



1 Combustion of rapeseed cake.
2 Reeds compressed in bale shape.

ENERGY FROM BIOMASS AND WASTE FUELS FOR THE FUTURE

**Fraunhofer Institute for
Environmental, Safety, and Energy
Technology UMSICHT**

**Institute Branch
Sulzbach-Rosenberg**
An der Maxhütte 1
92237 Sulzbach-Rosenberg



M. Eng., Dipl.-Wi.-Ing. Martin Meiller
Head of Department Renewable Energy
Phone +49 9661 8155-421
martin.meiller@umsicht.fraunhofer.de

Director
Prof. Dr.-Ing. Matthias Franke
Phone +49 9661 8155-600
matthias.franke@umsicht.fraunhofer.de

www.umsicht-suro.fraunhofer.de
www.umsicht.fraunhofer.de

The energetic biomass utilization is particularly important for the future energy supply. Biomass is an ecologically useful alternative to fossil energy materials and is permanently and reliably available in contrast to other regenerative sources of energy. Apart from wood which has previously mainly been used, the biomass potential can be substantially extended for the thermal use by energy crops and especially biogenous residues and waste materials, which do not compete with the production of food.

However, their partly complicated combustion characteristics require an adapted systems engineering. Fraunhofer UMSICHT can offer a comprehensive range of services of practical combustion tests, plant development and testing through to the scientific support of new concepts and processes.

Keywords

- Biogenous fuels
- Residues and waste materials
- Sewage sludge
- Combustion center
- Thermal processes
- Flue gas cleaning / filter technology
- Product and process development
- Pilot plant construction and test operation
- Plant assessment
- Feasibility studies

Target Groups

- Waste management and recycling industry
- Energy supplier
- Sewage treatment plants
- Manufacturing industry
- Public utility companies / municipalities
- Plant construction
- Environmental technology
- Consultancy firms



1



2

- 1 Sewage sludge pellets.
- 2 Test campaign with a 440 kW grate stoker furnace.

Technical equipment

Test stands

- Furnaces (30 - 440 kW) (grate stoker furnaces, furnace with ridge grate, fluidized fuel incinerator, gas solid combination boiler, rotary kiln, pyrolysis reactor)
- Flue gas cleanup according to 17th BImSchV [German Federal Emission Protection Directive for waste incineration] (ceramic filter with absorbent, activated carbon filter, electrostatic precipitator, pebble bed hot gas filter)
- Test facility for absorbent materials

Fuel treatment

- Pelletizing
- Admixture of additives

Measurement techniques / Analytics

- Continuous online flue gas analysis system (raw flue gas and clean gas)
- Fuel and residue laboratory
- Gravimetric dust measurement
- Cascade impactors
- Measurement of tar and C_xH_y

Software

- Central plant control technology, data collection and evaluation
- Comprehensive test-based fuel database
- Flow simulation and optimization by means of CFD
- CAD-based construction

Our services

- Combustion center for practical tests on the incineration and emission behavior of biogenous residues and waste materials
- Adequate test campaigns with optional scope of services
- Analysis of the fuel materials and combustion residues
- Development and testing of furnace and flue gas cleaning plants
- Thermotechnical process layout and plant dimensioning
- Adaptation of fuels and Combustion techniques
- Construction of pilot plants
- Feasibility studies for planned plants and processes for the energetic use of biomass, residues and waste materials
- Scientific examination of technology, economic efficiency and ecology
- Assessment and energetic optimization of facilities and production processes
- Studies and concepts for an integrated-thermal use

Your benefit

- A competent partner for research and development
- A long experience in the use of alternative fuels
- Efficient and customized solutions for the energetic utilization of biogenous residues and waste materials
- Risk-free and realistic testing of feedstocks
- Competitive advantages due to energetic utilization of production residues and optimized use of fuels
- Provision of the infrastructure of the combustion center for testing and optimization of plants
- Scientific analysis of innovative plant and process engineering
- Support when introducing new products on the market
- Economic fulfillment of own demand for heat and electricity