



**DBFZ Deutsches Biomasseforschungszentrum  
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[www.smartbiomassheat.com](http://www.smartbiomassheat.com)



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gemeinnützige GmbH

## TECHNICAL EQUIPMENT

- Fuel treatment including densification (ring-die pellet press)
- Firing test bed
- Different small firing systems from 5 to 120 kW nominal power
- Extensive measuring equipment for heat quantities, combustion performance and emissions
- Precipitator test bed
- Micro heat and power coupling systems (engine, fuel cell)
- Laboratory for biomass raw material and fuel analysis

In addition to our research funded by the Federal Ministry of Food and Agriculture (BMEL) and third-party funds we can also offer research contracts and research services.

## SERVICES

- Development, characterisation, pre-treatment and additive mixing of fuels
- Combustion experiments and comparative classification
- Precipitator measurement according to DIN 33999 (will be accredited in the near future)
- Accredited dust, CO and TVOC (total volatile organic carbon) measurements
- CFD simulation of thermodynamic processes

Publications and information on projects regarding „SmartBiomassHeat“ can be found online:  
[www.dbfz.de](http://www.dbfz.de) and [www.smartbiomassheat.com](http://www.smartbiomassheat.com)

With support from



by decision of the  
German Bundestag

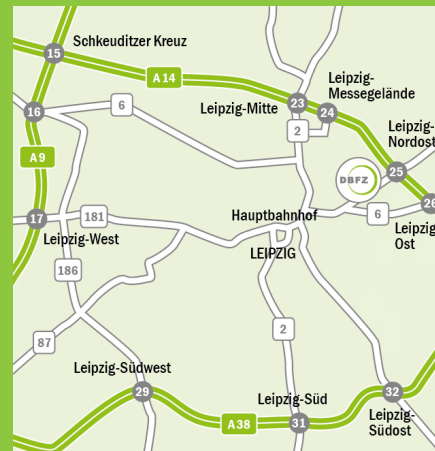


### GETTING HERE:

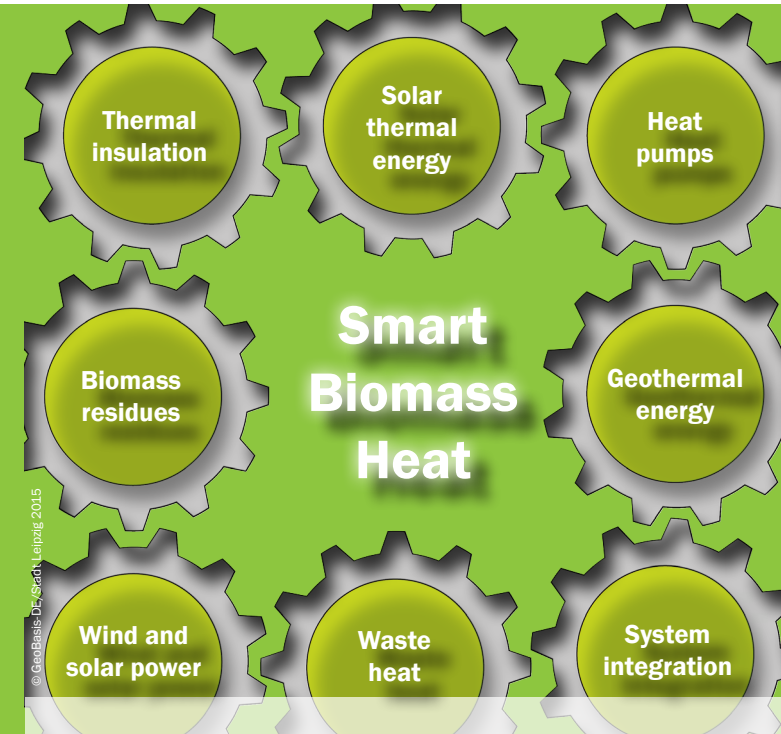
**By Train:** Arrive at Leipzig Central Station; then take tram 3/3E (towards Taucha/Sommerfeld) to Bautzner Straße; cross the road, pass the car park on the right, straight ahead to the entrance of number 116, turn left after approx. 100m, and the DBFZ entrance is another 60m on the left.

**By Car:** Via the A14 motorway; take the Leipzig Nord-Ost exit, Taucha; towards Leipzig; head towards the centre; pass the bft petrol station and the DBFZ is on the left (see 'By Train').

**By Tram:** Tram 3/3E (towards Taucha/Sommerfeld); alight at the Bautzner Straße stop (see 'By Train').



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## RESEARCH FOCUS AREA

SmartBiomassHeat  
Intelligent biomass heating  
technologies within the network  
of renewable energies



*„Future heat supply from biogenic solid fuels must become much more efficient, flexible and tailored to system requirements – it needs to get smarter!“*

(Dr. Volker Lenz, Head of the research focus area „SmartBiomassHeat“)

## HEAT FROM BIOMASS

The energy transition “Energiewende” is strongly dependent on the success of the heat transition “Wärmewende”. Considering that more than 50% of the heat demand is consumed in private households with more than 70% of the German citizens living in urban areas, the heat transition must respond especially to urban challenges. Heat from biomass is the most traditional renewable heat source and a cornerstone of human civilization. Today almost 90% of the renewable heat is still generated from biomass, satisfying about 11% of the total heat demand in Germany. Biomass is storable, yet often a scarce and well demanded commodity. Therefore, ambient heat, waste heat, solar thermal energy and heat from excess power will be primarily used in the renewable energy scenario 2050 envisaged by the EU and Germany. Additionally, the heat demand will be reduced through efficiency measures (50-60%) while electricity, heat and mobility will be better interlinked making a secure electricity supply even more important.

The future role of heat from biomass will focus mainly on these three tasks:

- Closing gaps in heat supply
- Generating additional benefit e.g. coupled electricity supply especially in winter
- Stabilizing electricity grids locally

## INTELLIGENT BIOMASS HEATING TECHNOLOGIES

The research focus area concentrates on small-scale, renewable heat production in single units and combined objects up to village scale or city districts by means of biomass residues, biogenic by-products and waste. The communication between intelligent biomass heating technologies and other renewable energy technologies is essential. Thus, the primary aim is to create an optimal technological and economic use of all renewable heating resources based on a flexible, demand-adapted deployment of biomass heating technologies.

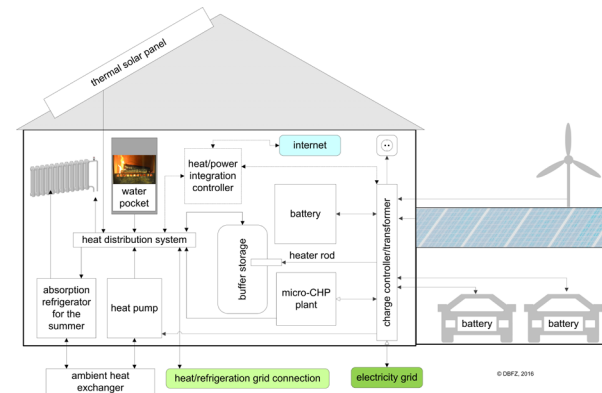


Figure: Example of a smart interplay of different renewable energy technologies to provide demand-driven heat and electricity (not all technologies will be used at the same time)

## INNOVATIVE SUPPLY CONCEPTS

An intelligent selection of different components leads to possible future innovative supply concepts:

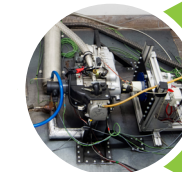
- Backup stove as part of a central heating system
- Power generating heaters in a very small to medium power range (5 kW<sub>el</sub> to 250 kW<sub>el</sub>)
- Combined heat and power generation from biomass residues and waste within a network of heating grids and in industrial applications (250 kW<sub>el</sub> to 5 MW<sub>el</sub>)

## MODULE DEVELOPMENT AND INTEGRATION

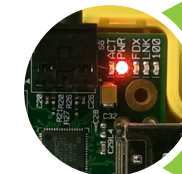
The necessary module development and research on integration is aiming at a smart (i.e. efficient, environmentally friendly, economical, safe, demand-adapted, flexible and sustainable) operation of biomass heating systems.



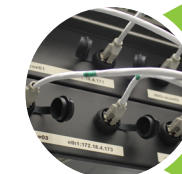
Upgrading biomass residues and by-products to innovative solid fuels by washing, sieving, mixing, torrefaction, hydrothermal carbonization and densification (e.g. pellets)



Investigating flexible and low-emission moduls such as micro-firing systems, micro-CHP, combined heat, cooling and power generation, secondary (also catalytic) emission control



Developing system tools for the integration of renewable heat into a renewable electricity grid such as communication platforms, standardized interfaces, heat integration system controllers, heat/power integration system controllers, design and consulting tools



Developing an interface technology for easy practicability (plug-and-run) and easy handling (automation + service)