Market Review and Feasibility Study of Pilot Projects for a Biochar Mill in Ukraine

Project Background

Name of Applicant	NEFCO, Boyarsky Derevoobrobny Kompleks (Woodworking Complex)
Project Info/Project Name	Market Review and Feasibility Study of Pilot Projects for a Biochar Mill in Ukraine
Contractor	Indufor Oy
Project Duration	December 2021–March 2023
Contract Value	€ 181,700.00

Project Summary

1 Project Summary

This report presents the results of the Market Review and Conceptual Feasibility Study of Pilot Projects for a Biochar Mill in Ukraine.

The project consisted of two stages.

- Stage A: preparation of a market review of the biochar sector in Ukraine, including a review of market trends for biochar globally and in Ukraine; identification of biochar production opportunities and end-use markets in Ukraine; preparation of a business model for biochar production to be utilised nationwide; investment justification and analysis of market conditions.
- Stage B: preparation of a Conceptual Feasibility Study of a small-scale brownfield biochar mill in Ukraine with a production capacity of 1,000 tonnes/year. The study aimed to evaluate the attractiveness of such a business at a conceptual level including: a site description, availability of raw material and its supply concept market analysis, indicative target markets and sales prices, technical (production) concept, financial analysis and risk analysis. The financial analysis was based on data from before the Russian invasion of Ukraine in 02/2022.

2 Project Conclusions

The results of the market study indicate significant market opportunities for biochar in Ukraine due to the prominence of the agriculture, mining, energy and metallurgy sectors, in which biochar can be efficiently and widely applied.

Based on available raw material, the annual supply-side market size (production opportunities or potential demand) is estimated to be over 8.5 million tons. Based on consumption rates in most potential end-use sectors, including applications for soils, animal feeding and metallurgy, the annual demand-side market size is estimated to be over 40 million tons.

The results of the Conceptual Feasibility Study of a small-scale brownfield biochar mill suggest that investment presents an attractive opportunity.

With a total investment of EUR 1.136 million, the project would undoubtedly be interesting and lucrative. In the base scenario, this investment would be paid back in 5.6 years. The main risk for such an investment project in an established market is the lack of awareness of biochar, although growing demand for biochar and increasing mineral fertiliser prices in Ukraine will improve the market position.

3 Impact on Human Rights and the project's Sustainable Development Goals (SDGs)

The project will contribute to the following sustainable development goals: 7 Affordable and clean energy, 12 Responsible consumption and production and 13 Climate action.

The main market driver of biochar is the increasing pressure to transition toward low-carbon economies and business models. Biochar is a climate solution that sequesters carbon from the atmosphere (if the product is produced sustainably and not used as an energy source) and reduces the carbon emissions of existing operations (if it replaces fossil fuel). The product

provides carbon offsetting opportunities, for example through investments in biochar projects.

If managed properly from a gender perspective, the project can also contribute to the SDG 5 Gender equality and 11 Sustainable cities and communities.

Overall, the project will positively impact the following SDGs:

4 Project Deviations

Initially, it was planned that two facilities would be selected for Stage B (Feasibility Study). However, following the completion of Stage A, it was found that despite significant potential for the development of a biochar market in Ukraine, there is currently no existing market since biochar is still unknown as a product. Due to the immaturity of Ukraine's market, the scope of Stage B was reduced to the preparation of a simplified business plan for a single facility.

5 Project Lessons Learnt

Lessons learnt

The project demonstrated the potential of biochar as the primary material for soil treatment, as a source of animal feed, as an adsorption material and in energy applications for metallurgy and other sectors in Ukraine. Biochar markets, even in Western Europe, are only in the early stages of development, and the market in Ukraine is immature. Despite market immaturity, the significant potential for the development of biochar products in Ukraine has been proven.

The greatest potential demand for biochar in Ukraine is from the metallurgy and related (such as cement manufacturing) sectors, which are financially self-sufficient and able to follow global decarbonisation trends. However, national policies lack appropriate incentive mechanisms for private sector actors, especially SMEs, that could support the development of a biochar market. Wood processing mills are another prospective candidate for developing an attractive biochar business model in Ukraine.

Benefits of the project

Finland has extensive expertise in this specific sector. The project increased Finnish experts' understanding of the market conditions in Ukraine and opened up opportunities for further cooperation. Furthermore, it improved cooperation between Finnish and Ukrainian experts.

It was concluded that national policies and environmental regulations are favourable for biochar production. Ukraine's overall political ambitions of achieving European standards should support this potential and provide incentives for the domestic market. This study justifies the need for biochar market introduction and support mechanisms.

The domestic market for bioenergy and other bio-solutions being in the early stages of development, together with the low awareness of biochar, are considered to be the major obstacles to establishing a biochar market.

Effectiveness of the project

The project was implemented successfully and the project deliverables complied with FS targets and FUTF objectives, including promoting cooperation between Finland and Ukraine and identifying opportunities for projects. Furthermore, the project increased awareness of biochar and its market potential to be competitive with traditional residues to biomass energy.