

# Research & Innovation

## from Baden-Wuerttemberg and Bavaria



Research Initiative Power Plants for the 21<sup>st</sup> Century

## ENERGY FOR THE 21<sup>ST</sup> CENTURY



Siemens AG, one of the largest power plant manufacturers, is partner of the research project. (Foto: Siemens AG)

The joint Bavarian and Baden-Württemberg research initiative „Power plants for the 21<sup>st</sup> century“ has challenging goals: future power plants shall become more dependable and more efficient at lower costs, they shall produce far less pollutants and be able to burn a wide range of fuels including renewables as well.

Many of the existing power plants in Germany will reach the end of their lifetime within the next years and must be replaced with modernized technology.

An improvement of the efficiency of e.g. a 500 MW-gas turbine of about 1% leads to additional power for a city with 10,000 households without increase of primary energy demand!

In the future, investment decisions of the utilities will be influenced by many factors: the tendency towards decentralised electricity supply, the increase of the capacity of weather dependent wind energy parks and of power and heat cogeneration plants as well as by the upcoming emission trading.

The latest developments of science in the areas of fluid dynamics, thermodynamics, combustion, material and other domains will serve the goals of avoiding an excessive increase of energy imports and of strengthening the competitiveness of the local power plant industry in the 21<sup>st</sup> century – for ecological and for economic reasons.

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### Sponsors:

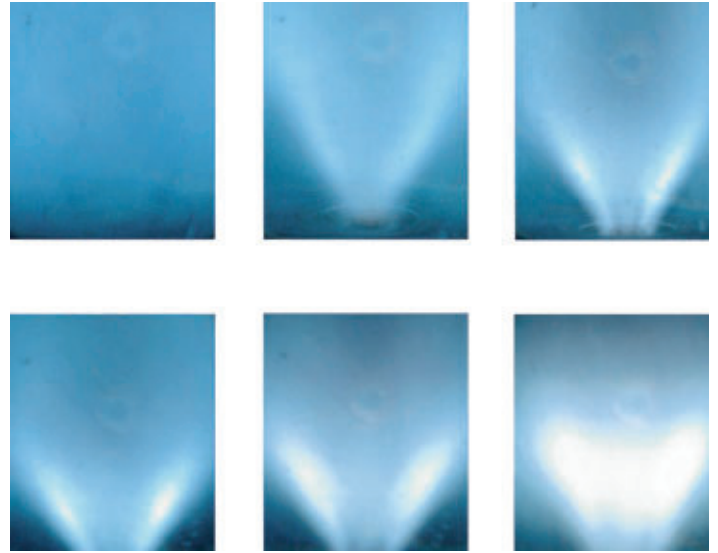
Funded by the Bavarian Ministry of Sciences, Research and the Arts, Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology, Bavarian Research Foundation and Baden-Württembergische Zukunftsoffensive III.

### Project Volume:

13,2 Mio. € (Grants and private contribution) for 4 years.



**Annular combustor test rig of a gas turbine for thermo-acoustic measurements.**



**Chemiluminescence of flames as indicator for the heat release distribution in combustion chambers.**

**Study of combustion instabilities at the Chair for Thermodynamics at the Technical University of Munich. (Foto: Prof. Sattelmeyer, TU Munich)**

## RESEARCH TOPICS:

**22 research groups and 11 industry partners work on 36 projects in the following workgroups:**

- energy economy
- power plant systems:
  - steam producer
  - turbo machines (fluid dynamics and high temperature components)
  - combustion chambers.

### **Economic Applications:**

The optimized single components and the results of the work group „energy economy“ will find a direct commercial application.

### **Scientific Cooperations:**

German Aerospace Center (DLR) – Institute of Combustion Technology

Research Institute for Energy Economy  
Technical University of Munich:

- Department of Energy Technology
- Institute for Energy Economy and Application Technology
- Institute of Flight Propulsion
- Institute of Thermodynamics
- Institute of Energy Systems

University of Erlangen-Nuremberg:

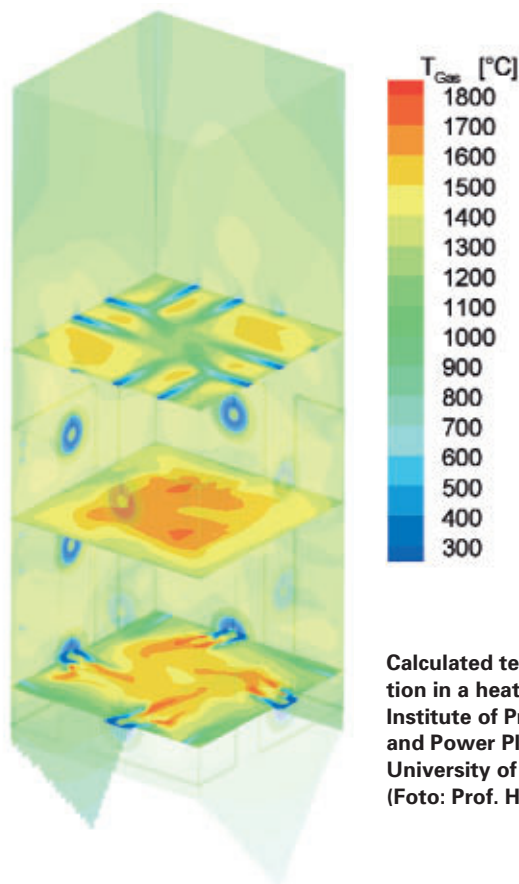
- Institute of General Properties of Materials (WWI)
- Institute of Fluid Mechanics
- Department of Technical Thermodynamics
- Institute of Science and Technology of Metals (WTM)

University of Karlsruhe:

- Engler-Bunte-Institute
- Institute of Thermal Turbomachinery (IST)

University of Stuttgart:

- Institute for Air Craft Propulsion Systems
- Institute of Thermal Turbomachinery and Machinery Laboratory
- Institut of Aerospace Thermodynamics (ITLR)
- Institute of Process Engineering and Power Plant Technology
- Materials Testing Institute (MPA)



**Calculated temperature distribution in a heating boiler of the Institute of Process Engineering and Power Plant Technology, University of Stuttgart. (Foto: Prof. Hein, Dr. Schnell)**

### **Industrial Partners:**

ALSTOM Power Boiler GmbH  
ALSTOM Power Generation AG  
E.ON Energie AG  
EnBW Kraftwerke AG  
Esytec Energie- & Systemtechnik GmbH  
MTU Aero Engines GmbH  
Promeos GmbH  
SGL Carbon AG  
Siemens AG