Residue2Heat

Renewable Residential Heating with Fast Pyrolysis Bio-Oil

A long-term objective of *Residue2Heat* is to use agricultural or forest residue streams that are unsuitable for food or feed production and have low ILUC values for residential heating. Within *Residue2Heat* a burner is modified to build up a reliable combustion system in which Fast Pyrolysis Bio-Oil (FPBO) can be used as single fuel. Up till now the utilization of FPBO in residential-scale systems has never been done.

Step 1) A wide variety of biomasses or biomass residue streams will be converted into a uniform 2nd generation liquid biofuel via the fast pyrolysis process. It's a process where organic material is rapidly heated to ~500°C in the absence of air leading to so-called fast pyrolysis bio-oil (FPBO).

Step 2) The properties of crude FPBO vary and are completely different compared to fossil fuel oils. In *Residue2Heat* the oil is conditioned and standardized for optimal market introduction. The produced FPBO in *Residue2Heat* will be ash free and of a standardized quality.

Step 3) The production of FPBO is decoupled from its use; time, scale and location. This is beneficial for the application and market introduction of FPBO in residential-scale heating system. The ambition in *Residue2Heat* is to clear the path for the implementation of handling and distribution of FPBO.

Step 4) Limited knowledge is available on physical and chemical properties of FPBO. One objective is to increase the knowledge of these properties in order to support the design process of highly efficient burners. The standardized FPBO is beneficial and increases the opportunities for market introduction of FPBO in residential heating systems.

Step 5) *Residue2Heat* aims not only to use the 2nd generation biofuel FPBO for residential heating but also to maximise the combustion efficiency. Currently, only 10% of the residential heating units are classified as high efficient condensing boilers (labelling A-class).

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