PRESS RELEASE

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Heating with Pyrolysis Oil

EU-Project aims to use biomass residues in residential heating market

The objective of a recently started EU research project called "Residue2Heat" is to use various streams of biomass waste for residential heat generation. The aim is, by means of a liquid fuel produced in a sustainable manner from agricultural and forestry biomass residues to considerable reduce the CO2 emissions in the heating market compared to fossil fuels. This 2nd generation bio-fuel is being produced employing the fast pyrolysis process using a wide variety of biomass residues as feedstock. An international consortium of research institutions and SMEs will examine the standardization and the use of FPBO in the heating market and optimize a condensing heating system for the use of this new kind of fuel.

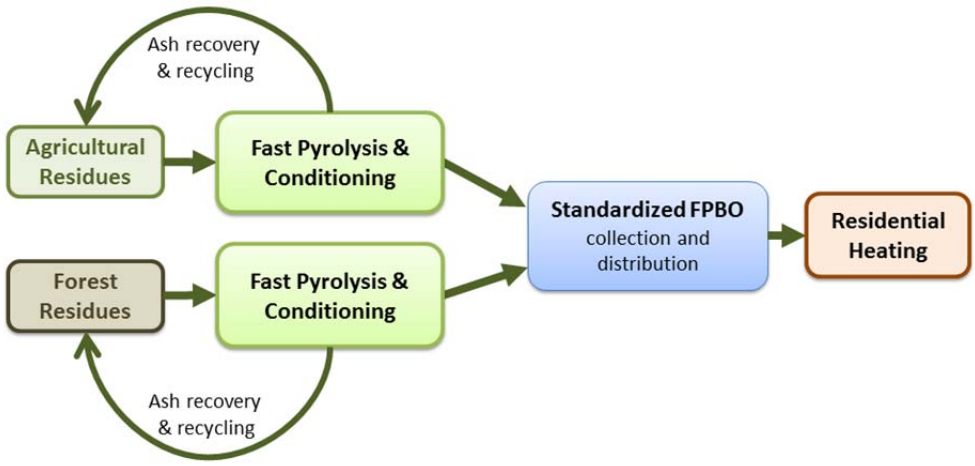

Figure 1: The overall concept of the EU research project "Residue2Heat" focusses on the development of a standardized pyrolysis oil from biomass residues, which can be used as fuel in the residential heating market. Graphics: OWI

The fuel is to be used for efficient heat generation in residential heating systems in the power range from 20 to 200 kW. The first challenge in this project is to produce FPBO despite its wide range of possible biogenic raw materials with a consistently high quality and highly standardized physico-chemical properties. The second central task of the project is the technical adaptation of a highly efficient condensing heating system for the use of FPBO. This is necessary because the physico-chemical properties of FPBO

differs from those of conventional fuels, so that for example the burner of the heating system needs to be redeveloped. The focus of development in particular is the mixture preparation, which is responsible for an efficient and low-emission operation of the burner.

The production process of FPBO uses the available resources efficiently, because more than 90% of ash and minerals remaining from the biomass are removed from the process and recycled. Within the project market studies are conducted which assess the potential of this new fuel and the modified heating system and provide further knowledge for a successfull market launch. The long-term goal of "Residue2Heat" is to produce FPBO on the basis of agricultural and forestry biomass residues, which neither can be used for food or feed production nor leads to indirect land use change (ILUC). The conceptual approach aims to obtain local biomass, convert it into FPBO in relatively small production facilities with a processing capacity from 20,000 to 40,000 tonnes of biomass per year and distribute the fuel locally to end-users.

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More information is available at:
www.residue2heat.eu

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About the Residue2Heat-consortium

The EU research project "Residue2Heat" combines the development of production technologies for the production of renewable fuels with the development of heating systems for the residential heating market. The project consortium is made up of three universities, three research institutes and three small and medium businesses from five different countries.

- RWTH Aachen University (Coordinator, DE)
- OWI Oel-Waerme-Institut GmbH (technical coordinator, DE)
- BTG Biomass Technology Group B.V. (NL)
- VTT Technical Research Centre of Finland Ltd. (FI)
- MEKU Energie Systeme GmbH & Co. KG (DE)
- Istituto Motori, Consiglio Nazionale delle Ricerche (IT)

- Politecnico di Milano (IT)
- BTG BioLiquids B.V. (NL)
- University of Innsbruck, Institute of Microbiology (AT)

Keyword: Fast-Pyrolysis

Fast pyrolysis is a process in which organic material is heated in the absence of oxygen to about 500 °C within a few seconds. Under these conditions organic and aqueous vapours, pyrolysis gas and charcoal arise. The vapours are rapidly cooled and condensed into a highly viscous liquid, so-called pyrolysis oil or fast pyrolysis bio-oil FPBO). This major product of the fast pyrolysis has about 70% of the energy content of the biomass and about half of the heating value of a conventional fuel oil. Additionally, valuable by-products (charcoal (10-15%) and low calorific gases (15-20%)) emerge, which can be used to generate process energy. In the pyrolysis process the majority of the ash and minerals are bound in charcoal and can be removed and recycled. Therefore highly ash-containing biomass streams can be converted into a virtually low-ash bio-oil.

The pyrolysis process is energetically self-sustaining and the FPBO contains about 70% of the energy content of the input biomass. Fast-pyrolysis bio-oil can be produced from a wide range of biomass or biomass residues. Its use is not necessarily linked to the production process, because it is storable and transportable. FPBO can be used as a renewable 2nd generation biofuel in custom oil heaters for space heating.

The fast pyrolysis process is optimized for the conversion of biomass to liquids and is intended to achieve the highest possible yield, therefore it is particularly suitable for the project of Residue2Heat. The pyrolysis process is energetically self-sustaining and suitable for the production of FPBO from a wide range of biomass or biomass residues. FPBO is easily storable and transportable and could be used in the future for space heating in adapted oil heaters due to its flexible availability at relatively high energy density as a renewable fuel of 2nd generation.