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Biomass based energy intermediates boosting biofuel production

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Deliverable

Selection of commercial boilers for energy carrier applications

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Publishable Summary

To proof the suitability of the bio-char from HTC as an energy carrier for a commercial CHP plant of EnBW, preliminary tests have been conducted at USTUTT. The results showed a good performance, regarding combustion stability and burnout. But since the self-ignition temperature of the HTC bio-char is as low as app. 110°C, there is a serious risk to use this bio-char in a commercial CHP plant based on anthracite.
Due to this risk, the combustion tests of the HTC bio-char in a commercial CHP plant have been cancelled.

This deliverable summarizes the reasons which led to this decision and shows the changes to the DOW which have been accepted.

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Report

1 Introduction

Prior to a combustion test of the bio-char from HTC in a commercial CHP plant, preliminary tests have been conducted at USTUTT. Focus of these preliminary tests was on the combustion stability, the emission behaviour and on the quality of residues. To proof the suitability of the bio-char for combustion in a commercial boiler and to select a possible applicable boiler, the results of these preliminary tests have been taken into account.

2 Decisions regarding selection

Regarding combustion stability and burnout, the preliminary combustion tests of HTC coal at USTUTT resulted in good combustion properties.

To achieve a maximum burnout and to enhance the efficiency of the plant, the coal which is burned in a commercial CHP plant is milled prior to the combustion. The milling is carried out in a bowl mill crusher using hot air from the air preheater to transport the coal dust into the boiler. Due to the usage of this hot air, the temperature in a mill can be above 250°C. Since the self-ignition temperature of the HTC bio-char is at app. 110°C, a self-ignition or explosion of the bio-char during the coal milling is sure. Since this would lead to a serious risk for the whole plant, it was decided to cancel the combustion tests in a commercial CHP plant and to extent the tests at USTUTT. There, further investigations will be performed.

3 Conclusions and future work

Due to the low self-ignition temperature of the HTC coal, combustion in a commercial CHP plant is not possible. Further tests at USTUTT will be conducted.
This decision was proposed to the General Assembly of the project and agreed.

Criteria have to be met to burn bio coal in commercial power plants based on anthracite are stated in Del. 5.1.
Retrofitting measures for power plants, which are necessary to burn the HTC coal (with a self-ignition temperature of app. 110°C) will be specified in Del. 5.7.