



# FRAUNHOFER INHAUS CENTER

Jointly researching, developing and achieving success in the market place

## INHAUS 1



## INHAUS 2



# FRAUNHOFER INHAUS CENTER

## Factsheet

SITE INHAUS CENTER: **APPROXIMATELY 8.000 SQM**

FLOOR SPACE INHAUS1 FACILITY (SMART HOME-LAB): **250 SQM**

FLOOR SPACE INHAUS2 FACILITY (SMART BUILDING-LABS): **APPROXIMATELY 5.200 SQM**

VALUE SAT. INHAUS CENTER INCLUDING LAND: **ABOUT 20 MILLION EUROS**

VALUE INHAUS2 FACILITY: **ABOUT 12 MILLION EUROS**

FUNDING INHAUS2 FACILITY: **8.7 MILLION EUROS (Fraunhofer / Federal Ministry for Research / EU)**

PLANNED TARGET VOLUME R & D PROJECTS

(BUSINESS AND PUBLIC): **ABOUT 27 MILLION EUROS till 12 / 2013**

INHAUS-BASED CONTRACTS WITH BUSINESS PARTNERS

(SYSTEMS, COMPONENTS, APPLICATION AND ADD-ON PARTNERS): **87**

PARTICIPATING FRAUNHOFER INSTITUTES: **6**

OPENING OF THE INHAUS CENTER WITH THE INHAUS 1 FACILITY: **4.3.2001**

OPENING OF THE INHAUS 2 FACILITY: **5.11.2008**



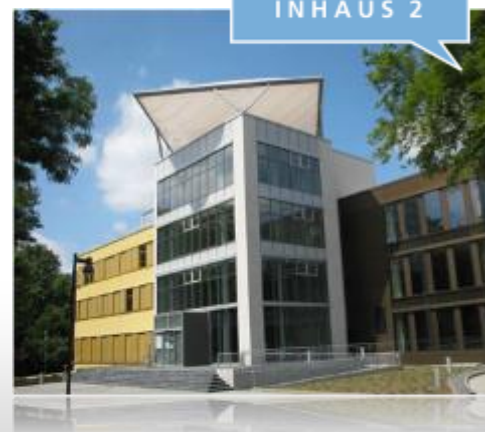
# FRAUNHOFER INHAUS CENTER

## Factsheet

**Total terrain:** 8.000 sq.m.



**Smart home lab:**  
250 sq.m.



**Smart building labs:**  
5.200 sq.m.

# FRAUNHOFER INHAUS CENTER

The research consortium



## Research collaborations outside of Fraunhofer:

University of Duisburg-Essen (Uni-DUE) with various departments  
University of Dortmund with various departments  
Colleges of Niederrhein, Gelsenkirchen and Dortmund  
Center for Fuel Cell Technology ZBT,  
Duisburg - Center for Semiconductor Optics ZHO, Duisburg

## International research collaborations:

France, Holland, Taiwan, Japan, USA and Spain

# FRAUNHOFER INHAUS CENTER

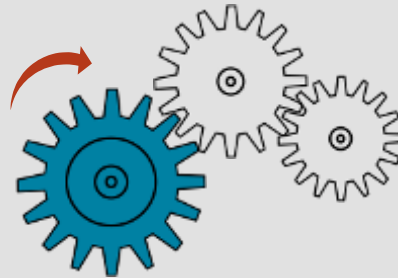
Expiration of the R&D between industry and research

## COMPONENTS OF INDUSTRIAL PARTNERS



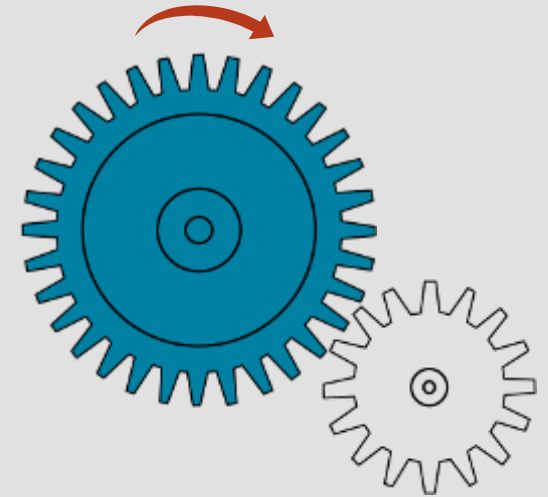
Innovative individual solutions on the basis of partner components

## MULTILATERAL SYSTEM INNOVATIONS



Development, testing and demonstration of value-added system solutions from partner components in the inHaus laboratories

## MARKETING SYSTEM



Marketing of the system solution with enlarged market potential at first in pilot projects

Source: Initiativkreis Ruhr; A.T. Kearney

# FRAUNHOFER INHAUS CENTER

Application areas



LIVING



BUILDING  
&  
BUILDING  
SYSTEMS



Energy  
&  
Building  
Technology



HEALTH  
&  
CARE



HOTELS  
&  
EVENT



Working



Ressources

# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Living



## Managed by Fraunhofer IMS

For the development, testing and demos in the inHaus1 a technical lab and a *living lab* are available.

### Goal:

Concepts, pilot development for system-capable components, system solutions and service concepts for customers from the manufacturer, service provider and user area.



# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Building & Building Systems



Managed by Fraunhofer IBP

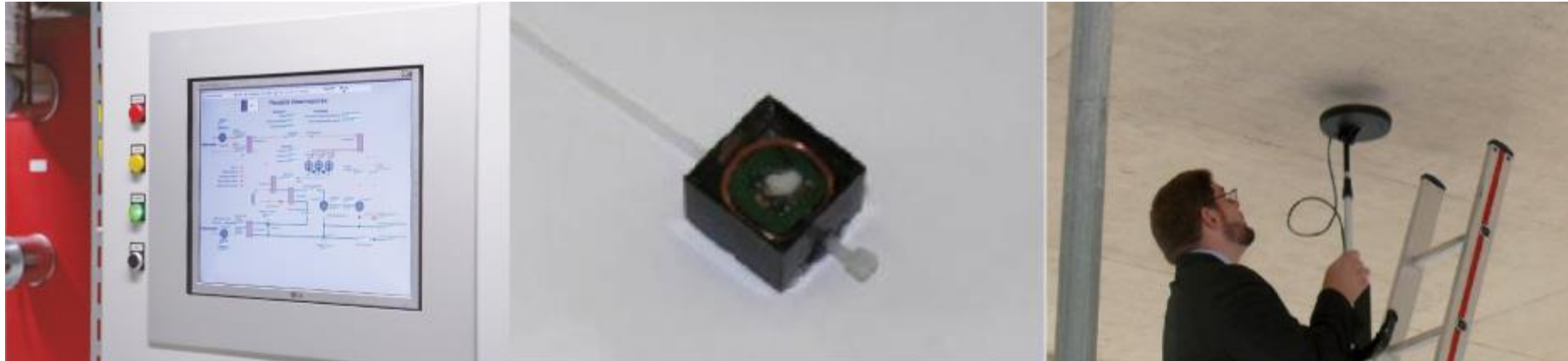
## Goal:

It is the goal of the *Building & Building Systems* business segment to cover the chain of raw materials producers, from material and product to systems suppliers to companies carrying out the construction and building managers.

The inHaus Center makes it possible to further develop the potential for innovative system solutions of the participating partners for all types of building and construction applications and to test these and showcase them in market-ready.

# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Energy and Building Technology



## Managed by Fraunhofer ISE

### Goal:

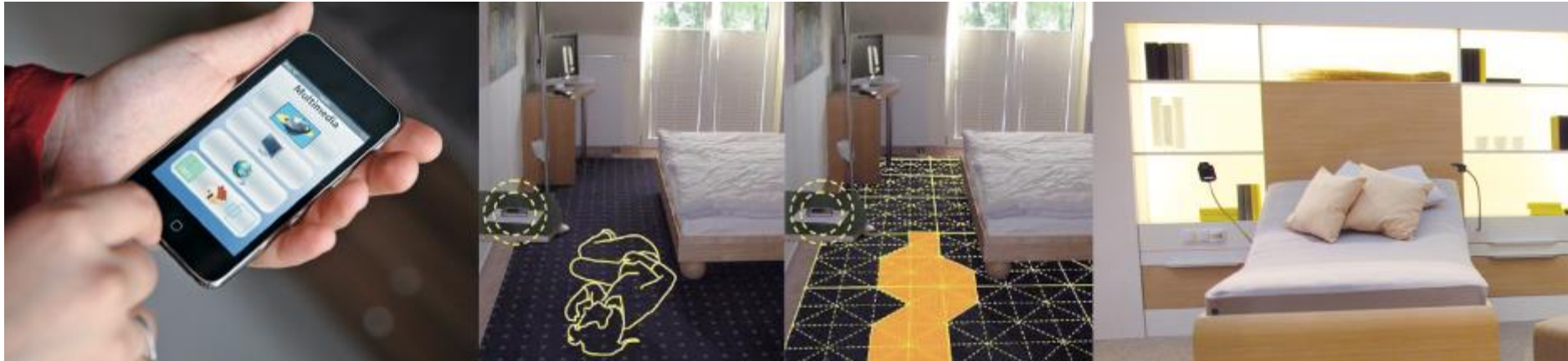
In the business segment of *Energy and Building Technology*, Fraunhofer develops new technologies and systems that foster a comfortable room climate and that make operating

a building in an energy-efficient and cost-effective way possible. All this is showcased in the inHaus2 research facility.

**Example:**  
Temperature  
micro transponder  
in concrete cores

# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Health & Care



Managed by Fraunhofer ISST and Fraunhofer IMS

## Goal:

The business segment *Health & Care* offers its customers an R&D platform where targeted research for new solutions in the health care area is carried out. The focus on these activities is on developing, testing and applying these technologies.

# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Hotel & Event



Managed by Fraunhofer IAO

## Goal:

The business segment *Hotel & Event* is developing innovative, sustainable solutions that aid the participating business partners in achieving strategic and economic success.

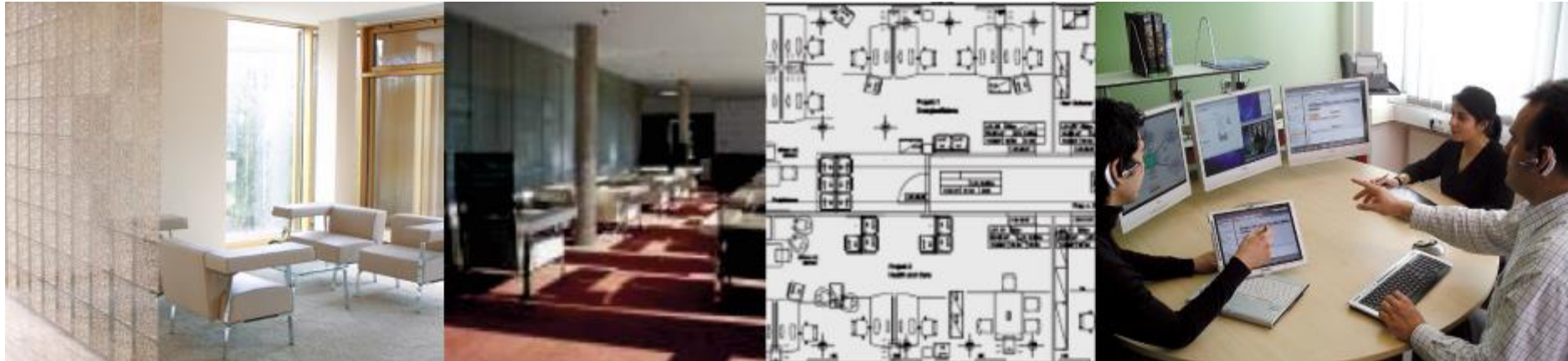
The innovation workshop NextHotelLab serves as a testing site and development platform for all areas of hotel and event properties.

## Example:

Showcase FutureHotel – platform for field tests, marketing and demonstration

# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Working



## Managed by Fraunhofer IAO

### Goal:

The goal of the inHaus business segment *Working* is to open up optimization potentials with respect to the work infrastructure.

To achieve this, we created a versatile research platform in order to develop, with our partners, more efficient working systems.

### Example:

3 floors with a different purpose / layout, particularly suitable for comparative research



# FRAUNHOFER INHAUS CENTER – BUSINESS UNITS

Ressources



## Managed by Fraunhofer Umsicht

### Goal:

Using potential: Ressources flow into processes, products and services relating to building construction and the use of buildings. A sustainable use of the ressources – regardless of wether finite or infinite – is very important..

At our inHaus-Center we develop and research together with our partner appropriate innovations, instruments and strategies for that.

# FRAUNHOFER INHAUS CENTER – R&D

Cross-cutting issues in research

Optimized functions and processes  
(rooms, buildings, applications)



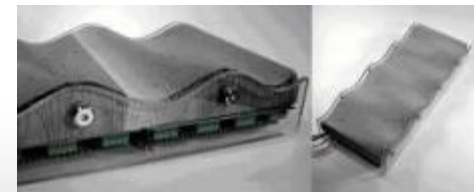
Intelligent, integrated space  
and building systems



Systems integration  
methods and technologies



Intelligent, integrated components with  
system abilities (material, design, electronics)

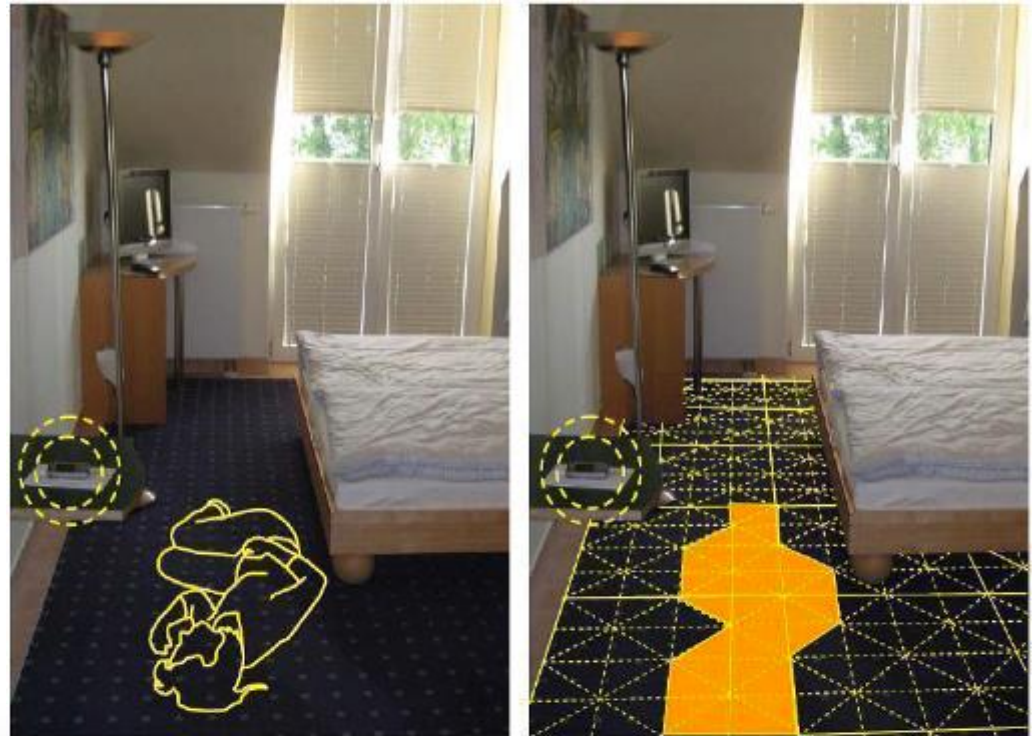


# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

Intelligent floor with load and motion sensors

- Special film is mounted under the carpet
- Foil determines the position of the resident
- Analysis of the movement and the occupancy pattern

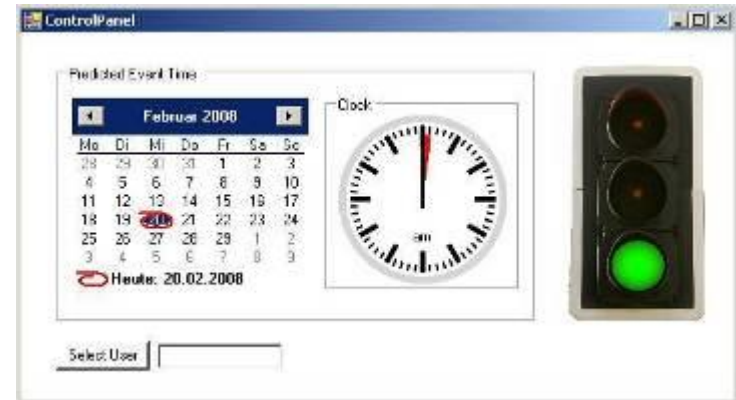
→ FALL DETECTION



# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

## Emergency detection by behavior patterns

- Based on simple home automation sensors
- Lack of signaling activity (e.g. caused by a fall)
- Adaptation to patterns of behavior



# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

inBath: Assistant-room system for the nursing field





# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

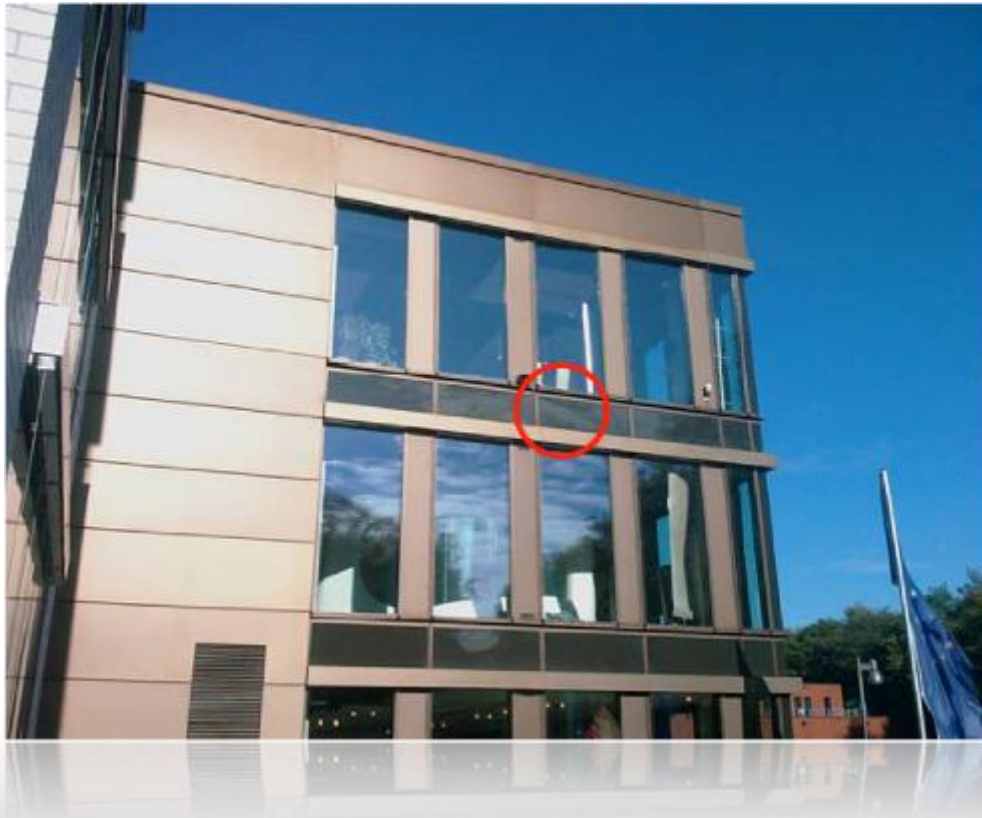
Room automation with intelligent, networked systems furniture

- **Illuminated furniture with attention control, for example the medicine cabinet**
- **Intelligent cabinets and drawers**
- **Reminder about light and sound, access control**
- **Furniture with tactile feedback for example interactive with visual disabilities**
- **Furniture with a motor supported estimation**
- **Drawers open automatically when you touch**
- **Furniture with entertainment and information function**



# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

PCM-cartridges (heat storage in glass facades)



# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

New and active materials



Highly effective insulation



Thermally and acoustically highly effective building blocks



Intelligent facades



Acoustic wave breakers in thermally active concrete

# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

Heating / Cooling / Energy Saving Systems

## More inHaus systems (normal operation and research)

- Heating- / cooling- / storage
- Facades – intell shading
- Geothermal plant
- Sorption cooling
- BACnet building automation



**Example:**  
inHaus2 – concrete core activation



# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

Conduction of projects from research to practice: inHaus innovation tool satellite projects



**Example:**  
Pilot residential service living in the City of Hattingen with 50 apartments.



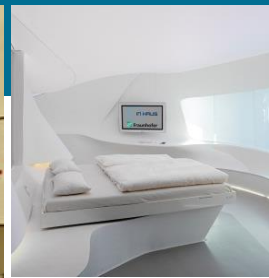
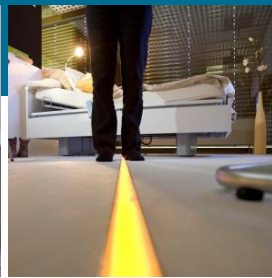
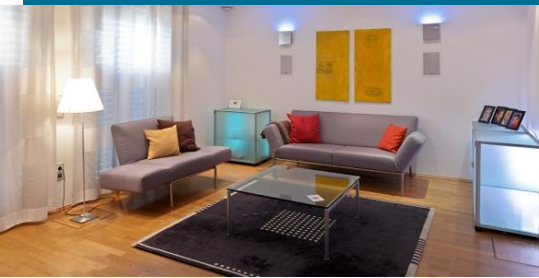
# FRAUNHOFER INHAUS CENTER – EXAMPLES OF R&D

Conduction of projects from research to practice: inHaus innovation tool satellite projects

- Geothermal
- Component activation
- Controlled ventilation
- Functions to optimize the user-dependent energy consumption
- Long-time energy monitoring



**Example:**  
Piloting innovative building functions at the State Office of  
Statistics and computing, Duesseldorf



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