Success Story
COMET

FFG

bioenergy2020+

BE2020
BIOENERGY 2020+ GmbH
Programme: COMET – Competence Centers for Excellent Technologies
Programme line: K1-Centres
COMET subproject, duration and type of project:
Future low Emission Technologies, 04/2015 – 03/2019, multi-firm

The candle burns for eternity – part 2

In the previous COMET funding phase, the highly innovative concept of the candle burner was now put successfully into reality. Together with the technology partner AUSTROFLAMM, various investigations concerning emission release behaviour under real-life environment were conducted. In particular the type of ignition, briquette-geometry and raw material, as well as the behaviour of the end customer were investigated on their influence on the emission of air pollutants. The results show, that the candle burner sets a new state-of-the-art in terms of emissions at low energy output.

The candle burner from the idea to innovation

The idea of the candle burner bases on the continuous feed of an upright standing biomass briquette into a burning chamber, were it combusts like a candle flame. Because of the continous feed, almost stationary conditions of combustion and a long burning duration can be realized. As a result, low emissions at a variable heat output of 1.8 to 4kW and maximized energy efficiency are achieved within this patented combustion concept.

The technology of the candle burner was drafted within the previous COMET funding period and was brought into a technology together with our licensing partner AUSTROFLAMM. Within the current project, the influences of the end-user behavior on the release of air pollutants under real-life conditions were investigated. AUSTROFLAMM tested the customer response to the new technology at the ISH fair in Frankfurt 2017. There was a strong interest which will speed up market release.

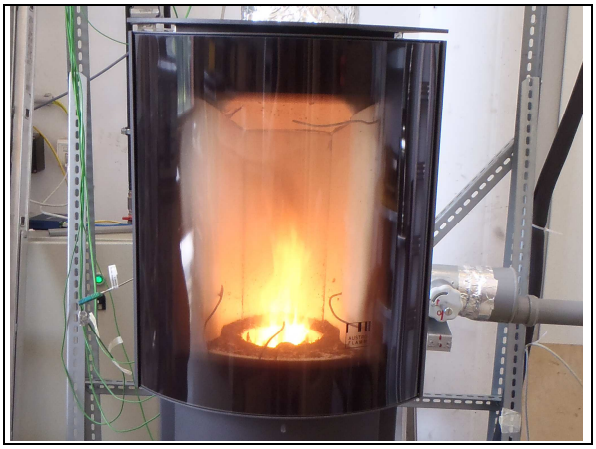

Fig. 1: The candle burner technology in action (source: BIOENERGY2020+)

Research & Development close to the end customer

In particular for residential room heating systems, the implementation within the building envelope as well as the end customer behaviour have a significant impact on the release of air

bmwfw Federal Ministry of Science, Research and Economy
bmvit Austrian Ministry for Transport, Innovation and Technology

pollutants. Consequently, this influences need to be considered already at an early stage of research & development of robust biomass combustion systems to overcome the ongoing air quality discussions.

Within the present COMET project, various end-customer related influences were investigated in the candle burner technology:

- Testing of 13 different methods for ignition (from paraffin igniters, wood wool to newspaper) for optimization of the ignition behavior
- Tests with 10 different types of briquettes (in terms of geometry and raw materials) showed the applicability for EU available briquetted fuels

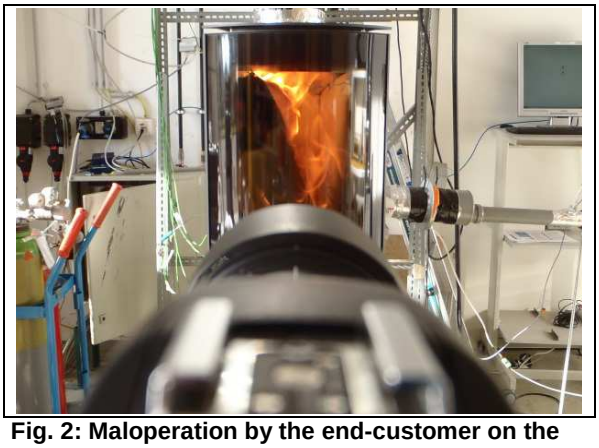

Fig. 2: Maloperation by the end-customer on the teststand – filling the candle burner with log wood (source: BIOENERGY2020+)

- Tests with variable draught conditions showed, the increase of real-life emissions at low and high draughts of the chimney system
- A concept was developed to eliminate maloperations by the end-user as good as possible by limiting the degree of freedom for the end-customer.

Impact and effects

The candle burner technology will have a significant impact on the markets of residential room heating systems. This type of technology will be able to set a new state-of-the-art in terms of low emission release and low energy output, which is demanded by the new low energy demanding building standards.

The presented approach of research & development considers directly the end-customer needs and concerns in terms of their impact on emission release. This is in particular in times of real-life test methods a path braking evolution and states the basis for a sustainable improvements for the air quality.

In addition, the candle burner technology enables new markets for biomass industry and may significantly contribute to a recovery of the biomass branch.

Contact and information
K1-Zentrum BE2020

BIOENERGY 2020+ GmbH
Inffeldgasse 21b, A-8110 Graz
T +43 (316) 873-9201
E jens-michael.kirchhof@bioenergy2020.eu, www.bioenergy2020.eu

Project coordination
Jens-Michael Kirchhof

Project partners

Organisation	Country
AUSTROFLAMM	Österreich
Josef Lumper	Österreich