Danish Energy Agency

Draft requirement specification Contract on subsidy for biochar carbon storage on Danish agricultural soils

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Carsten Niebuhrs Gade 43
1577 København V

T: +45 3392 6700
E: ens@ens.dk

www.ens.dk

1 Introduction

This Appendix contains the DEA's draft description of the DEA's requirements specification that bidders/beneficiaries will have to comply with to be eligible for aid from the biochar subsidy scheme.

Please note that besides the requirements in this annex biochar carbon storage will have to comply with other regulations e.g. environmental regulation as well as regulation related to fertilizers. These requirements are not described in this annex. The requirements described here are mainly related to carbon storage, although potential environmental limit values from the EU CRCF regulation are mentioned briefly and in broad terms.

Subject
1. Minimum quantity to be stored
The purpose of the aid scheme is to increase carbon storage in Danish agricultural soils by applying biochar whereby the carbon storage can be accounted as negative CO2 emissions on the Danish greenhouse gas inventory report. In each bid bidders shall determine the number of tonnes of CO2e per year understood as the amount of biogenic carbon being stored in biochar. Each bid shall as a minimum determine a yearly number equal to at least 400 tonnes of CO2 each year. 400 tonnes of CO2 is equal to the weight of 109 tonnes of carbon. To calculate tonnes of carbon contained per tonne of CO2 the weight of CO2 will have to be divided by a factor of 3.666. That is, carbon's share of the total weight of CO2 is 27.3% and the weight share of oxygen is 72.7%. Furthermore, bidders will be required to indicate yearly storage commencement in 2027, 2028, 2029 or 2030 of the application of biochar to Danish agricultural mineral soils. As mentioned in Section 3.3 in "Invitation to market dialogue on the biochar aid scheme" it is not yet determined how to measure the aid that will be available for carbon storage in biochar in Danish agricultural soils. The methodology for calculating

aid will depend on an ongoing Danish research project, where a methodology for accounting biochar carbon storage on the Danish greenhouse gas inventory report is developed. The methodology will be decided before the tender and will be specified in the final requirement specification for the tender, as explained further in point 8 in this annex.
2. Yearly certification procedure
The DEA considers setting a requirement that the biochar carbon storage on Danish agricultural soils is to be certified. It is not yet decided which certification criteria to set. It is up for consideration whether to require that the biochar is certified under the new voluntary CRCF regulation. The CRCF regulation is described in regulation EU/2024/3012, in Commission implementing regulation EU/2025/2358 and in Commission delegated regulation EU/2026/285. Another possibility could be to require, that the biochar is certified in accordance with European Biochar Certificate (EBC) or other requirements. The EBC guidelines are available at the Carbon Standards International website. The DEA expects at a minimum a need for setting as requirement that each individual type of biochar will need to be certified by an accredited auditor and be assigned a unique yearly batch number. Each batch number can only be produced a maximum of one year (in line with for example CRCF- and EBC guidelines), but the biochar can be applied in the year it is produced or in the year after. In each following year a new certification procedure is required and a new unique batch number will have to be issued. A specific batch must abide to certain production requirements. The yearly certification requirements are still not decided upon, but the DEA considers that the certification may have to prove that the biochar complies with the following criteria listed under points 2a-2f. The DEA notes that the list is nor finally decided upon and nor does it necessarily represent a full listing of requirements that may be set.
2.a Is certified for biochar carbon storage on agricultural soils.
2.b Comply with environmental regulation.

2.c The DEA considers a requirement that the biochar may have to comply with certain production requirements as well as minimum requirements concerning carbon content in the biochar. This will be decided upon before the tender.

The DEA notes that under CRCF and EBC a minimum temperature of 350 degrees Celcius is required, when producing biochar.

Since the share of carbon in biochar that is non-degradable will increase at high carbonization temperature it may be considered setting a higher minimum temperature limit in the biochar production process or alternatively it may be considered for example that a high fraction of the carbon in the biochar will have to be non-degradable, so that this fraction of the carbon cannot over time be re-emitted as CO2. The DEA notes that under CRCF- and EBC certification guidelines there is no such specific requirements besides the abovementioned temperature minimum requirement.

The DEA notes that under CRCF and EBC certain other production criteria are set, not in all instances being equal. For example, CRCF and EBC guidelines set requirements concerning retention time. Such requirements may also apply in the subsidy scheme, although not yet decided upon.

2.d That only sustainable biomass is used for producing biochar. The DEA considers that biomass may have to comply with the sustainable biomass requirements in the revised renewable energy directive EU/2023/2413. Furthermore, it will be considered whether to require that the sustainable biomass requirements stated in the CRCF may also be set as requirement. According to CRCF, if biochar is the main product from the production plant, only waste and residues are eligible feedstocks.

Furthermore, the DEA considers setting a requirement that only biochar from certain types of biomasses will be eligible for aid. This may follow ongoing work on a Danish methodology on how to account for biochar carbon storage in biochar from selected common types of biomasses in Denmark's national greenhouse gas inventory report. This requirement may be set, since the intention of the scheme is to account the carbon storage in biochar on the Danish greenhouse gas inventory. Thus, types of biochar that will not be accountable on Denmark's greenhouse gas inventory may not be eligible for aid.

2.e That the biochar production plant is designed in a way to avoid methane emissions in line with CRCF- and EBC requirements.

2.f Based on laboratory measurements from accredited laboratories the certificate may have to prove the biochar contents per ton of dry weight, currently the following:

Related to carbon storage:
-carbon (C) content per tonne of dry weight biochar
-inertinite carbon content per tonne of dry weight biochar
-semi-inertinite carbon content per tonne of dry weight biochar
-wet weight (as received at measure/test laboratory) over dry weight (measured by measure/test laboratory after drying) of biochar
-Overall carbon weight share in biochar
-Hydrogen, (H), per ton of biochar dry weight
-Oxygen, (O), per ton of biochar dry weight
-H/C-ratio (molar)
-O/C-ratio (molar)

Related to content of fertilizer, being the responsibility of the Danish Agency for Green Transition and Aquatic Environment:
-Nitrogen, (N), content
-Phosphorous, (P), content

Related to environmental regulation, being the responsibility of the Danish Environmental Protection Agency:
-lead, cadmium, copper, nickel, mercury, zinck, chromium, arsenic, benzo[e]pyrene, benzo[j]fluoranthene, PCB, PCDD/F, PAH_{16}, PAH_8

Other and potentially new requirements following from regulation. If it is decided to set the requirement to follow a certain certification scheme, such as CRCF or EBC, the biochar may have to comply with new requirements that may be set in future in these certification schemes.

3. Municipal approval

With current regulation there is a requirement to send an application to the local municipality and get consent before applying biochar to Danish agricultural soils.

Biochar must comply with environmental regulation. A new environmental regulation is planned to be published before the finalisation of the tender. This is the responsibility of the Environmental Protection Agency.
4. **Report sales/transfers of biochar**
Report all sales/transfers of biochar to Danish farmers to SGAV's reporting system for fertilizer suppliers before application to Danish mineral agricultural soils. Minimum requirements are to be decided later when designing the MRV-system. The DEA considers that the following minimum reporting requirements may apply: -Date of the sale/transfer -Unique batch numbers for each type of biochar -Tonnes of biochar of each batch -The sales/transfer report has to be signed by both the supplier and the farmer -CVR number of the supplier -CVR/CPR number of the farmer The DEA notes that some of the above reporting requirements already exists today. Other potentially new reporting requirements may be deemed necessary to be able to register carbon content in biochar. The DEA is currently drafting a bill that will form the legal basis for such potential new reporting requirements. This bill is planned for publication before the tender.
5. Report application of biochar
Report to SGAV's Danish fertilizer reporting system after application to agricultural soils Minimum requirements are to be decided later when designing the MRV-system. The DEA considers that the following minimum reporting requirements may apply: -Unique batch numbers for each type of biochar -Tonnes of biochar of each batch -CVR/CPR number of the farmer -Geographical location where the biochar is applied to mineral agricultural soils -Perhaps it needs to be declared if biochar is applied on sandy or clay soils

The DEA notes that some of the above reporting requirements already exists today. Other potentially new reporting requirements may be deemed necessary to be able to register carbon content in biochar.

6. Report on certificates etc

Beneficiaries must report to DEA on a yearly basis on certificates for all the specific batch numbers of biochar applied. If certificates are not published, DEA may share the certificates with Danish Center for Energy and Environment as well as other public authorities and the public if deemed needed.

It is to be decided if beneficiaries will also have to report on some of the following:
-Public support given to pyrolysis plants
-Income from the sale of voluntary climate credits
-Income from sale of heat
-Income from sale of pyrolysis gas
-Income from sale of pyrolysis oil

It is furthermore to be considered if Danish pyrolysis plants will have to report on some of the following:
-Use of biomass
-Use of electricity
-Use of fossil fuels
-Self-consumption of pyrolysis gas in the pyrolysis plant
-Production of biochar
-Production of pyrolysis gas and -oil
-Production of heat

7. Reporting and invoicing

Beneficiaries must report documentation for storage to the DEA at least on a yearly basis. In the report beneficiaries shall state the amounts of biochar applied to mineral soils for each batch of biochar.

It is up for consideration which type of documentation exactly will be needed. It could be for example proof that the biochar is delivered to farmers and applied to mineral soils by farmers.

The application for aid is accepted if all the requirements mentioned above are fulfilled.

It still has to be decided how frequent invoicing and payment of aid shall be carried out.

8. Calculation of aid

As explained in Section 3.3 in the invitation to market dialogue on the biochar aid scheme it is up for consideration how exactly to measure the aid that will be available for carbon storage in biochar.

The methodology for calculating aid will depend on an ongoing Danish research project that is developing a methodology for accounting biochar carbon storage on the Danish greenhouse gas inventory report. The methodology will be decided upon before the tender and will be specified in the final requirement specification for the tender.

The DEA expects that aid may to a large extent be based on the amount of non-degradable carbon contained in the biochar. This is because the purpose of the aid scheme is to remove carbon from atmospheric CO2. It is also a possibility that the degradable semi-inert part of carbon in biochar will be eligible for aid, if it is proven that the semi-inert carbon will remain stored long term although not permanently since parts of the degradable carbon may be re-emitted as CO2 to the atmosphere. It is furthermore a possibility that an aid deduction per amount of carbon stored may be applied to take into account other factors, depending on the results of the abovementioned research project.

Besides the bid price (measured as DKK/ton CO2 stored permanently in biochar applied to mineral agricultural soils), the aid will be adjusted each year in line with adjustments in the consumer price index.

It remains to be decided whether there will be a deduction in the aid if the pyrolysis plant has received subsidy and how this will be calculated in practice.

It is furthermore to be decided later whether there will be a deduction in the aid if climate credits have been sold and a methodology on how this deduction will be calculated in practice is to be developed.

Aid will be paid after it is proven that biochar has been applied to soils in line with the description under points 2, 3, 4, 5, 6 and 7 above.

9. Eligible for aid

Only biochar that have been applied to mineral agricultural soils and afterwards registered by suppliers in SGAV's reporting system for fertilizer suppliers as well as in SGAV's reporting system for fertilizer application is eligible for aid.

This follows from the MRV-system that is currently being developed as well as from expected reporting requirements following from the methodology that is currently being developed to be able to account biochar carbon storage on Denmark's national greenhouse gas inventory report.

If SGAV's system for registering biochar carbon storage is not ready from the start-up date of the subsidy scheme this, or parts of, these requirements may be postponed until the reporting system is ready for use. In that case similar reporting requirements to ENS may apply.

All technologies that comply with the certification criteria as well as the other criteria mentioned in this Annex may be eligible for aid.

Only biochar carbon storage that is being accounted for in the Land-Use, Land-Use-Change and Forestry sector, in the subsector "mineral agricultural soils" in Denmark's national greenhouse gas inventory is eligible for aid.

This also means that only types of biochar that can be accounted for as biochar carbon storage on Denmark's national greenhouse gas inventory report is eligible for aid. The specific requirements are not yet decided but will be specified in the final requirements specification to be used in the tender.

This follows from the methodology that is being developed to be able to account biochar carbon storage on Denmark's national greenhouse gas inventory report.
10. Not eligible for aid
Biochar carbon storage that is being accounted for in the national greenhouse gas inventory report in another country than Denmark is not eligible for aid.
Biochar applied to other soil categories than mineral agricultural soils are not eligible for aid. Biochar applied to organic soils (either in agriculture, forest or elsewhere) is not eligible for aid. Likewise, biochar applied in sea water, inlets, lakes, wetlands, forest areas or in fortified areas (including buildings, roads, gravel pits etc) is not eligible for aid. This follows from the methodology that is being developed to be able to account biochar carbon storage on Denmark's national greenhouse gas inventory report.
Types of biochar that cannot be accounted for as biochar carbon storage on Denmark's national greenhouse gas inventory report are not eligible for aid. This follows from the methodology that is being developed to be able to account biochar carbon storage on Denmark's national greenhouse gas inventory report.