Promoting the penetration of agrobiomass in European rural areas

Grant Agreement No 818369

# D5.1: National and European framework conditions

## Part 4: National framework conditions - Denmark


Lead Beneficiary: FBCD

Main authors: Gunnar Hald Mikkelsen, Louise Krogh Johnson (FBCD)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 818369.

| Deliverable Factsheet | |
|---|---|
| **Full title** | National and European framework conditions. Part 4: National framework – Denmark |
| **Deliverable Number** | D5.1 |
| **Work Package** | WP5 Providing Europe with a strategy and regulations for agrobiomass heat |
| **Task(s)** | T5.1 Monitoring of current national and European framework conditions |
| **Lead Beneficiary** | FBCD |
| **Main authors** | Gunnar Hald Mikkelsen, Louise Krogh Johnson (FBCD) |
| **Version** | 1.0 |
| **Date** | 9 June 2020 |

| Dissemination Level | |
|---|---|
| **X** | PU - Public |
| | PP - Restricted to other programme participants (including the EC) |
| | RE - Restricted to a group specified by the consortium (including the EC) |
| | CO - Confidential, only for members of the consortium (including the EC) |

| Approvals | |
|---|---|
| **Task Leader** | B.E. |
| **WP Leader** | B.E. |
| **Reviewer** | Manolis Karampinis (CERTH), Alberto Rocamora (B.E.) |

# Document history

| Version | Date | Main modification | Entity |
|---|---|---|---|
| 1.0 | 9 June 2020 | Final version, integrating review comments | FBCD |

# Disclaimer of warranties

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 818369.

This document has been prepared by AgroBioHeat project partners as an account of work carried out within the framework of the EC-GA contract no 818369.

Neither Project Coordinator, nor any signatory party of AgroBioHeat Project Consortium Agreement, nor any person acting on behalf of any of them:

a. makes any warranty or representation whatsoever, express or implied,
    i. with respect to the use of any information, apparatus, method, process, or similar item disclosed in this document, including merchantability and fitness for a particular purpose, or
    ii. that such use does not infringe on or interfere with privately owned rights, including any party's intellectual property, or
    iii. that this document is suitable to any particular user's circumstance; or
b. assumes responsibility for any damages or other liability whatsoever (including any consequential damages, even if Project Coordinator or any representative of a signatory party of the AgroBioHeat Project Consortium Agreement, has been advised of the possibility of such damages) resulting from your selection or use of this document or any information, apparatus, method, process, or similar item disclosed in this document.

# Abbreviations

| Abbreviation | Explanation |
|---|---|
| CAP | Common Agricultural Policy |
| CHP | Combined Heat and Power |
| DH | District Heating |
| DKK | Danish Krone |
| LRTAP Convention | Long-range Transboundary Air Pollution Convention |
| NAPCP | National Air Pollution Control Plan |
| NCEP | National Climate and Energy Plan |
| NEC | National Emissions Ceiling |
| NOX | Nitrogen Oxides |
| PM | Particle Matter |
| RES | Renewable Energy Sources |
| RDP | Rural Development Programme |
| TOC | Total Organic Carbon |
| VAT | Value Added Tax |

# Project consortium

| # | Full name | Acronym |
|---|---|---|
| 1 | Ethniko Kentro Erevnas kai Technologikis Anaptyxis | CERTH |
| 2 | Fundación Centro de Investigación de Recursos y Consumos Energéticos | CIRCE |
| 3 | Asociación Española de la Valorización Energética de la Biomasa | AVEBIOM |
| 4 | BIOS BIOENERGIESYSTEME GmbH | BIOS |
| 5 | Food & Bio Cluster Denmark | FBCD |
| 6 | Bioenergy Europe | B.E. |
| 7 | Zelena energetska zadruga za usluge | ZEZ |
| 8 | Asociatia Green Energy | GEA |
| 9 | Institouto Agrotikis kai Synetairistikis Oikonomias INASO-PASEGES | INASO-PASEGES |
| 10 | Bioenergy Association of Ukraine | UABIO |
| 11 | White Research Sprl | W.R. |
| 12 | Agronergy | AGRONERGY |
| 13 | Association d'Initiatives Locales pour l'Energie et l'Environnement | AILE |

# Contents

# Country: Denmark

- Agriculture is a key economic activity, amounting to 5.5 % of Danish GDP.
- Danish farmers are well educated and familiar with new scientific knowledge.
- 62 % of the Danish land is covered with agriculture. 54 % of this is cereal production.
- Straw from cereals is the main domestic biomass resource for energy production.
- 50 % of straw is incorporated into soil. 50 % is used for energy production and for bedding, 64 % of this part is used for energy production.

# 1. Agrobiomass availability

54 % of the land is covered with cereals, which mainly is used for fodder for pigs. For 2006, the cereals covered 2,614,058 ha, total straw production was 5,754,123 tons. For agricultural purpose 1,846,638 tons, for energy production 1,188,290 tons and the surplus that was incorporated in the soil amounted to 2,719,195 tons; straw surplus quantities can be considered as feedstock for energy production.

According to data from the Danish Energy Agency[1], in 2018 straw amounted to 2.25 % of gross energy consumption production and 10.2 % of RES production in the country.

In recent years, droughts have led to straw shortages in Denmark[2] (as well as in all Scandinavia) that have led DH operators to start using more wood chips.

[1] https://ens.dk/sites/ens.dk/files/Statistik/energy_statistics_2018.pdf
[2] www.endswasteandbioenergy.com/article/1490285/straw-shortage-raise-denmarks-heating-bills

| Agricultural residues | |
|---|---|
| **Straw** | **PRODUCTION:** Cereals are the dominant agricultural crop in Denmark, covering 54 % of the agricultural production.<br><br>**GEOGRAPHICAL DISTRIBUTION:** Even spread all over the country.<br><br>**ESTIMATION OF BIOMASS PRODUCTION**: The production of straw is around 6,000,000 tons per year. Around 32 % of the straw production is used for energy.<br><br>**USES**: According to Danish Energy Agency data, in 2018 the energy use of straw was distributed as follows:<br>• 33 % in DH<br>• 19.6 % in small-scale CHP<br>• 19.2 % in large-scale CHP<br>• 16.7 % in single family houses<br>• 11.2 % in agriculture, forestry, horticulture (basically farm heating)<br><br>**Prices:** The price of straw in bale form is around 460 DKK / t (a little over 60 EUR/t), including all costs up to the point where a farmer is ready to deliver the straw to a consumer. |
| **Maize** | **CROP PRODUCTION:** Maize is cultivated for silage production for cows. Therefore, there are no residues available for energy purposes. |

| Energy crops | |
|---|---|
| **Poplar and Willow** | In 2019, 764 hectare were cultivated. with poplar, and 4,808 hectare with willow. Figures based on the EU hectare aid reported for Denmark. A minor production situated on agricultural soils. |

# 2. Rural Development

| Rural Development | |
|---|---|
| How is Rural Development managed? | The Danish Rural Program is the implementation of the European Agricultural Fund for Rural Development, which is part of the EU's Common Agricultural Policy (CAP). The rural program is realized through funding from the EU and the Danish state. With EU funding, the total budget for the period 2014-2020 is about 9.3 billion DKK, 6.8 billion DKK is from the EU.<br><br>The rural program is implemented through a number of grant schemes. Farmers, businesses, the population and others can apply for the grant schemes with initiatives that contribute to the program's objectives. |
| Are agrobiomass feedstocks suitable for bioheat included in the Ecological Focus Area? (for example, Short Rotation Coppice, Miscanthus, Silphium perfoliatum) | No crops are excluded to grow on agricultural land. |
| Are there any restrictions on the cultivation of dedicated energy crops (woody or grassy varieties)? | There are no restrictions in relation to grow energy crops. Willows and Poplars can be grown. |
| Are there any restrictions or mandated practices covering agricultural residues collection? | *No.* |
| Is there any support for the valorization of agricultural residues at national level? Or at local level? | The advisory services support with price calculations. |
| Is there a ban on burning stubbles, prunings or other agricultural residues? | Order on the ban on field burning of straw, etc.<br><br>Pursuant to section 16 (2). 1 and 2, § 80, § 92 and § 110 (1). 3, of the Environmental Protection Act, cf. Statutory Order No. 1317 of 19 November 2015, provides:<br><br>§ 1. Straw or other similar parts of agricultural crops shall not be burnt on fields or un cultivated land. |

# 3. Logistics and other market considerations

| Logistics | |
|---|---|
| Are harvesters/balers for agricultural residues readily available in the market?<br><br>Is there an investment support available to cover the cost of these machines? | The sector of agricultural machinery manufacturing is well developed. All farmyard machinery are available. But no support for buying agricultural machinery. |
| Are there any specialized service companies for agricultural residues harvesting and logistics?<br><br>How does the biomass market usually operate? | Farmers selling straw are organised in "Straw Supplier Association (Danske Halmleverandører, www.danskhalm.dk), who support with price calculation and market development. The price for 1 kg of straw from the farmer is calculated from the following:<br>Straw should contain a maximum of 15% water.<br>The fertilizer value of straw.<br>Handling of straw in the field.<br>Pressing straw for bales<br>Transport of straw to the farm.<br>The price for storage.<br>Insurance.<br>Other expenses.<br><br>The price is around 0.46 DKK per kg of straw.<br><br>Evenly spread commercial agricultural machine contractors all over the country can be hired to do work in the fields including collecting straw.<br><br>Works under commercial market conditions. |
| Are there companies producing agro-pellets?<br><br>Are there any resistance in the market for this kind of product? | A few companies are producing straw pellets, but they are used for bedding.<br><br>No. It is price dependent. Straw pellets are more expensive than pellets of wood. Pellets of straw have a prize around 245 EUR per ton. |

# 4. Air quality

<table>
<tr><th colspan="2">Air quality</th></tr>
<tr><td>Has the state submitted a NAPCP? (National Air Pollution Control Programme)</td><td>The Air Quality Directive, the NEC Directive and the LRTAP Convention are supported by a comprehensive source-specific legislation to help ensure compliance with the limit values laid down in the Directives and the Convention. This applies, for example control of stoves, vehicles, ships and companies. The regulation exists of both EU and national rules.</td></tr>
<tr><td>Competence over air quality related issues is at National or at Local level?</td><td>In Denmark, the regulation of air pollution is divided between several levels of government. In general, the departments are responsible for the overall policy development and drafting of regulations. The Boards implement the legislation and carry out monitoring tasks and reporting obligations. The municipalities are largely responsible for approval and supervision with companies except a few large companies, where the Danish Environmental Protection Agency carries out the approval and supervision obligation. There are no additional restrictions at local level.</td></tr>
<tr><td>Are performance standards and/or emission limits a possible barrier to deployment of agrobiomass heating systems up to 500 kW?</td><td>In Denmark we had to fulfill limit for installing of new biomass heating systems. From 31/12/2022 the new limits are which also covers straw boilers:<br><br>
<table>
<tr><th></th><th colspan="4">Gaseous emissions (mg/Nm3)</th></tr>
<tr><th>Type of equipment</th><th>PM</th><th>TOC</th><th>NOx</th><th>CO</th></tr>
<tr><td>Open or closed fireplace and wood stoves</td><td>30</td><td>70</td><td>160</td><td>1250</td></tr>
<tr><td>Pellet stoves</td><td>20</td><td>35</td><td>160</td><td>250</td></tr>
<tr><td>Pellet or woodchips boilers</td><td>15</td><td>10</td><td>130</td><td>100</td></tr>
</table>
* Oxygen 13%<br>
2. In space heaters below 35 kW mandating use of pellet certified to respect the standards A1 UNI EN ISO 17225-2 d</td></tr>
<tr><td>Are performance standards and/or emission limits a possible barrier to deployment of agrobiomass heating systems from 500 kW to 1 MW?</td><td>It might be a barrier for new installations.</td></tr>
</table>

# 5. Tax breaks

| Tax breaks | |
|---|---|
| What is the VAT applicable to agrobiomass feedstock? | In Denmark there is only two VAT applicable:<br>Selling biomass VAT is 25%<br>Buying biomass VAT is 20%.. |
| For comparison, what is the standard VAT rate and the one applicable to fuels used for heating (e.g. heating oil, LPG, natural gas, firewood, pellets, etc.)? | In Denmark there are only the two above mentioned VAT calculations for all biomasses and fuels . In general these VAT is used on all products. |
| Are there any tax detraction on refurbishment of buildings/replacement of heating system that can be potentially applied to agrobiomass heating? | There is no financial support or reduction in taxes for either new installations or for renovating (upgrading) existing plants. There is support if in your house replace the ollie boiler with another heating source. It can be biomass but not necessary. |

# 6. Other support measures targeting heating

| Other support measures targeting heating | |
|---|---|
| Are there any rural development measure in place to support the production of bio-heat on-farm? | No. |
| Are there national or local incentives to substitute old fossil fuel boilers (investment support)?<br><br>Are they applicable to agrobiomass heating solutions? | No. |
| Are there any specific measures in support of energy communities / renewable energy cooperatives that could be applicable to agrobiomass heating? | No. |

# 7. Buildings Efficiency

| Buildings Efficiency | |
|---|---|
| Are there any incentives to renovate buildings integrating renewable heat?<br><br>Are agrobiomass systems eligible for support under such schemes? | No. |

# 8. Policy Coherence

| Policy Coherence | |
|---|---|
| Are policy instruments impacting agrobiomass designed in a coherent way?<br><br>*1. Soil considerations vs. Valorisation of residues* | Farmers in Denmark are regulated by a number of production laws. Straw is not burnt, they must use post-harvest crops on large parts of the area which is mowed down and there is a very large animal production. Livestock manure is available throughout the country. This means that legislation ensures that carbon is supplied to the soil. However, all these measures do not mean that the carbon content of the soil increases but is kept at a level so that the yields can be maintained. |
| *2. Definition of waste vs. co-products/agri residues* | In Denmark, what controls what organic waste can be used for is the content of heavy metals. All waste of organic origin can be used when only the heavy metal content is very low. All sludge is analyzed for heavy metals before use. If the heavy metal content is too high, it is dried and burned. Livestock manure is not analyzed the content here is lower than in industrial fertilizers. |
| *3. Is the Common Agricultural Policy Strategic plan being developed in harmony with the National Energy and Climate Plan?* | In general, in the field of climate and environmental policy, all industrial branches are trying to reduce greenhouse gas emissions and reduce the impact on the environment. Agriculture must also participate. A number of laws are being prepared to ensure that the environment and climate objectives can be achieved. |
| *4. NECPs: 5 dimensions are developed in harmony?* | |
| *5. Is there a national bioeconomy strategy? Are there any measures targeting agrobiomass for energy? Are those measures coherent with rural development and energy and climate related policies?* | Energy production and regulations for climate and environment regulation seems to be in harmony. There is no bigger discussion in relation to these subjects. Agro biomass is included in the national plan for not using fossil oils. |