2. Wood processing waste.
3. Straw bales.

**ENERGY FROM BIOMASS WITH FLUIDIZED BEDS**

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**Recovering Biowaste**

Does your company produce biowaste? Would you like to recover energy from this waste rather than dispose of it expensively?

We will assess your waste’s potential energy, develop custom concepts based on that and use processes of thermal energy conversion to supply you with heat, cooling and power for your needs.

Biowaste’s specific properties frequently preclude its use in conventional conversion processes. Its elemental composition of chlorine, sulfur and alkali constituents present major challenges and are responsible for premature ash fusion, corrosion and high concentrations of pollutant gases.

This is where we come in: On the basis of feasibility studies, we will develop customized value chains for distributed utilization of your biowaste, incorporating emission standards. What is more, we will develop plant concepts for you and provide you support when you are implementing them, getting them approved and commissioning them.

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**Keywords**

- Biowaste
- Fuel analysis
- Fuel conditioning
- Thermochemical conversion in fluidized beds
- Distributed power, cooling and heat supply

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Conversion Concepts to Recover Your Waste
– Material and energy footprints
– Process engineering and design of combustors including flue gas purification and heat extraction

Infrastructure for Excellent Research

Fluidized Bed Combustion
– Laboratory and pilot units with thermal outputs of 15 kW to 150 kW for stationary and bubbling fluidized beds

Fuel and Ash Analysis
– Laboratory facilities of our own and collaboration with fuel laboratories and academic institutions
– Ash tests of pure and blended fuels, ash fusion point analyses using heating microscopes
– Chemical waste analysis to identify elemental constituents that form ash
– Fuel conditioning, e.g. drying, blending, milling, pelletizing and additizing

Our References

Model Projects
– “Straw Combustion”: Development of a distributed combustor with cogeneration for the fuel straw
– “MDE4”: Utilization of municipally produced biomass for distributed heat supply
– “EnerSpreu”: Recovery of energy from agricultural waste from combine harvesting

Sectors
– Agriculture, livestock farming and forestry
– Municipal facilities
– Waste disposal
– Energy supply, especially biogas plants

From the Idea to the Concept

Custom Fuel Analyses
– Study and assessment of potential
– Fuel analysis compliant with current standards, including ultimate, proximate and heating value analysis, thermogravimetry, determination of autoignition temperature, particle size distribution, transport and storage properties and ash sintering analyses

Concepts for Low-emission Combustion
To meet the requirements of pollution control laws and make the potential energy of your waste fully recoverable, we provide:

– Combustion tests of biowastes and blends, among other things, with varying moisture, to simulate different climatic harvesting conditions
– Staged-air combustion
– Flue gas recirculation
– Waste additization to bind chlorine and sulfur compounds in ash
– Control of ash fusion by employing fuel additives or additized bed materials
– Determination of need for secondary pollutant gas reduction
– Assessment of material recovery paths, e.g. use as fertilizer

Some of the Biomass Studied
– Straw, wheat chaff and husks, barley, rape, soy and rice
– Feed waste
– Broken grain
– Landscaping material, green waste, root wood
– Digestate from biogas plants
– Biowaste from the pharmaceutical industry, e.g. chestnut, ginkgo and hawthorn

Images: 1 Torsten Birth, 2 Dirk Mahler, 3 Daniela Martin, 4 Bernhard Kiep, 5 Marcus Kögl