



Summary and response to consultation on biochar carbon storage aid scheme

Office/department
Gas and biogas

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Background

From June to August 2026, the Danish Energy Agency ("DEA") conducted a public consultation and market dialogue concerning competition impact and proportionality of a planned State aid scheme to support permanent carbon storage in biochar applied to Danish agricultural soils in the period 2027-45. The consultation was conducted in line with the European Commission's Guidelines on State aid for climate, environmental protection and energy 2022 ("CEEAG")¹, which require that a response summarizing and addressing the input received during the consultation is published. This memo constitutes the DEA's response to the input received during the public consultation.

The consultation

The biochar carbon storage aid scheme follows from the November 2024 political Agreement on the Implementation of a Green Denmark, which allocates DKK 10.2 billion (2025 prices) to support carbon storage in biochar produced by pyrolysis in the period 2027–2045. Aid is intended to be granted per tonne of carbon from biogenic CO₂ permanently stored in biochar applied to Danish agricultural soils, with the objective of reducing Denmark's net greenhouse gas emissions to be accounted for as so called "negative emissions" in Denmark's National Greenhouse Gas Inventory Report in line with UNFCCC reporting guidelines.

On 26 June 2026, the DEA launched the public consultation and market dialogue on its preliminary design considerations of the aid scheme. A main design element being one tender round to be decided early 2027 and the possibility of bidding to store carbon in biochar in the period 2027-45 (batch one) or 2030-2045 (batch 2). The consultation material consisted of a cover note, the Invitation to market dialogue concerning the biochar aid scheme and a draft requirement specification. The DEA emphasized that the design was preliminary and that the market dialogue would inform the final tender documents.

The DEA held an information meeting on 18 August 2026, at which the preliminary aid scheme design was presented and market participants were invited to ask

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¹ Communication from the Commission, Guidelines on State aid for climate, environmental protection and energy 2022 (2022/C 80/01) ("CEEAG").



questions and provide input. By the deadline for written contributions 26 August 2026 the DEA received 18 written contributions from a range of stakeholders, including existing and prospective pyrolysis operators, project developers, technology suppliers, actors in the biomass and biogas value chains, industry associations, the financial sector, academia and civil-society organisations. Some contributions contained commercially sensitive information. Such information is therefore reflected only in aggregated or anonymised form in this memo. The outcome of the market dialogue will serve as input to the elaboration of the final tender design and inform the Danish Government as well as the European Commission State aid process.

Summary of market information received and the DEA's response

The consultation confirms market interest in the biochar aid scheme. Several respondents are existing or prospective pyrolysis plant operators or developers with concrete plans of establishing new pyrolysis plants. Other respondents represent pyrolysis plant technology suppliers, financing institutions, sector organisations and academia. The replies therefore provide useful evidence on market conditions, but they do not constitute binding bids. The DEA consequently considers the indications on future biochar carbon storage volumes, prices and project timing to be indicative and does not infer a final number of bidders from the consultation alone.

Expected bidding volumes and timing.

The responses show a wide range of potential project sizes and maturity levels. Publicly disclosed indications range from individual projects in the low thousands or tens of thousands of tonnes of permanent carbon storage per year to portfolios once fully scaled with annual volumes above 100,000 tonnes measured as CO₂ equivalents. A limited amount of biochar carbon storage from existing production capacity may be possible from 2027, whereas several respondents developing new facilities expect material biochar volumes only from approximately 2029-2032. Several respondents noted that additional bidding opportunities at a later stage could allow projects that are not sufficiently mature for an initial tender to participate once permitting, financing, feedstock supply and offtake arrangements with Danish farmers and land-owners as well as buyers of voluntary carbon market credits are further advanced. The DEA notes this relevant market information as a basis for assessing the timing and overall design of the scheme. No conclusion on the number of bidding rounds is drawn from the consultation alone but can serve as input for the Government's further considerations about the scheme.

Expected bidding prices and bankability.

The consultation did not provide a sufficiently uniform set of firm price indications to allow the DEA to draw conclusions on the likely level of bids. Views on the preliminary bid ceiling were mixed. While some respondents considered the



proposed level broadly workable, several respondents argued that a higher bid ceiling could be warranted in order to reflect updated technology-cost expectations and the risk profile of projects at the current stage of market development.

In particular, respondents pointed to uncertainties relating to capital and operating costs, technology risks, financing conditions, VAT treatment, regulatory requirements and permitting, as well as future revenues from co-products and voluntary carbon removal credits.

Several respondents noted that, to the extent such uncertainties cannot be sufficiently mitigated or reflected in the contractual framework, bidders may need to incorporate corresponding risk premia in their bids. Conversely, a higher bid ceiling would not in itself determine the level of aid ultimately granted, but would provide a wider range within which projects with different cost structures and risk profiles could compete. The DEA notes these considerations and will take the market input into account when assessing the final bid ceiling and the underlying cost and revenue assumptions. The aid granted to individual beneficiaries is intended to be determined through the competitive pay-as-bid process, subject to the final conditions of the tender.

Number of bidding rounds and batch design.

A substantial part of the respondents favour dividing the allocation into more than one bidding round. The main argument being that a single allocation at an early stage could require immature projects to price regulatory, technical and financing uncertainty into their bids, whereas a later round could attract additional projects and lower risk premia. Several respondents simultaneously supported the preliminary two-batch structure within a bidding round, under which projects able to deliver earlier are prioritised, and some proposed a later “mop-up” round for volumes released after default or withdrawal. The DEA notes that while multiple rounds could improve competition and allow increasing project maturity for more pyrolysis plant projects over time, this must be balanced against the objective of achieving early climate effects and the applicable budgetary and political framework.

Regulatory framework, certification and delivery risk.

The timing and content of the new forthcoming but not yet published environmental framework for applying biochar to Danish agricultural soils, the specific methodology for determining permanent carbon storage and the final certification and MRV requirements were repeatedly identified as key sources of uncertainty. Several respondents called for the main regulatory and methodological requirements to be clarified before binding bids are submitted, while also emphasising that requirements should be administratively workable and avoid unnecessary duplication with recognised certification systems. Respondents also stressed the importance of consistent traceability, prevention of double counting and clear rules where requirements change during the contract period. The DEA



recognises that clarity on these elements is relevant both to bid preparation and to the ability of projects to deliver the contracted carbon storage. The consultation input will therefore inform the further development of the environmental, certification and MRV frameworks and their interaction with the tender requirements.

Penalty mechanism and financial guarantees.

Respondents commented frequently on the proposed penalty mechanism and its interaction with project delivery risk and financial guarantees. Views differed on the appropriate calibration. Some respondents considered the proposed mechanism and the possibility of reducing or waiving penalties broadly workable, while others argued that the level should be sufficiently robust to discourage speculative or non-credible bids. At the same time, several respondents requested clearer and more flexible treatment where non-delivery or delay results from circumstances outside the beneficiary's reasonable control, in particular delays or refusals in permitting and changes in regulation. Respondents also noted that guarantee requirements may affect financing and the ability of projects to submit bids. The DEA considers it important that the final contractual framework provides credible incentives for delivery while remaining proportionate to the risks that beneficiaries can reasonably manage. The level of penalties, guarantee requirements and the circumstances in which penalties may be reduced or waived will be further assessed as part of the final tender design.

Voluntary carbon removal credits and claw-back.

The potential sale of voluntary biochar carbon removal credits was identified as a potentially relevant, but uncertain, supplementary revenue stream. Respondents differed in their assessment of the proposed claw-back mechanism. Some considered a claw-back acceptable provided that the calculation rules are clear and predictable, while others argued that an extensive claw-back could reduce the financing value of voluntary credits and result in higher aid bids. Suggestions included threshold-based or partial claw-back models, treatment based on realised net income rather than gross revenue, and no general claw-back below a baseline necessary to prevent overcompensation. The DEA notes that the treatment of voluntary credit revenues is relevant to both project bankability and the assessment of proportionality and overcompensation. The consultation input will be taken into account in the further design of any claw-back mechanism and the associated reporting requirements.

Competition, imported biochar and level playing field.

Several respondents commented on the competitive conditions between Danish and imported biochar and between existing and new production capacity. A recurring point was that any eligible imported biochar should be subject to comparable requirements concerning sustainability, environmental quality, certification, MRV, traceability and safeguards against double counting or double financing. Some respondents also raised concerns that differences in regulatory



requirements or sunk investment costs could affect competitive conditions. The DEA notes the importance of transparent and non-discriminatory eligibility requirements and of ensuring the environmental integrity of the supported carbon storage. These considerations will be reflected in the further specification of eligibility, documentation and MRV requirements in accordance with applicable EU law.

Award criteria and project maturity.

Most respondents that commented on the allocation mechanism recognised the rationale for competitive price-based bidding, but several suggested supplementing price competition with requirements or assessments related to project maturity and deliverability. Other suggestions included taking account of carbon efficiency, use of residual biomass, utilisation of surplus heat or other environmental co-benefits. The DEA notes that such proposals may address delivery risk and broader environmental effects, but may also increase complexity and reduce the transparency of bid comparison. The final allocation framework will therefore need to balance simplicity and price competition with appropriate requirements ensuring that supported projects are credible and capable of delivering eligible permanent carbon storage.