>(mg/Nm3)</td>
</tr>
<tr>
<td>Biogas</td>
<td>340</td>
<td>200</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

An important issue in the Netherlands is the NBW/Natura 2000. In case the wood boiler or biogas installation is close to a Natura 2000 area it may not be allowed to start a biogas installation due to emissions. This issue will show up in an early stage when the “bestemmingsplan” needs to be arranged.
8.3.3 Belgium

Flemish emission laws are stated in the VLAREM legislation and can be found on following website: http://navigator.emis.vito.be.

Wood combustion

VLAREM II article 4.2.2 §2 and addendum 4.2.2 for more detailed information. Waste gasses need to be emitted by appropriate chimneys or other guiding channels if the total emission of one or more from the next polluting agents exceeds the norm.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Emission norm (kg/u)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrous oxides (expressed in NO)</td>
<td>40</td>
</tr>
<tr>
<td>Sulfurdioxide</td>
<td>60</td>
</tr>
<tr>
<td>Total dust</td>
<td>15</td>
</tr>
<tr>
<td>Lead</td>
<td>0,5</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0,01</td>
</tr>
<tr>
<td>Thallium</td>
<td>0,01</td>
</tr>
<tr>
<td>Chlorine</td>
<td>20</td>
</tr>
<tr>
<td>Hydrogen chloride and inorganic chlorine compounds</td>
<td>20</td>
</tr>
<tr>
<td>Hydrogen fluoride an inorganic fluorine compounds</td>
<td>1</td>
</tr>
<tr>
<td>Carbonmonoxide</td>
<td>1.000</td>
</tr>
</tbody>
</table>
Emission values for large combustion plants who run on biomass are regulated by VLAREM II article 5.32.2.1 §1. New installations where the permit is issued after the 1 January 2010 need to comply with next values (NO\(_x\) is calculated as NO\(_2\)):

<table>
<thead>
<tr>
<th>Nominal thermal power (MW)</th>
<th>Emission limits in mg/Nm(^3) for annual mean values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dust</td>
</tr>
<tr>
<td>50 to 100</td>
<td>20</td>
</tr>
<tr>
<td>100 to 300</td>
<td>15</td>
</tr>
<tr>
<td>300 or more</td>
<td>6</td>
</tr>
</tbody>
</table>

Biogas plants

VLAREM II article 5.31.1.2 regulates the emission values of gas engines either with or without cogeneration. The values are expressed for dry exhaust gasses in mg/Nm\(^3\) and presume an oxygen level of 5% (volume) in the exhaust gasses. (NO\(_x\) is calculated as NO\(_2\))

<table>
<thead>
<tr>
<th>Type gasmotor</th>
<th>Nominal thermal power (MW)</th>
<th>Emissionvalues in mg/Nm(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO(_x)</td>
</tr>
<tr>
<td>First permit before 1 January 2000</td>
<td>1300 x (\eta/30)^*</td>
<td>1300</td>
</tr>
<tr>
<td>First permit on or after 1 January 2000 and before 1 January 2005</td>
<td>500 x (\eta/30)</td>
<td>1300</td>
</tr>
</tbody>
</table>
Water emission norms are also regulated by VLAREM legislation. Specific values (see below) for manure processing facilities, which include biogas plants, are given by addendum 5.3.2 24bis of VLAREM II.

<table>
<thead>
<tr>
<th>Parameter in mg/l</th>
<th>Chemical oxygen demand (COD)</th>
<th>Biochemical oxygen demand (BOD)</th>
<th>Total nitrogen</th>
<th>Total phosphorus</th>
<th>Chlorides</th>
<th>Total suspended matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large businesses (≥ 60.000 ton/year)</td>
<td>125</td>
<td>25</td>
<td>15</td>
<td>2</td>
<td>1800</td>
<td>35</td>
</tr>
<tr>
<td>Businesses who use calf manure (every size)</td>
<td>125</td>
<td>25</td>
<td>15</td>
<td>2</td>
<td>2800</td>
<td>35</td>
</tr>
<tr>
<td>Other installations</td>
<td>125</td>
<td>25</td>
<td>15</td>
<td>2</td>
<td>-</td>
<td>35</td>
</tr>
</tbody>
</table>
8.3.4 Italy

In Italy a number of regulations exist regarding anaerobic digestion systems and biogas utilization.

- Air emissions

Engine Emissions

The emissions of the cogenerator of a biogas plant are the most critical environmental aspect of these systems. The people who want produce renewable energy with biogas should therefore be familiar with the rules and carefully monitor compliance of the plant with all emission parameters. These limits are set-up in the annex – part V of D.Lgs. 152/2006.

Pollution threshold level for engine that use biogas

The levels are set in mg/Nm3 and referring to one hour of operation in the harshest conditions, excluding periods of startup, shutdown, and malfunction. The limits refer to the volume of dry gaseous effluent compared to normal conditions. For internal combustion engines, the emission limit values, referring to a standard volume of oxygen of 5% in the dry flume are the following:

<table>
<thead>
<tr>
<th>Plant thermal power</th>
<th>≤ 3MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total organic carbon (COT)</td>
<td>150 mg/Nm³</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td>800 mg/t Nm³</td>
</tr>
<tr>
<td>Nitrogen oxides (NO₂)</td>
<td>500 mg/Nm³</td>
</tr>
<tr>
<td>Inorganic compounds of Cl (come HCl)</td>
<td>10 mg/Nm³</td>
</tr>
</tbody>
</table>
8.3.5 Poland

In Poland limitations for emissions from energy plants are contained in Regulation of the Minister for the Environment of the 22nd April, 2011 on emission standards of installation (OJ No 95, item 558). This document concerns plants where amount of energy introduced to the system fuel is at least 1 MW. Emissions from smaller plants are not regulated. Additional, in case of need to obtain at least one from the following permits:

- the decision on the environmental conditions on the basis of assessment of environmental impact,
- the decision to permit release of gases or dust into the air,
- application due to the release of gases or dust into the air,

it has to be checked if level of some emissions in the air do not exceed threshold values presented in Regulation of the Minister for the Environment of the 3rd March, 2008 on the levels of certain substances in the air (OJ No 47, item 281). Levels of emission has to be calculated for area of a specified size around the energy plant, defined in Regulation of the Minister for the Environment of the 26th January, 2010 on reference values for some substances in the air (OJ No 16, item 87).

Table 8-4: Overview on emission threshold values for wood combustion and biogas plants (OJ No 95, item 558).

<table>
<thead>
<tr>
<th>fuel</th>
<th>installed power (as amount of energy introduced to the system fuel)</th>
<th>O₂-relative value (Vol.-%)</th>
<th>emission threshold values (mg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>≥ 1 MW and &lt; 50 MW</td>
<td>6</td>
<td>100 400 400</td>
</tr>
<tr>
<td></td>
<td>≥ 50 MW and ≤ 100 MW</td>
<td></td>
<td>50  - 400 200</td>
</tr>
<tr>
<td></td>
<td>&gt; 100 MW and ≤ 300 MW</td>
<td></td>
<td>30  - 300 200</td>
</tr>
<tr>
<td></td>
<td>&gt; 300 MW</td>
<td></td>
<td>30  - 200 200</td>
</tr>
<tr>
<td>Biogas</td>
<td>≥ 1 MW</td>
<td>3</td>
<td>5  - 200 35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.3.6 Estonia

To protect the environment and the human beings health, various emissions are limited and controlled. Those limitations are defined by the national law and are part of the required conditions to get construction permits. In Estonia mostly the Ministry of Environment and the Ministry of Economic Affairs and Communication are engage with the emission regulations.

As the regulations and requirements can change in the period of time only the links to the emission regulations are presented:

a) regulations prepared by Ministry of Environment:

   Ambient air:
   A short summary in English is available in
   http://www.envir.ee/1104350

   Legislation of protection of ambient air in Estonian is available in
   http://www.envir.ee/1035

   Environmental Management:
   A short summary in English is available in
   http://www.envir.ee/67253

   Legislation of environmental management in Estonian is available in
   http://www.envir.ee/2660

Combustion processes are linked with emissions to air, water usage or waste disposal. Producers of energy must pay pollution charges for emissions into the ambient air. According to the regulations, CO₂ emissions from biofuels are not counted. In other words, biofuels are exempted from CO₂ pollution charges.
b) regulations prepared by Ministry of Economic Affairs and Communication:

Electricity Market Act in Estonian is available in
https://www.riigiteataja.ee/akt/112122011009

District Heating Act in Estonian is available in
https://www.riigiteataja.ee/akt/13349182

Liquid Fuel Act in Estonian is available in
https://www.riigiteataja.ee/akt/115032011019

Requirements for liquid fuel in Estonian are available in
https://www.riigiteataja.ee/akt/119012011024

c) Other:

Sustainable Development Act in Estonian is available in
https://www.riigiteataja.ee/akt/13148461
8.4 Subsidy regulations

8.4.1 Germany

For Germany, various subsidy regulations with respect to bioenergy are available on different administrative levels (e.g., national level, federal state level, etc.), for specific kinds of biomass and/or bioenergy (heat, electricity) and for different target groups (e.g., private persons, business companies, etc.). Moreover, subsidies may contain non-repayable investment grants, low-interest loans or fixed tariffs for electricity provision.

The following links give an overview on the huge variety of subsidy options for Germany:

✓ http://www.foerderdatenbank.de/

✓ http://www.carmen-ev.de/dt/energie/foerderungcontent.html

Following a short description of main subsidy regulations and the relevant links for amount of subsidy will be given. Please note that the Renewable Energy Sources Act has changed in 2012 and generally amounts and frame conditions of subsidies can change within short time periods.
# Renewable Energy Sources Act

**(Erneuerbare-Energien-Gesetz > EEG)**

### Focus

The Renewable Energy Sources Act came into force in 2000 and was modified 2004 and 2009. It was last modified and updated again in 2012. It rules:

- Priority connection to the grid systems for general electricity supply of installations generating electricity from renewable energy sources and from mine gas within the territory of the Federal Republic of Germany, including its exclusive economic zone,
- The priority purchase, transmission, distribution of and payment for such electricity by the grid system operators, and
- The nationwide equalisation scheme for the quantity of electricity purchased and paid for.

With regard to biomass the Renewable Energy Sources Act refers to **electricity provision from biogas, wood and other biomass substrates** (for specification of biomass substrates which are applicable within EEG: see “Biomasseverordnung” at [www.erneuerbare-energien.de](http://www.erneuerbare-energien.de)).

### Target groups

Operators of plants which provide electricity from renewables (e.g. from biomass) to the electricity grid.

### Content/ How regulation works

The subsidies, i.e. feed-in tariffs, for biomass plants which provide electricity to the grid (e.g. biogas plants or CHP wood plants) comprise Basic fees as well as Bonuses (each given in Ct./kWh).

#### Basic fees:

Depending on capacity of biomass plant

- Four groups of biomass plant capacity have been defined: $< 150 \text{ kW}_{el}$, $151-500 \text{ kW}_{el}$, $501-5.000 \text{ kW}_{el}$, $> 5.000 \text{ kW}_{el}$ (reference: yearly full load)
- Each capacity group is characterised by a typical basic fee including the KWK-bonus; the larger the biomass plant capacity the lower is the basic fee

#### Bonuses:

Depending on characteristics and operation of plant:

- Substrate type Bonus: Bonus for the use of certain substrates. They are divided into two categories and depending on the electric output the bonus is given. ([http://www.erneuerbare-energien.de](http://www.erneuerbare-energien.de))
- Bonus for small plants: Bonus for plants with an electric power capacity up to 75 kW and a manure usage of 80 %.
- Market Bonus: The basis is the amount of achieved refunding of the operator.

The feed-in tariffs for a biomass plant are generally fixed for 20 years.

#### Degression

For Biomass Basic fees and Bonuses is set to 1% (tariffs for installations commissioned after 2012 are lowered on 1 January of each following year by the fixed percentage of 1%)

### Detailed Amount of subsidy / Links

2012 EEG feed-in tariffs and degression rates as well as examples for calculation are listed under:


For **General information** on Renewable Resources Sources Act see: [http://www.erneuerbare-energien.de/inhalt/47883/](http://www.erneuerbare-energien.de/inhalt/47883/)

Exemplary calculators for amount of feed-in tariffs are available in the internet.

### Comments

Please note: Subsidies for new biogas plants (operation start from 01.01.2012,) are reduced in EEG 2012.
### Act on Combined Heat and Power Generation

(Kraft-Wärme-Kopplungsgesetz > KWK-Gesetz)

<table>
<thead>
<tr>
<th>Focus</th>
<th>The Act on Combined Heat and Power Generation rules the payment for electricity from highly efficient CHP plant and the subsidies for upgrading and new construction of heat grids (the latter will be described in detail below).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target groups</td>
<td>„Operator/carrier“ of the heat grid</td>
</tr>
<tr>
<td>Content/ How regulation works</td>
<td>Upgrading and new construction of heat grids will be sponsored provided that several frame conditions are fulfilled, e.g.</td>
</tr>
<tr>
<td></td>
<td>• starting-up of the heat grid: Above 50% of the heat must be provided by CHP plants (e.g. fired by biomass)</td>
</tr>
<tr>
<td></td>
<td>• finishing construction: At least 60% of the heat must be provided by CHP plants (e.g. fired by biomass)</td>
</tr>
<tr>
<td></td>
<td>• …</td>
</tr>
<tr>
<td>Amount of subsidy / links</td>
<td>Subsidies for upgrading and new construction of heat grids: per millimetre nominal diameter of newly laid heat conduction: 1 Euro per meter length of section. For details see:</td>
</tr>
<tr>
<td></td>
<td>• <a href="http://www.bafa.de/bafa/de/energie/kraft_waerme_kopplung/stromverguetung/index.html">http://www.bafa.de/bafa/de/energie/kraft_waerme_kopplung/stromverguetung/index.html</a></td>
</tr>
<tr>
<td>Comments</td>
<td>Please note: the explanations above focus on the upgrading and new construction of heat grids which principally is applicable to CHP-plants fired by fossil fuels or biomass. The Act on Combined Heat and Power Generation also rules the payment for electricity from highly efficient CHP plants. However, biomass CHP plants which receive feed-in tariffs based on EEG cannot claim for these payments (no double sponsorship for electricity feed-in)!</td>
</tr>
</tbody>
</table>

### Market Incentive Programme for funding of measures for the use of renewable energies („Marktanreizprogramm zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien“ > MAP)

<table>
<thead>
<tr>
<th>Focus</th>
<th>The market incentive programme offers investment grants for funding of measures for the use of renewable energies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target groups</td>
<td>e.g. private persons, self-employed persons, municipalities, non-profit organisations…</td>
</tr>
<tr>
<td>Content/ How regulation works</td>
<td>With regard to bioenergy investment grants currently are offered for pellet-burning stoves, pellet boilers and wood chip boilers which are installed in existing buildings. Exception: biomass plants for provision of process heat.</td>
</tr>
<tr>
<td>Amount of subsidy/links</td>
<td>Currently (march 2012), a basic investment grant is offered for the following types of biomass plants:</td>
</tr>
<tr>
<td></td>
<td>• Pellet-burning stoves with water pocket (5 kW up to max. 100 kW): 36 €/kW, at least 1.000 €</td>
</tr>
<tr>
<td></td>
<td>• Pellet boilers (5 kW up to max. 100 kW): 36 €/kW, at least 2.000 €</td>
</tr>
<tr>
<td></td>
<td>• Pellet boilers (5 kW up to max. 100 kW) with newly installed buffer (at least 30 l/lW): 36 €/kW, at least 2.500 €</td>
</tr>
<tr>
<td></td>
<td>• Wood chip plants (5 kW up to max. 100 kW) with newly installed buffer (at least 30 l/lW): overall 1.000 € per plant. Additionally, boni are granted: e.g. combination bonus (if at the same time a eligible solar thermal plant is installed)</td>
</tr>
<tr>
<td></td>
<td>Actual data and information on basic investment grant, boni and preconditions are available under:</td>
</tr>
<tr>
<td></td>
<td>• <a href="http://www.bafa.de/bafa/de/energie/erneuerbare_energien/index.html">http://www.bafa.de/bafa/de/energie/erneuerbare_energien/index.html</a></td>
</tr>
</tbody>
</table>
Please note: Frame conditions and investment grants have to be checked regularly. During the last years there have been a lot of drastic changes!

<table>
<thead>
<tr>
<th>Promotional Programmes by the Kreditanstalt für Wiederaufbau (kfW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
</tr>
<tr>
<td>• kfW offers long-term low-interest loans and to some extent redemption grants. Two Promotional Programmes are of major interest with regard to biomass plants;</td>
</tr>
<tr>
<td>• Promotional programme for housing, home modernisation and energy conservation</td>
</tr>
<tr>
<td>• Promotional Programme for Renewable Energies</td>
</tr>
<tr>
<td><strong>Target groups</strong></td>
</tr>
<tr>
<td>• Promotional programme for Housing, home modernisation and energy conservation: homeowners, private builders, landlords and housing companies.</td>
</tr>
<tr>
<td>• Programme for Renewable Energies: e.g. private individuals, not-for-profit organisations which feed the generated electricity/heat into the network; Self-employed professionals; Domestic and foreign enterprises majority-owned by private individuals</td>
</tr>
<tr>
<td><strong>Content/ How regulation works</strong></td>
</tr>
<tr>
<td>Several sub-programmes exist which offer different long-term low-interest loans and to some extent redemption grants. Depending in the planned biomass project the different programmes have to be checked for their applicability.</td>
</tr>
<tr>
<td>Programme for Housing, home modernisation and energy conservation, e.g.:</td>
</tr>
<tr>
<td>• kfW programme for energy-efficient construction</td>
</tr>
<tr>
<td>• kfW programme for energy-efficient refurbishment</td>
</tr>
<tr>
<td>• kfW programme for home ownership</td>
</tr>
<tr>
<td>Programme for Renewable Energies:</td>
</tr>
<tr>
<td>• kfW Renewable Energies Programme – Standard (Electricity and heat from renewable energies, generated in combined heat and power stations)</td>
</tr>
<tr>
<td>• kfW Renewable Energies Programme – Premium (for large plants in which heat is generated from renewable energies)</td>
</tr>
<tr>
<td><strong>Amount of subsidy / links</strong></td>
</tr>
<tr>
<td>Low-interest loans and redemption grants for the different programmes including the relevant frame conditions are listed under:</td>
</tr>
<tr>
<td>Overview and loans:</td>
</tr>
<tr>
<td>• <a href="http://www.kfw.de/kfw/de/Inlandsfoerderung/Programmuebersicht/index.jsp">http://www.kfw.de/kfw/de/Inlandsfoerderung/Programmuebersicht/index.jsp</a></td>
</tr>
<tr>
<td>Housing:</td>
</tr>
<tr>
<td>• <a href="http://www.kfw.de/kfw/en/Domestic_Promotion/Our_offers/Housing.jsp">http://www.kfw.de/kfw/en/Domestic_Promotion/Our_offers/Housing.jsp</a></td>
</tr>
<tr>
<td>Renewable Energies:</td>
</tr>
<tr>
<td>• <a href="http://www.kfw.de/kfw/en/Domestic_Promotion/Our_offers/Renewable_energy.jsp">http://www.kfw.de/kfw/en/Domestic_Promotion/Our_offers/Renewable_energy.jsp</a></td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>Low-interest loans are modified regularly!</td>
</tr>
</tbody>
</table>
8.4.2 The Netherlands

In the Netherlands there are different types of subsidies for sustainable energy. The most important subsidy is an exploitation subsidy called SDE.

**SDE subsidy**

The SDE subsidy besides wood combustion and co-digestion includes all different kind of sustainable energy like geothermal, waste incineration, solar energy, wind energy etc. The SDE subsidy pays the difference between the cost price of bio-energy and the market price of regular energy. Yearly the costs are calculated by ECN and based on these costs the basic fees for delivered heat, electricity or bio-methane are determined. In case the subsidy is granted the difference between the basic fee and the market price will be paid by the government for a fixed amount of years (biogas and wood combustion = 12 years). For wood combustion only installations bigger than 0.5 MWth can request SDE subsidy.

The SDE subsidy works with a fixed budget which can be different per year. In 2012 the total budget was 1.7 billion €. The subsidy is divided in 5 separate phases which open on different dates. The technologies which need the lowest amount of subsidy can request the subsidy in the first phases. In case the budget is reached the subsidy closes and projects which did not get the subsidy have to wait for the next year. In 2011 and 2012 the budget was reached in the first phase. With the basic fees in the first phase it was not possible to have a positive business case with a standard co-digestion installation combined with a CHP installation or biogas upgrade installation. Before a request for the SDE subsidy can be requested the project needs to have all necessary permits and an agreement with the land over.

For more information regarding the SDE please see [www.agenstschapnl.nl/SDE](http://www.agenstschapnl.nl/SDE).

**EIA and MIA**

The EIA (energy investment reduction) and MIA (environment investment reduction) are both tax regulations in which a percentage of the investment can be additionally used to lower the taxable profit of the organization. In this way less tax needs to be paid. Every year a list is created by AgentschapNL in which the installations which can use the EIA or MIA regulation are summed up.

For biogas installation only the investment in the CHP installation and gas upgrading installation can be used in the EIA. For further information about the EIA please see: [http://www.agentschapnl.nl/nl/node/100148](http://www.agentschapnl.nl/nl/node/100148).

In the MIA list small biogas plants in which only manure is digested are present. Large biogas plants cannot use the MIA.

**VAMIL**

The VAMIL is closely related to MIA and can be used to depreciate the investment at an own chosen moment. In this way tax can be slightly reduced.

**Investment subsidies**

Some provinces like Overijssel offer additional investment subsidies for especially small scale digesters. It’s always wise to check the website of your province, region to see if additional subsidies are available.
8.4.3 Belgium

The report „Beste Beschikbare Technieken (BBT) voor(mest)covergistingsinstallaties“ by Derden et al. (2012) gives an overview of existing support measures. Conditions and terms of these support measures are subject of constant change. Following paragraphs give an overview of different kinds of support measures related to digester plants.

Ecologiepremie-plus – This support is granted to ecological investments e.g. investments made in environmental and energy related technologies that lead to new energy saving methods as well as renewable energy technology. Installations that certify for GSC or WKK-certificaten cannot apply for an ecologiepremie-plus. In practice this means that digester plants which produce electricity are excluded from this support measure. A limitative list of supported technologies by the „ecology plus“ program can be retrieved on: http://www.agentschapondernemen.be/artikel/welke-investeringen-komen-aanmerking-incl-limitatieve-technologie%C3%ABnlijst

Groenestroomcertificaten (GSC) – This system of certificates is in order since 1 January 2002 in Flanders. One GCG is given for every 1.000 kWh of green energy production. Minimum tariffs for these GSC’s are:

For biogas produced from manure or other agriculture substrates
- 110 €, when the installation was built after 1 January 2012 and received no „ecologiepremie“;
- 100 €, when the installation was built before 1 January 2012 at one hand, or after 1 January 2012 and recieve an „ecologiepremie“.

For industrial digesters
- 90€, when the installation was built after 1 January 2010;
- 80€, when the installation was built before 1 January 2010.

The timespan of this support is 10 years. (Source: www.vreg.be/minimumsteun)

WKK-certificaten (as for 15 October 2010) – This is a support measure for installations that use heat-power coupling as a mean to recuperate energy that would otherwise be lost. A certificate is given for every 1.000 kWu of primary energy saving. This implies a 10% energy saving in practice for most installations.

Exploitatiesteun voor groene warmte – The actionplan „Groene Warmte“ has been approved by the Flemish governement on 15 July 2011. It composes of different measures to stimulate the production of heat based on renewable energy sources. Financial support mechanisms are stipulated in this actionplan for larger industrial installation from 1MW and more.

Other support measures (as for 15 October 2010)

- Investment deduction of 15,5% (www.energiesparen.be)
- Support for demonstration projects (www.energiesparen.be)
- De groeipremie (www.vlaanderen.be/groeipremie)
- Support for demonstration project (www.energiesparen.be)
- Advice cheques, starters loan, education support ... (www.vlaanderen.be/euroinfocentre)
8.4.4 Italy

For Italy, various subsidy regulations with respect to bioenergy are available on different administrative levels (e.g., national level, federal state level, etc.), for specific kinds of biomass and/or bioenergy (heat, electricity) and for different target groups (e.g., private persons, business companies, etc.).

The following links give an overview on the huge variety of subsidy options for Italy:

- [http://www.gse.it/en/qualificationandcertificates/CertificatesofOrigin/Pages/default.aspx](http://www.gse.it/en/qualificationandcertificates/CertificatesofOrigin/Pages/default.aspx)

Following a short description of main subsidy regulations and the relevant links for amount of subsidy will be given.

**Green Certificates (GCs)**

**About**

Green Certificates (GCs) are tradable instruments that GSE grants to qualified renewable-energy power plants (IAFR qualification) which have been commissioned before 31 December 2012 as per Legislative Decree 28/2011.

The number of certificates issued is proportional to the electricity generated by the plant/system and varies depending on the type of renewable source used and of project (new, reactivated, upgraded, renovated system/plant).

The GC support scheme is based on the legislation which requires producers and importers of non-renewable electricity to inject a minimum quota of renewable electricity into the power system every year.

GCs represent proof of compliance with the renewable quota obligation: each GC is conventionally worth 1 MWh of renewable electricity. GCs are valid for three years: those issued in respect of electricity generation in a given year (reference year) may be used towards compliance with the obligation also in the following two years.

To fulfill their obligation, producers and importers may inject renewable electricity into the grid or purchase an equivalent number of GCs from green electricity producers.

**How to obtain GCs**

Producers may apply for GCs after qualifying their plants as renewable-energy power plants/systems (IAFR).

Producers whose plants/systems have a yearly average nominal capacity not exceeding 1 MW (0.2 MW for wind power plants/systems), excluding solar ones, may exercise the right of option between GCs and the all-inclusive feed-in tariff.

Upon the first issuing of GCs, GSE opens an ownership account in the name of the producer, where the issued GCs are deposited. GSE tracks the movements of GCs via a dedicated information system. Holders of ownership accounts may access the system after obtaining an appropriate identification code from GSE.

GSE also creates ownership accounts in the name of producers and/or importers subject to the obligation specified in art. 11 of Legislative Decree 79/99 (upon receiving their self-certification concerning the non-renewable electricity that they have generated and/or imported), as well as in the name of parties wishing to trade GCs.
Holders of ownership accounts may - through the Internet – connect to their dedicated area of the information system in order to immediately check the status of and movements in their accounts and enter GC purchase and/or sale transactions.

**The support mechanism**

Plants with a capacity of at least 1 kW which are connected to the electricity network are eligible for the GC mechanism. However, plants with a capacity of up to 1 MW (0.2 MW for wind power) may opt for the all-inclusive fixed tariff.

The support mechanism differs according to the technology used.

In fact, Law No 244/2007 introduced a table of multiplication coefficients on the basis of which the number of GCs issued varies according to the renewable source used.

Table 2 of financial law 2008 (upgrade to law 23/07/2009 n.99):

<table>
<thead>
<tr>
<th></th>
<th>Wind power, for plants larger than 200 kW</th>
<th>1,00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>b Offshore wind power</td>
<td>1,50</td>
</tr>
<tr>
<td>2</td>
<td>Geothermal</td>
<td>0,90</td>
</tr>
<tr>
<td>3</td>
<td>Wave and tidal power</td>
<td>1,80</td>
</tr>
<tr>
<td>4</td>
<td>Hydro</td>
<td>1,00</td>
</tr>
<tr>
<td>5</td>
<td>Biodegradable waste, biomass other than that included in the point below</td>
<td>1,30</td>
</tr>
<tr>
<td>6</td>
<td>Biomass and biogas produced by local agriculture or forestry</td>
<td>1,80</td>
</tr>
<tr>
<td>7</td>
<td>Landfill gas and residual gases from purification processes and biogas other than those included in the point above</td>
<td>0,80</td>
</tr>
</tbody>
</table>

**Average price for certificates**

The Energy Markets Regulator (GME), which manages the GC market, publishes all the information on exchanging certificates (quantities and prices) online.

No real floor bottom price has been set for green certificates, since the price is determined by the market, according to the principle of supply and demand. Nonetheless, the Ministerial Decree of 18/12/2008 established that, in order to prevent an excessive supply, during the three-year period and at the holders’ request, the GSE can withdraw the GCs for production referring to years up to 2010. The withdrawal price is the average price over the previous three years for exchanges of all GCs regardless of the reference year, either on the GME-regulated market or through bilateral contracts. The 2010 withdrawal price for GCs is €88.90/MWh.

There is also a reference price, which is the price at which the GSE puts GCs onto the market (the regulations allow for this possibility in order to deal with demand which exceeds supply) which, per MWh of electricity, is equal to €180 minus the annual average electricity transfer price for the previous year (defined by the AEEG). The GC reference price set by the GSE for 2010 is €113.8/MWh.

In the event of excessive supply, where the price paid by the GSE to withdraw GCs is lower than the GSE’s selling price, it is probable that a GC market will develop between a minimum price, equal to the price paid by the GSE to withdraw GCs, and a maximum price equal to the GSE’s selling price.
- **Certification of generated/ imported electricity**

**About**

On a yearly basis, GSE verifies compliance with the obligation specified in article 11 of Legislative Decree 79/99 (quota obligation).

**Obliged parties**

By 31 March of each year (n), producers and importers of conventional electricity that are subject to the obligation (electricity > 100 GWh) must submit a self-certification of the data that are required to determine: i) the electricity subject to the obligation in respect of generation and/or imports in the previous year (n-1); and ii) the green certificates (GCs) corresponding to the yearly mandatory quota in respect of generation in the year (n-2).

The renewable electricity to be injected into the power system in compliance with the above-mentioned obligation must be generated by RES-E (IAFR) qualified plants.

Exemptions from the obligation are as follows:

- renewable electricity generated in CHP (co-generation) plants;
- renewable electricity imported for the reference year 2011, provided that it is certified by Guarantees of Origin issued by an EU Member State or Norway or Switzerland, in accordance with art. 15 of Directive 2009/28/EC;
- renewable electricity which may count towards the achievement of the national target of 17%, under art. 25, para. 2 of Legislative Decree 28/2011.

**GSE’s role**

If producers or importers fail to fulfill their obligation or to submit their data (self-certification), GSE will - under the Ministerial Decree of 24 October 2005 – report them to AEEG, which will impose the penalties specified in art. 4, para. 3 of Legislative Decree 387/03.

The number of GCs to be introduced into the national power system is obtained by multiplying the amount of the generated and/or imported electricity, subject to the obligation and exceeding 100 GWh, by the mandatory quota for the reference year.

<table>
<thead>
<tr>
<th>Reference year</th>
<th>Mandatory quota (%)</th>
<th>Compliance year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3.80</td>
<td>2011</td>
</tr>
<tr>
<td>2008</td>
<td>4.55</td>
<td>2012</td>
</tr>
<tr>
<td>2009</td>
<td>5.30</td>
<td>2013</td>
</tr>
<tr>
<td>2010</td>
<td>6.05</td>
<td>2014</td>
</tr>
<tr>
<td>2011</td>
<td>6.80</td>
<td>2015</td>
</tr>
<tr>
<td>2012</td>
<td>7.75</td>
<td>2016</td>
</tr>
</tbody>
</table>

From 2013 onwards as provided by Dlg 28/2011, the quota obligation is reduced equal to zero in 2015.
### All-inclusive feed-in tariff

**About**

The all-inclusive feed-in tariff (tariffa onnicomprensiva) is a national scheme applicable to RES-E plants (excluding solar ones) which have a **nominal real power of less than 1 MW** (200 MW for on-shore wind plants). The tariff is granted over a period of 15 years, during which its rate remains fixed and based on the amount of electricity fed into the grid, for all plants commissioned by 31 December 2012.

To benefit from this form of support, producers must first ask **GSE** to **qualify their plants as RES-E** (“IAFR – Impianto Alimentato a Fonti Rinnovabili”). It represents an alternative to the [green certificates](#) scheme and is differentiated by type of source.

### Value

<table>
<thead>
<tr>
<th>Source</th>
<th>All-inclusive feed-in rate (€cent/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind (P &lt; 200 kW)</td>
<td>30</td>
</tr>
<tr>
<td>Geothermal</td>
<td>20</td>
</tr>
<tr>
<td>Waves and tides</td>
<td>34</td>
</tr>
<tr>
<td>Hydro (other than the one indicated in the previous point)</td>
<td>22</td>
</tr>
<tr>
<td>Biomass, biogases and bioliquids complying with Regulation (EC) No 73/2009</td>
<td>28</td>
</tr>
<tr>
<td>Landfill gas, sewage treatment plant gas, biogases and bioliquids complying with Regulation (EC) No 73/2009</td>
<td>18</td>
</tr>
</tbody>
</table>

The right of option between green certificates and the all-inclusive tariff is exercised upon **submitting the application for RES-E (“IAFR”) qualification** to GSE. Before the end of the support period, a single passage is allowed from one support scheme to the other; in this case, the duration of the period of eligibility for the new support scheme is reduced by the period of eligibility that has already elapsed under the previous scheme.

### High-efficiency CHP and white certificates

**What is it**

Combined heat & power generation (CHP) or **co-generation** provides significant energy savings compared to separate generation. The criteria for qualifying generating units as **high-efficiency CHP** are set out in the Ministerial Decree of 4 Aug. 2011, effective from 1 Jan. 2011. This decree completed the transposition of Directive 2004/8/EC, started with
Legislative Decree no. 20 of 2007, into the Italian legislation. Generating units qualified as high-efficiency CHP have access to the Energy Efficiency Certificates (“TEE” or white certificates) scheme, on the terms and conditions and under the procedures specified in the Ministerial Decree of 5 Sept. 2011.

GSE’s role
GSE carries out the following activities:

- **qualifying** high-efficiency CHP plants
- **determining** the number of **white certificates** to be issued to high-efficiency CHP qualified units whose owners have applied for this form of support
- **buying back white certificates** - in response to a request made by a producer - at a price equal to the one applicable on the date of commissioning of the unit (or on the date of entry into force of the Ministerial Decree of 5 Sept. 2011 in the case of units already in operation);
- carrying out activities of **verification** and monitoring of the supported plants and notifying the Ministry of Economic Development and the producer of their outcome;
- issuing the **Guarantee of Origin** of electricity from high-efficiency co-generation (CHP-GO) in compliance with Legislative Decree no. 20 of 2007

**Guarantee of Origin (GO)**

About
The Guarantee of Origin (GO) is a voluntary certificate giving evidence of electricity generation from renewables and issued on demand to producers. In Italy, the GO was introduced by Legislative Decree 387/03, implementing Directive 2001/77/EC on promotion of electricity produced from renewable energy sources in the internal electricity market. With the GO, producers may demonstrate the origin of the electricity that they sell. Legislative Decree 28/11, transposing Directive 2009/28/EC, repealed Directive 2001/77/EC and introduced some new provisions concerning the GO. The new GO (art. 34, Legislative Decree 28/11) has the sole purpose of enabling electricity suppliers to disclose the share of renewable energy in their fuel mix to final customers. The new GO will be issued, transferred and cancelled electronically. An implementing decree will update the procedures regarding the issuing and utilisation of the new GO.

GSE’s role
Prior to issuing the Guarantee of Origin (GO), GSE is required to conduct a procedure of technical identification of plants, as specified in the Decree of the Ministry of Productive Activities of 24 Oct. 2005 (updated guidelines on support for electricity generated from renewables as per art. 11, para. 5, Legislative Decree no. 79 of 16 March 1999). To this end, GSE developed a specific Technical Procedure. Under art. 11, para. 1 of the above-mentioned decree, the procedure was approved by the Ministry of Economic Development, in consultation with the Ministry of Environment, Land and Sea Protection, with its Decree of 21 Dec. 2007 (Gazzetta Ufficiale no. 16 of 19 Jan. 2008, Supplemento Ordinario no.17).

After obtaining the technical identification (“IRGO”) of their plants, operators may – on a yearly basis – ask GSE to issue the GO for their generated electricity. To submit the application for technical identification of plants (“IRGO”) and obtain the GO, fill in the application forms in the format shown in the “Documents” section on the right side of this page (italian version).
### Renewable-Energy Certificates of Origin (RECOs)

#### About RECOS

A **Renewable Energy Certificate of Origin** (“CO-FER” - RECO) gives proof of the renewable origin of the sources used by power plants which have been qualified to obtain Certificates of Origin (“ICO-FER” qualification).

Each **RECO** is worth **1 MWh** and issued on the basis of the electricity fed into the grid by the above-mentioned plants.

RECOs may be transferred from producers to suppliers, also through traders.

#### GSE’s role

GSE grants the **ICO-FER** qualification at the request of producers. The qualification document specifies the renewable electricity generated by each plant. GSE issues RECOs - at the request of producers whose plants are ICO-FER qualified - on a monthly basis. The number of RECOs is based on the meter readings of the electricity fed into the grid that GSE receives from grid operators.

In order to obtain the ICO-FER qualification, producers must meet the requirements of the “Procedura per l’identificazione degli impianti alimentati da fonti rinnovabili ed emissione e gestione delle certificazioni di origine per i suddetti impianti” (procedure for identifying renewable-energy plants in view of issuing and managing Certificates of Origin) - italian version.

The procedure makes it possible to:

- **identify the producer** and the **type of renewable energy source** used to generate the electricity to be certified;
- **certify the electricity generated by renewable-energy plants** and injected into the grid by each producer;

**transfer RECOs** (that GSE has issued to the producer) to selling companies under principles of transparency and traceability, so that each RECO is at all times owned by a single party.
8.4.5 Poland

In Poland investments in bioenergy plants can be financed from e.g.:

- preferential environmentally friendly loans with subsidies to interest paid or to some extent redemption of loan possible from:
  - National Fund for Environmental Protection and Water Management in cooperation with banks,
  - Provincial Funds for Environmental Protection and Water Management in cooperation with banks.

- subsidy in the form of non-returnable aid getting during competitions taking place in different dates to the end of 2013. Subsidy can be getting:
  - in the Operational Programme Infrastructure and Environment – OPI&E (usually the minimal value of the project is PLN 10 mln, the subsidy is in the form of a prepayment or refundation),
  - in the Regional Operational Programmes of particular voivodeship - ROP (usually the maximal value of the project is PLN 10 mln, the subsidy is in the form of a prepayment or refundation),
  - in the Rural Development Programme, for places with max 5,000 inhabitants - RDP (the subsidy is in the form of refundation).

<table>
<thead>
<tr>
<th>The National Fund for Environmental Protection and Water Management (NFOŚiGW)</th>
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<td><strong>Focus</strong></td>
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<td><strong>Content/ How regulation works</strong></td>
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<tr>
<td><strong>Amount of subsidy / links</strong></td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
</tbody>
</table>
Provincial Funds for Environmental Protection and Water Management (WFOŚiGW)

Focus
- co-financing investments which e.g. eliminate pollution of air
- investments connected with improving energy efficiency and using renewable energy sources are treated as special priorities

Target groups
entities undertaking projects of the enterprises in the field of renewable energy sources and high-efficiency cogeneration

Content/ How regulation works
- several sub-programmes exist which offer different grants and subsidies to interest paid (in cooperation with defined banks) or to some extent redemption of loans
- programmes are concerned individual voivodeships.

Amount of subsidy / links
Grants and possibilities of getting subsidies to interest paid or to some extent redemption of loans are listed under, for example of Warsaw Fund for Environmental Protection and Water Management (every voivodeship has its own rules of co-financing investments):

Grants:
Subsidies to interest paid (in cooperation with BOŚ S.A., Cooperative Bank in Mszczonów, Bank PKO B.P.):
Redemption of loans:
- http://www.wfosigw.pl/strefa-beneficjenta/umorzenia

Comments
Grants and possibilities of getting subsidies to interest paid or to some extent redemption of loans are modified regularly!

Following a short description of main subsidy regulations and the relevant links for amount of subsidy will be given (main link is http://www.funduszeeuropejskie.gov.pl/). Please note that it will be valid to 2013. Types of aid mentioned above are presented in the table below, where are specified: types of projects for aiding (financing of investment in wood combustion, biogas plants contains also investment in biogas plant, if it occurs in project), total investment cost and possible financing of eligible costs (every programme defines percentage of subsidy to eligible costs, sometimes also minimal and maximal values; to simplify the assumption was made in the table – total investment cost is equal to eligible costs), types of beneficiary (in many cases all entitled to subsidy are not enumerating, there ‘…’ is written).

The operational programme infrastructure and environment (POIIS)

Measure 4.5. Support for enterprises for air protection

Focus
- conversion of existing conventional combustion installations into biomass/biogas plant (excluding projects, as a result of which emission to the air will increase)
- total cost of investment has to be at least PLN 8 mln for small² and medium-sized³ enterprises; for large⁴ enterprises total cost of investment is not defined

Target groups
entrepreneurs

Amount of subsidy / links
- up to 30% of the total investment cost
- up to PLN 20 mln
Overview:
### Measure 9.1. High-efficiency energy generation

**Focus**
- construction and reconstruction of heat and power cogeneration plants or heat generation plants, as a result of which these plants will satisfy the requirements laid down for high-efficiency cogeneration\(^4\) (excluding fossil fuel co-combustion plant)
- total cost of investment has to be at least PLN 10 mln for units using biomass/biogas and at least PLN 20 mln for the rest

**Target groups**
- entrepreneurs
- territorial self-government units and their groups
- public service obligations as part of their territorial self-government units

**Amount of subsidy / links**
- up to 65% of the total investment cost for small enterprises\(^2\)
- up to 55% for medium-sized enterprises\(^3\)
- up to 45% for large enterprises\(^4\)
- up to PLN 30 mln

Overview:

### Measure 9.4. Generation of energy from renewable sources

**Focus**
- construction or power increasing of plant using biomass/biogas, cogeneration is not required
- total cost of investment has to be at least PLN 10 mln for units using biomass/biogas and at least PLN 20 mln for the rest

**Target groups**
- e.g. entrepreneurs, territorial self-government units and their groups, public service obligations as part of their territorial self-government units, ...

**Amount of subsidy / links**
- up to 65% of the total investment cost for small enterprises\(^4\)
- up to 55% for medium-sized enterprises\(^3\)
- up to 45% for large enterprises\(^4\)
- up to PLN 40 mln

Overview:

### Measure 9.5. Production of biofuels from renewable sources

**Focus**
- construction of biogas production installation
- total cost of investment has to be at least PLN 20 mln

**Target groups**
- entrepreneurs

**Amount of subsidy / links**
- up to 50% of the total investment cost for voivodeships: Lubelskie, Podkarpackie, Warmińsko-Mazurskie, Podlaskie, Świętokrzyskie, Opolskie, Małopolskie, Lubuskie, Łódzkie, Kujawsko-Pomorskie
- up to 40% for voivodeships: Pomorskie, Zachodniopomorskie, Dolnośląskie, Wielkopolskie, Śląskie
- up to 30% for the Mazowieckie voivodeship
- for micro\(^1\) and small\(^2\) enterprises subsidy may be increased by 20 p.p.
- for medium-sized\(^4\) enterprises subsidy may be increased by 10 p.p.
- up to PLN 30 mln

Overview:

**Comments**
Subsidies are modified regularly!
¹ microenterprise – enterprise which employs fewer than 10 employees and whose annual turnover does not exceed EUR 2 mln
² small enterprise – enterprise which employs fewer than 50 employees and whose annual turnover does not exceed EUR 10 mln
³ medium-sized enterprise – enterprise which employs fewer than 250 employees and whose annual turnover does not exceed EUR 50 mln
⁴ large enterprise – enterprise which employs min. 250 employees or whose annual turnover exceed EUR 50 mln.
⁵ high-efficiency cogeneration – coproduction of heat and electric energy providing primary energy saving (PES) in comparison with separated production (for plant of electric power at least 1 MW saving has to attain min. 10%).

\[ PES = \left( 1 - \frac{1}{\eta_{qc} + \eta_{ge}} \right) \times 100 \]

PES is calculated using the formula:

- \( \eta_{qc} \) - efficiency of heat production in cogeneration
- \( \eta_{ge} \) - efficiency of electricity production in cogeneration
- \( \eta_{refc} \) - reference efficiency of heat production in separate generation – adequately if heat is taking by process steam/hot heating water or exhaust gases are used directly: for firewood and wood waste – 86%/78%, for agricultural biomass – 80%/72%, for biogas – 70%/62%
- \( \eta_{refe} \) - reference efficiency of electricity production in separate generation – if plant were put into operation in 2006-2011: for firewood and wood waste – 33%, for agricultural biomass – 25%, for biogas – 42%

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### Regional operational programmes (PR)

**only for the Dolnośląskie voivodeship – Measure 5.1. Renewable energy sources**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment has to be at least PLN 300,000 in places not falling under RDP¹, min. PLN 3 mln in places falling under RDP for communities or organizational units with organizer as a territorial self-government unit and up to PLN 10 mln

**Target groups**
e.g. energy companies, public sector entities, unions and associations of territorial self-government units, ...

**Amount of subsidy / links**
- for investments falling under the public aid⁶: up to 60% of the total investment cost for micro² and small³ enterprises, up to 50% for medium-sized⁴ enterprises, up to 40% for the rest
- up to 99% for territorial self-government units

**Overview:**
- [http://rpo.dolnyslask.pl/fileadmin/user_upload/upload/2012%20stycze%C5%84/12012_5_URPO_czysta_2011_STYCZEN.pdf](http://rpo.dolnyslask.pl/fileadmin/user_upload/upload/2012%20stycze%C5%84/12012_5_URPO_czysta_2011_STYCZEN.pdf)

**only for the Kujawsko-Pomorskie voivodeship - Measure 2.4. Environment-friendly energy infrastructure**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

**Target groups**
e.g. companies established and operating in the voivodeship kujawsko-pomorskie, unions and associations of territorial self-government units,...
Amount of subsidy / links

- for investments not falling under the public aid: up to 75% of the total investment cost
- for investments falling under the public aid: up to 70% for microenterprises, up to 60% for small and medium-sized enterprises, up to 50% for the rest
- up to 100% for budget units

Overview:
- [http://www.mojregion.eu/opis-dzialania/rpo-2.4.html](http://www.mojregion.eu/opis-dzialania/rpo-2.4.html)

only for the Lubelskie voivodeship – Measure 1.4. Investment subsidy to adaptation of enterprises to environmental protection requirements and to renewable energy sources

Focus

- construction or reconstruction biomass/biogas plants
- total cost of investment can be at least PLN 15,000 and up to PLN 8 mln for projects, in which electric energy is used for internal load
- total cost of investment can be at least PLN 143,000 and up to PLN 10 mln for projects, in which maximum 50% of electric energy is used for internal load

Target groups
micro-, small and medium-sized entrepreneurs

Amount of subsidy / links

- for projects, in which electric energy is used for internal load: up to 70% of the total investment cost
- for projects, in which maximum 50% of electric energy is used for internal load: up to 70% of the total investment cost for micro-² and small³ enterprises and up to 60% for medium-sized⁴ enterprises

Overview:

only for the Lubelskie voivodeship – Measure 6.2. Environment-friendly energy

Focus

- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

Target groups
e.g. territorial self-government units, …

Amount of subsidy / links

- up to 100% of the total investment cost for territorial self-government units

Overview:

only for the Lubuskie voivodeship – Measure 3.2. Improvement of air quality, energy efficiency and development and renewable energy sources utilization

Focus

- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

Target groups
e.g. entrepreneurs, territorial self-government units, …

Amount of subsidy / links

- for investments not falling under the public aid: up to 85% of the total investment cost
- for investments falling under the public aid: up to 70% for micro-² and small³ enterprises, up to 60% for medium-sized⁴ enterprises, up to 50% for the rest

Overview:

only for the Łódzkie voivodeship – Measure II.9. Renewable energy sources

Focus

- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

Target groups
e.g. entrepreneurs, territorial self-government units, …
### Implementation Guide

**Amount of subsidy / links**
- for investments not falling under the public aid: up to 85% of the total investment cost
- for investments falling under the public aid: up to 70% for micro- and small enterprises, up to 60% for medium-sized enterprises, up to 50% for the rest

Overview:

**only for the Małopolskie voivodeship – Measure 7.2. Improvement of air quality and increase of renewable energy sources utilization**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

**Target groups**
- e.g. entrepreneurs, territorial self-government units, …

**Amount of subsidy / links**
- for investments not falling under the public aid: up to 85% of the total investment cost
- for investments falling under the public aid: up to 70% for micro- and small enterprises, up to 60% for medium-sized enterprises, up to 50% for the rest
- up to 100% for budget units
- min. PLN 20,000
- up to PLN 5 mln

Overview:

**only for the Mazowieckie voivodeship – Measure 4.3. Air protection, power engineering**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas (up to 10 MW)
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

**Target groups**
- e.g. entrepreneurs, territorial self-government units, …

**Amount of subsidy / links**
- for investments not falling under the public aid: up to 60% of the total investment cost
- for investments falling under the public aid: up to 50% for micro- and small enterprises, up to 40% for medium-sized enterprises, up to 30% for the rest
- up to 97% for territorial self-government units

Overview:
- [http://rpo.mazowia.eu/wybierz-priorytet-i-dzialanie/70.html](http://rpo.mazowia.eu/wybierz-priorytet-i-dzialanie/70.html)

**only for the Opolskie voivodeship – Measure 4.3. Air protection, renewable energy sources**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest

**Target groups**
- e.g. territorial self-government units, …

**Amount of subsidy / links**
- for investments not falling under the public aid: up to 85% of the total investment cost
- for investments falling under the public aid: up to 70% for micro- and small enterprises, up to 60% for medium-sized enterprises, up to 50% for the rest
- up to 100% for budget units
- min. PLN 250,000
- up to PLN 5 mln

Overview:
- [http://rpo.opolskie.pl/docs/uszczegolowienie_wersja_n08.pdf](http://rpo.opolskie.pl/docs/uszczegolowienie_wersja_n08.pdf)

**only for the Podkarpackie voivodeship – Measure 2.2. Energy infrastructure**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas
- total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest
<table>
<thead>
<tr>
<th>Target groups</th>
<th>e.g. entrepreneurs, territorial self-government units, …</th>
</tr>
</thead>
</table>
| **Amount of subsidy / links** | • for investments not falling under the public aid\(^5\): up to 75% of the total investment cost  
• for investments falling under the public aid\(^6\): up to 70% for micro-² and small\(^3\) enterprises, up to 60% for medium-sized\(^4\) enterprises, up to 50% for the rest  
• up to 95% for for territorial self-government units  
**Overview:**  
| **only for the Podlaskie voivodeship – Measure 5.1/2. Development of regional/local environment protection infrastructure** |  
**Focus** | • construction or reconstruction biogas production installation and plant using biomass/biogas  
• total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest |
| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |
| **Amount of subsidy / links** | • for investments not falling under the public aid\(^5\): up to 85% of the total investment cost  
• for investments falling under the public aid\(^6\): up to 70% for micro-² and small\(^3\) enterprises, up to 60% for medium-sized\(^4\) enterprises, up to 50% for the rest  
**Overview:**  
| **only for the Pomorskie voivodeship – Measure 5.4. Development of power engineering based on renewable sources** |  
**Focus** | • construction or reconstruction biogas production installation and plant using biomass/biogas  
• total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest |
| **Target groups** | e.g. territorial self-government units, … |
| **Amount of subsidy / links** | • for investments not falling under the public aid\(^5\): up to 95% of the total investment cost  
• for investments falling under the public aid\(^6\): up to 60% for micro-² and small\(^3\) enterprises, up to 50% for medium-sized\(^4\) enterprises, up to 40% for the rest  
**Overview:**  
| **only for the Śląskie voivodeship – Measure 5.3. Clean air and renewable energy sources** |  
**Focus** | • construction or reconstruction biogas production installation and plant using biomass/biogas  
• total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest |
| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |
| **Amount of subsidy / links** | • for investments not falling under the public aid\(^5\): up to 85% of the total investment cost  
• for investments falling under the public aid\(^6\): up to 60% for micro-² and small\(^3\) enterprises, up to 40% for the rest  
**Overview:**  
| **only for the Świętokrzyskie voivodeship – Measure 4.1. Development of regional environment protection and energy infrastructure** |  
**Focus** | • construction or reconstruction biogas production installation and plant using biomass/biogas  
• total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest |
| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |
| **Amount of subsidy / links** | • for investments not falling under the public aid\(^5\): up to 85% of the total investment cost  
• for investments falling under the public aid\(^6\): up to 70% for micro-² and small\(^3\) enterprises, up to 50% for medium-sized\(^4\) enterprises, up to 40% for the rest  
**Overview:**  
<table>
<thead>
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<th><strong>only for the Warmińsko-Mazurskie voivodeship – Measure 6.2.1. Utilization of renewable energy sources</strong></th>
<th><strong>Focus</strong></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>construction or reconstruction biogas production installation and plant using biomass/biogas (excluding projects, in which electric energy is used for internal load)</td>
</tr>
<tr>
<td></td>
<td>total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest</td>
</tr>
</tbody>
</table>

| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |

| **Amount of subsidy / links** | for investments not falling under the public aid⁵: up to 85% of the total investment cost |
| | for investments falling under the public aid⁵: up to 60% for micro-² and small³ enterprises, up to 50% for medium-sized⁴ enterprises, up to 50% for the rest |

| **Overview:** |  |

<table>
<thead>
<tr>
<th><strong>only for the Wielkopolskie voivodeship – Measure 3.7. Increase of renewable energy resources utilization</strong></th>
<th><strong>Focus</strong></th>
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<tbody>
<tr>
<td></td>
<td>construction or reconstruction biogas production installation and plant using biomass/biogas of power range 0.25-50 MW</td>
</tr>
<tr>
<td></td>
<td>total cost of investment can be up to PLN 10 mln for units using biomass/biogas and up to PLN 20 mln for the rest</td>
</tr>
</tbody>
</table>

| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |

| **Amount of subsidy / links** | for investments not falling under the public aid⁵: up to 85% of the total investment cost |
| | for investments falling under the public aid⁵: up to 60% for micro-² and small³ enterprises, up to 40% for the rest |

| **Overview:** |  |

<table>
<thead>
<tr>
<th><strong>only for the Zachodniopomorskie voivodeship – Measure 4.1. Renewable energy and power management</strong></th>
<th><strong>Focus</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

| **Target groups** | e.g. entrepreneurs, territorial self-government units, … |

| **Amount of subsidy / links** | for investments not falling under the public aid⁵: up to 75% of the total investment cost |
| | for investments falling under the public aid⁵: up to 60% for micro-² and small³ enterprises, up to 40% for the rest |

| **Overview:** |  |
| | http://www.rpo.wzp.pl/rpo/uszczegolowienie_rpo/p-r-m-a-14684/uszczegolowienie_rpo.htm |

| **Comments** | Subsidies are modified regularly! |

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¹ PR of particular voivodeships defines range of subsidy to investments leading by a community or organizational unit with organizer as a territorial self-government unit, in places falling under RDP: min. PLN 3 mln, whereas if the community cannot use the subsidy from RDP it is max PLN 3 mln

² microenterprise – enterprise which employs fewer than 10 employees and whose annual turnover does not exceed EUR 2 mln

³ small enterprise – enterprise which employs fewer than 50 employees and whose annual turnover does not exceed EUR 10 mln

⁴ medium-sized enterprise – enterprise which employs fewer than 250 employees and whose annual turnover does not exceed EUR 50 mln

⁵ large enterprise – enterprise which employs min. 250 employees or whose annual turnover exceed EUR 50 mln

⁶ falling under the public aid - when the investor leads economic activity, also non-profit
### Rural Development Programme

**Measure 311. Diversification into non-agricultural activities**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas (excluding places with more than 5,000 inhabitants)

**Target groups**
- natural person (farmer)

**Amount of subsidy / links**
- up to 50% of the total investment cost
- up to PLN 100,000

**Measure 321. Basic services for the economy and rural population**

**Focus**
- construction or reconstruction biogas production installation and plant using biomass/biogas (excluding places with more than 5,000 inhabitants)

**Target groups**
- community or organizational unit with organizer as a territorial self-government unit

**Amount of subsidy / links**
- up to 75% of the total investment cost
- up to PLN 3 mln

**Measure 312. Creation and development of microenterprises**

**Focus**
- investments connected with creation and development of microenterprises operating within the range of biogas generation from agricultural products and energy generation from biomass (excluding places with more than 5,000 inhabitants)

**Target groups**
- e.g. natural person, legal person leading or undertaking economic activity as microenterprise¹

**Amount of subsidy / links**
- up to 50% of the total investment cost
- up to PLN 100,000, if it is expected to create 1 job position
- up to PLN 200,000, if it is expected to create 2 job positions
- up to PLN 300,000, if it is expected to create min. 2 job positions

¹ microenterprise – enterprise which employs fewer than 10 employees and whose annual turnover does not exceed EUR 2 mln

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Financial support mechanism during operation rely on property rights for certificates issued under certificates of origin for energy, presented in the table below.

### Act of Parliament Energy Law

**Focus**
- Energy Law rules:
  - the priority purchase, transmission, distribution of and payment for electricity and heat from renewable energy sources by the grid system operators
  - the nationwide equalisation scheme for the quantity of electricity purchased and paid for

**Target groups**
- operators of plants which provide electricity/heat/biogas from renewables (e.g. from biomass) to the grid system

**Content/ How regulation works**
- Mechanism of subsidies, i.e. certificates of origin for energy, for biomass plants which provide electricity to the grid (e.g. biogas plants or CHP wood plants) rests on: for every produced (not necessary sold) MWh electric energy the certificate of origin for energy is issued. Then the property rights is sold, what generates income. There are following
types of certificates of origin of energy in Poland:

- from renewable energy source (customary named as green certificates) – support lasts to the end of 2017,
- from high-efficiency cogeneration for electric power under 1 MW (yellow certificates) – support lasts to the end of 2012,
- from high-efficiency cogeneration from biogas (violet certificates) – support lasts to the end of 2018,
- from high-efficiency cogeneration from the rest of fuels and plants of electric power min. 1 MW (red certificates) – support lasts to the end of 2012,
- of agricultural biogas next putting into distribution network (brown certificates) – support lasts to the end of 2019 (legal acts has not been introduced yet, so in fact the mechanism is not operating yet). The amount of produced biogas will be counted over on the basis of lower heating value into equivalent amount of electricity coming from renewable energy sources according to the formula

\[ E = \frac{M \cdot r}{42.0} \]

where:
- \( M \) – the amount of produced biogas in m³,
- \( r \) – lower heating value in MJ/m³
- 0.42 – so far this value has been merely proposed mean efficiency of electric energy generation in renewable source

### Detailed Amount of Subsidy / Links

Below possible cases with achieved incomes from certificates of origin sale are enumerated:

- electricity coming from biomass or biogas – green certificates – 283 PLN/MWh
- electricity production in high-efficiency cogeneration from biomass – green + red certificates – 283 PLN/MWh + 9 PLN/MWh = 292 PLN/MWh
- electricity production in high-efficiency cogeneration from biogas in plants of electric power below 1 MW – green + yellow certificates – 283 PLN/MWh + 126 PLN/MWh = 409 PLN/MWh
- electricity production in high-efficiency cogeneration from biogas in plants of electric power min. 1 MW – green + violet certificates – 283 PLN/MWh + 58 PLN/MWh = 341 PLN/MWh
- agricultural biogas production and putting into distribution network – brown certificates – 283 PLN/MWh

The value of certificates of origin for energy partially is subject to marketable mechanisms and is changing during time, see:


For general information on Energy Law see:


### Comments

Please note: subsidies will be changed after introducing Act on Renewable Energy Sources which proposes correction factors for certificates of origin for energy from different type of sources. For general information see:

8.4.6 Estonia

In Estonia support mechanisms for renewable energy depend on the market segment they are applied to. Direct support mechanisms as well as indirect support mechanisms are used.

Many support mechanisms are defined in the legislation. Direct support mechanisms in the Electricity Market Act (in Estonian is available in https://www.riigiteataja.ee/akt/112122011009) are targeted to increasing the share of renewable energy sources in the electricity production market. Provisions in the Alcohol, Tobacco, Fuel and Electricity Excise Duty Act (in Estonian is available in https://www.riigiteataja.ee/akt/123122011005), describe the indirect support mechanism for liquid biofuel sales. Direct support mechanisms for combined heat and power generation (co-generation) are incorporated in the Electricity Market Act. Environmental taxation is applied according to the Environmental Charges Act, and includes indirect support mechanisms for renewable energy utilisation in energy production. Pollution charges are not applied if renewable energy sources are used in energy generation. The application of renewable energy sources is promoted through the building regulations.

A subsidy is available for those producers who have decided to sell electricity from renewable energy sources on their own.

A combined heat and power station may use combination of fossil and renewable fuel (mixed fuel) at the same time. The share of electricity from renewable energy sources is calculated on the basis of the energy content, and the energy content is determined through the fuel quality and fuel amount data. More detailed guidelines for calculating the share of electricity from renewable energy sources are described in a separate regulation of the Minister of Economic Affairs and Communications. A special promotion mechanism is also applied for Cogenerators. The market for electricity from high-efficiency cogeneration is guaranteed.

The price of biomass fuels may fluctuate. In order to ensure the competitiveness of biomass users producing electricity in the fuel market, a special provision in the Electricity Market Act has been adopted for Cogenerators using mixed fuel.

Producers are entitled to sell electricity from renewable energy sources at the feed-in tariff or receive a subsidy up to 12 years from the start of production.

The regulations and comments of the taxation and payment facilities of the aspects of renewable energy are available in the homepage of Ministry of Finance (http://www.fin.ee/?id=2021) or in the homepage of Estonian Tax and Customs Board (http://www.emta.ee/?id=2516).

The most important of them are:

- alcohol, Tobacco, Fuel and Electricity Excise Duty Act (in Estonian is available in https://www.riigiteataja.ee/akt/123122011005);
- explanations about turnover tax (in Estonian are available in http://www.fin.ee/?id=280).
In addition to above mentioned there are also different support measures for bioenergy production in the structural assistance activities. Structural assistance is channelled to different fields divided among three operational programmes. Energy-related activities are financed under the Operational Programme for Development of Living Environment. “Development of the Energy Sector” is provided to operations intended to reduce the adverse environmental impacts of the energy sector and to increase the use of renewable energy sources. The renewable energy objectives are broader use of renewable energy sources and use of alternative sources of energy in transport.

More detail information about structural assistance is available in the homepage of Ministry of Economic Affairs and Communication (http://www.mkm.ee/struktuurifondid-4).

There are also different support measures for biomass and bioenergy production in the domains of agriculture and forestry. For the forestry the list of measures with detail rules is available in the homepage of Private Forest Centre (http://www.eramets.ee/toetused). For the agricultural said all the measures implemented are available in the homepage of Agricultural Registers and Information Board (ARIB) (http://www.pria.ee).

In addition to agricultural area-related aids also different investment support for bioenergy projects can be applied according to the Estonian Rural Development Plan (the information of the support measures is also available in the homepage of ARIB):

- investments into the production of bioenergy (the objective of the agricultural producer applying for support is that predominant share of produced bioenergy will be used on-farm);
- diversification into non-agricultural activities (investments into bio-energy production in case the energy is predominantly marketed);
- improving the economic values of forests and adding value to forestry products (among the other eligible activities/investments, also purchase of tangible and intangible assets to acquire and introduce new products, processing methods and technologies (incl. the purchase of movable equipment or machinery (technology for collecting and processing wood chips and waste at the site)) for biofuel production and non-movable equipment or machinery for the production of wood pellets, wood briquette, charcoal and chips);
- adding value to agricultural and non-food forestry products (investments for the purchase and implementation of equipment and technologies to produce biofuels from agricultural products and non-wood forestry products and from processing waste of agricultural and non-wood forestry produce processing industry or taking into use of renewable energy and biofuels and waste energy of the production process).
8.5 Further information and consulting

8.5.1 Germany

Internationales Biogas und Bioenergie Kompetenzzentrum (IBBK)
Telefon: +49 7954 926203
www.biogas-zentrum.de
info@biogas-zentrum.de

Fachagentur Nachwachsende Rohstoffe e.V. (FNR), www.fnr.de
www.bio-energie.de
info@bio-energie.de

Regionale Bioenergieberatung in der Landwirtschaft
www.bioenergie-portal.info

Fachverband Biogas e.V. (FvB)
www.biogas.org
info@biogas.org

Thüringer Landesanstalt für Landwirtschaft (TLL)
http://www.thueringen.de/de/tll/

http://www.carmen-ev.de/

Institut für Energiewirtschaft und Rationelle Energieanwendung (IER), Universität Stuttgart
www.ier.uni-stuttgart.de

Deutsches BiomasseForschungsZentrum (DBFZ) gGmbH
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8.5.2 The Netherlands

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InfoMil
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8.5.3 Belgium

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Vlaams Landmaatschappij
Gulden-Vlieslaan 72 - 1060 Saint-Gilles
+32(0)2 543 72 00
http://www.vlm.be

Vlaamse Milieumaatschappij
A. Van de Maelestraat 96 - 9320 Erembodegem
Tel. +32(0)53 72 64 45
Fax +32(0)53 71 10 78
info@vmm.be
http://www.vmm.be

Vlaamse Regulator van de Elektriciteits- en Gasmarkt
Graaf de Ferrarisgebouw Koning Albert II-laan 20, bus 19 - 1000 Brussel
Tel. +32 (0)2 553 17 00
Fax. +32 (0)2 553 13 50
info@vreg.be
http://www.vreg.be
8.5.4 Italy

Agenzia nazionale per le nuove tecnologie, l’energia e lo sviluppo economico sostenibile (ENEA)
http://www.enea.it

Legambiente
http://www.legambiente.it

Unione Nazionale Comuni Comunità Enti Montani (UNCEM)
http://www.uncem.it

Sportello Fonti rinnovabili
http://www.fonti-rinnovabili.it/

Il Portale italiano delle Energie Rinnovabili
http://www.energie-rinnovabili.net/

Chimica verde
http://www.chimicaverde.net

Associazione Italiana di Tecnologia Alimentare (AITA)
http://www.aita-nazionale.it/

Consorzio Italiano Biogas e Gassificazione (CIB)
http://www.consorziobiogas.it/

Consorzio Monviso Energia
http://www.monvisoenergia.it

Ministero dell‘ ambiente
http://www.minambiente.it

Ministero delle politiche agricole alimentari e forestali (MIPAAF)
http://www.politicheagricole.it

Unione delle province d’Italia (UPI)
http://www.upinet.it/

Gestore servizi energetici (GSE)
http://www.gse.it
8.5.5 Poland

National Energy Conservation Agency (NAPE)
Tel. + 48 22 50 54 661
http://www.nape.pl
nape@nape.pl

Energy Conservation Foundation (FPE)
Tel. + 48 22 50 54 661
http://www.fpe.org.pl
biuro@fpe.org.pl

Institute for Renewable Energy (EC BREC IEO)
Tel. +48 22 825 46 52
http://www.ieo.pl
biuro@ieo.pl

Polish Biomass Association (POLBiom)
Tel. +48 22 542 11 04
http://www.polbiom.pl
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Polish Biogas Association (PBA)
Tel. +48 58 622 81 81
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Renewable Energy Association (SEO)
Tel. +48 22 433 12 38
http://www.seo.org.pl
biuro@seo.org.pl

Polish Economic Chamber of Renewable Energy (PIGEO)
Tel. +48 22 548 49 99
http://www.pigeo.org.pl
pigeo@pigeo.pl

Energy Regulatory Office (URE)
Tel. +48 22 661 61 07
http://www.ure.gov.pl
ure@ure.gov.pl

The Energy Market Agency (ARE)
http://www.are.waw.pl/
biuro@are.waw.pl

Environmental Information Center (ClôS)
Tel. +48 22 57 92 215
http://www.ekoportal.gov.pl
centrum@cios.gov.pl

Center for Information about the Energy Market (CIRE)
http://www.cire.pl
8.5.6 Estonia

**Estonian University of Life Sciences** (in Estonian *Eesti Maaülikool*)

*internet: http://www.emu.ee*

Centre of Renewable Energy (in Estonian *EMÜ Taastuvenergia Keskus*)

*internet: http://tek.emu.ee/tek/
telephone: +372 731 3268
contact person: Argo Normak
e-mail: Argo.Normak@emu.ee*

Unit of Bioconversion of Crops and Wastes (in Estonian *EMÜ Biogaasi labori koduleht*)

*internet: http://bioconversion.emu.ee*

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**Ministry of Agriculture** (in Estonian *Põllumajandusministeerium*)

*internet: http://www.agri.ee*

Plant Products Bureau (in Estonian *Taimekasvatussaaduste büroo*)

*telephone: +372 625 6235
contact person: Martti Mandel
e-mail: Martti.Mandel@agri.ee*

Calculator of Energy Crops (in Estonian *Energiakultuuride kalkulaator*)

*internet: http://www.agri.ee/energia/index.php?module=2&op=&dok_id=1*

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**Ministry of Economic Affairs and Communication** (in Estonian *Majandus- ja Kommunikatsiooniministeerium*)

*internet: http://www.mkm.ee*

Sustainable Energy Division (in Estonian *Säästva Energia Talitus*)

*telephone: +372 625 6497
contact person: Madis Laaniste
e-mail: Madis.Laaniste@mkm.ee*
Ministry of Environment (in Estonian Keskkonnaministeerium)
internet: http://www.envir.ee

Environmental Management Department (in Estonian Keskkonna korralduse osakond)
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contact person: Valdeko Palginõmm
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Ambient Air Department (in Estonian Välisöhu osakond)
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contact person: Heidi Koger
e:mail: Heidi.Koger@envir.ee

Estonian Farmers Federation (in Estonian Eestimaa Talupidajate Keskliit)
internet: http://www.talulit.ee
television: +372 604 1783
contact person: Kaul Nurm
e:mail: kaul@talulit.ee

Estonian Biomass Association (in Estonian Eesti Biokütuste Ühing)
internet: http://www.eby.ee

Stockholm Environment Institute in Tallinn (in Estonian Säästva Eesti Instituut. Stockholmi Keskkonnainstituudi Tallinna Keskus)
internet: http://www.sei-international.org/index.php/tallinn

Estonian Wind Power Association (in Estonian Eesti Tuuleenergia Assotsiatsioon)
internet: http://www.tuuleenergia.ee
9 REFERENCES