

# KENWO

## Cost-effective Energy Management on the Base of a Sustainable Energy Concept

by

Prof. Dr.-Ing. F. Schmidt, Dr.-Ing. R. Kopetzky  
Dipl. Ing H. Freihofer, Dipl. Ing. K. Wunderlich

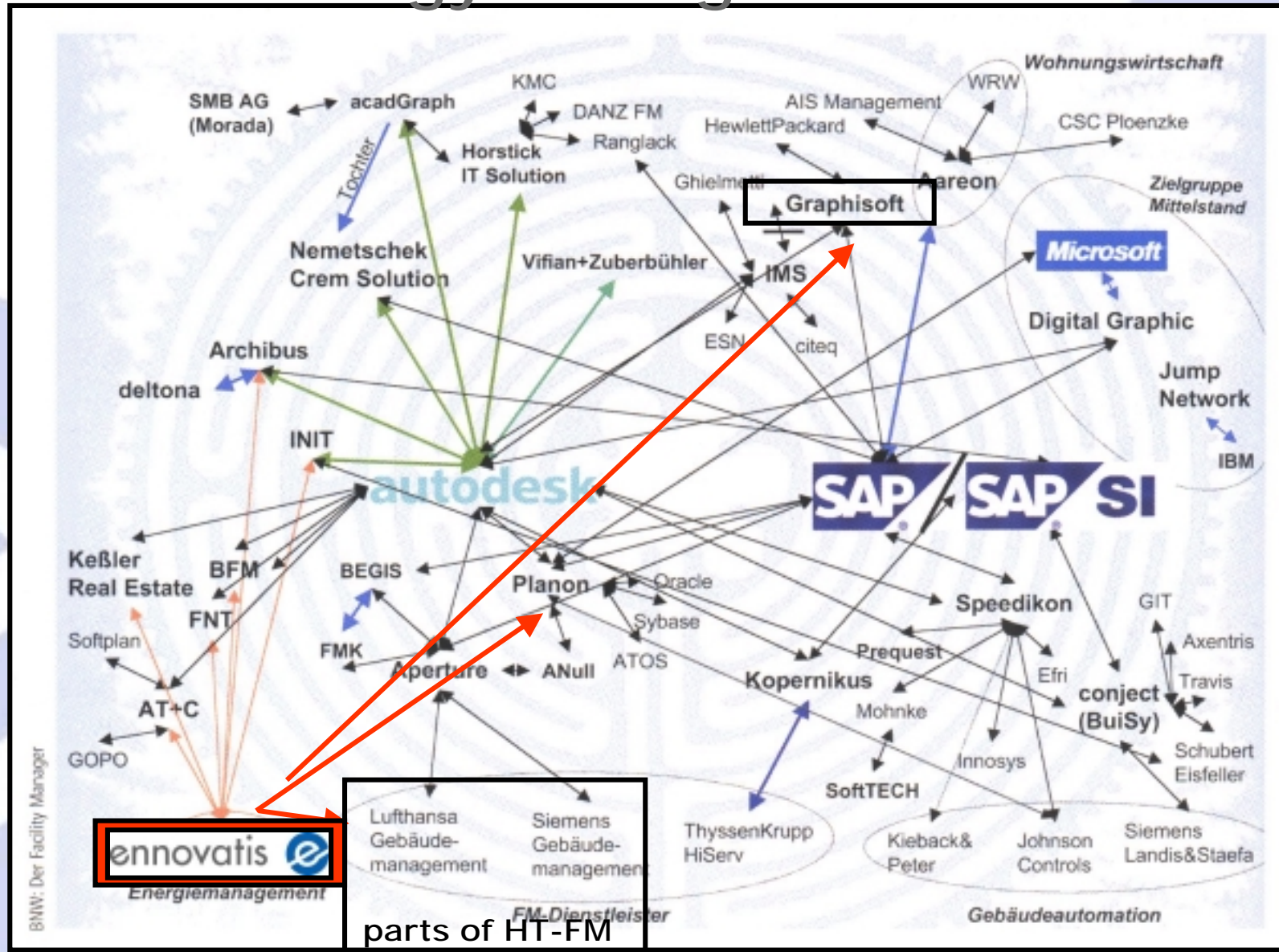
ennovatis



# About ennovatis

- Develops and provides services in the area of energy management and controlling
  - planning of buildings and technical equipment
  - energetic retrofit of buildings and building operation
  - energetic optimisation of production processes
- Develops and provides cost-effective hardware for the automatic reading of meters and sensors
- Based on these ennovatis offers
  - development of building specific and consistent optimisation concepts
  - support in implementing the concepts
  - continuous quality control to meet energy demand most efficiently

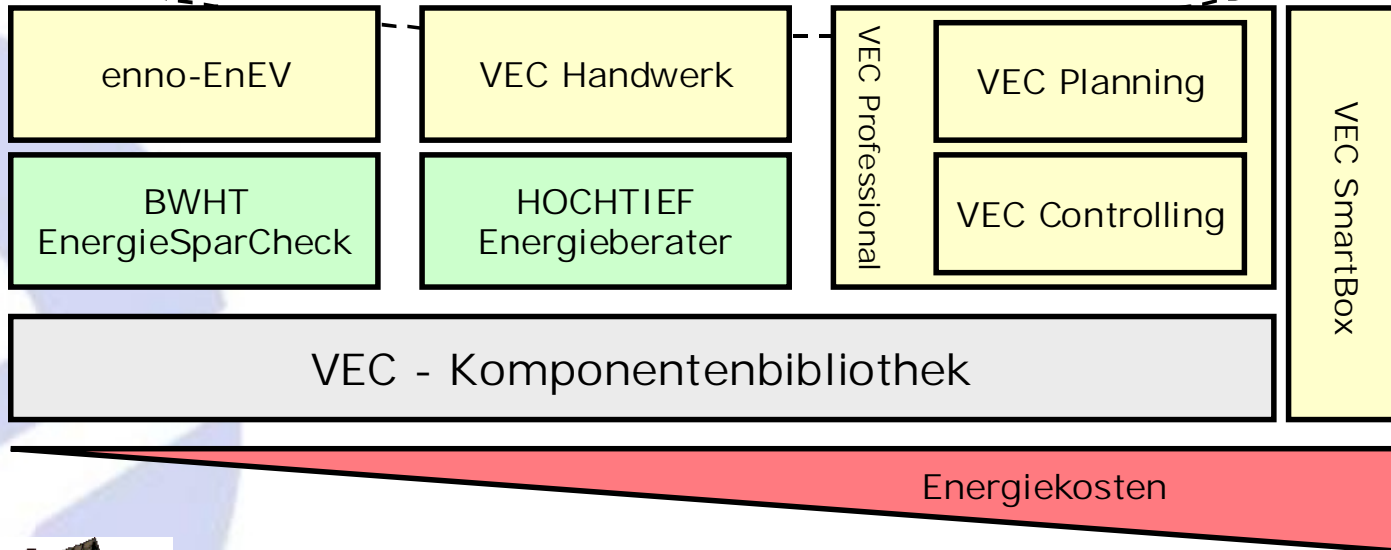
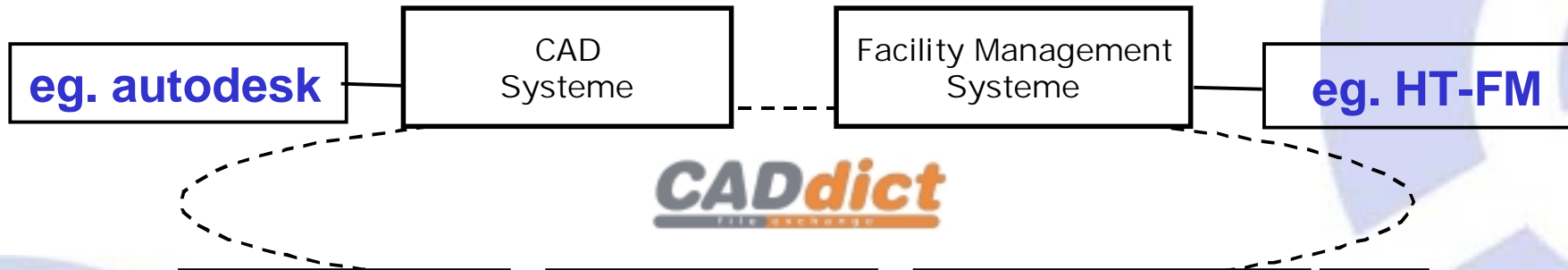
# ennovatis means energy management as ist best



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# ennovatis: products and partners



Wohngebäude



Liegenschaften

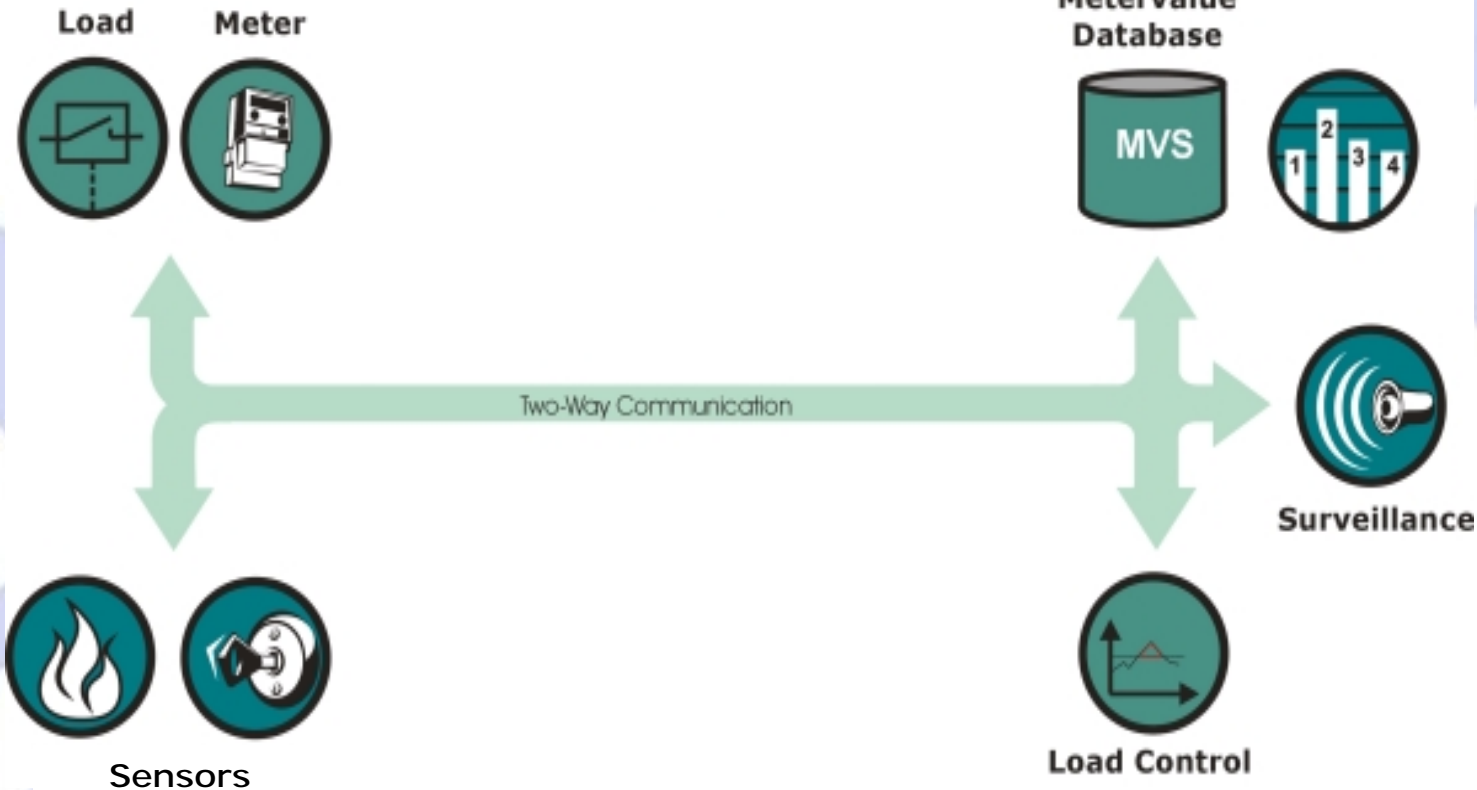
Standardprodukte
  Individualprodukte
  Fremdsysteme

# Our approach to reach sustainable energy reductions in buildings

- Analyse the building, its technical equipment and their usage
  - simple analysis by EnergyConceptAdviser type solutions
  - standard analysis by ennoENEV, ESC or EPBD solutions
  - Advanced analysis by VisualEenergyCenter
- Automatic reading of meters and sensors implemented in IP technology
- Model based analysis of meter and sensor data
- Development of building specific and consistent optimisation concept
- Continuous quality control (monitoring and analysis) to meet energy demand most efficiently

# Solution offered by ennovatis

collect data    transport information    monitor building



Requirements:

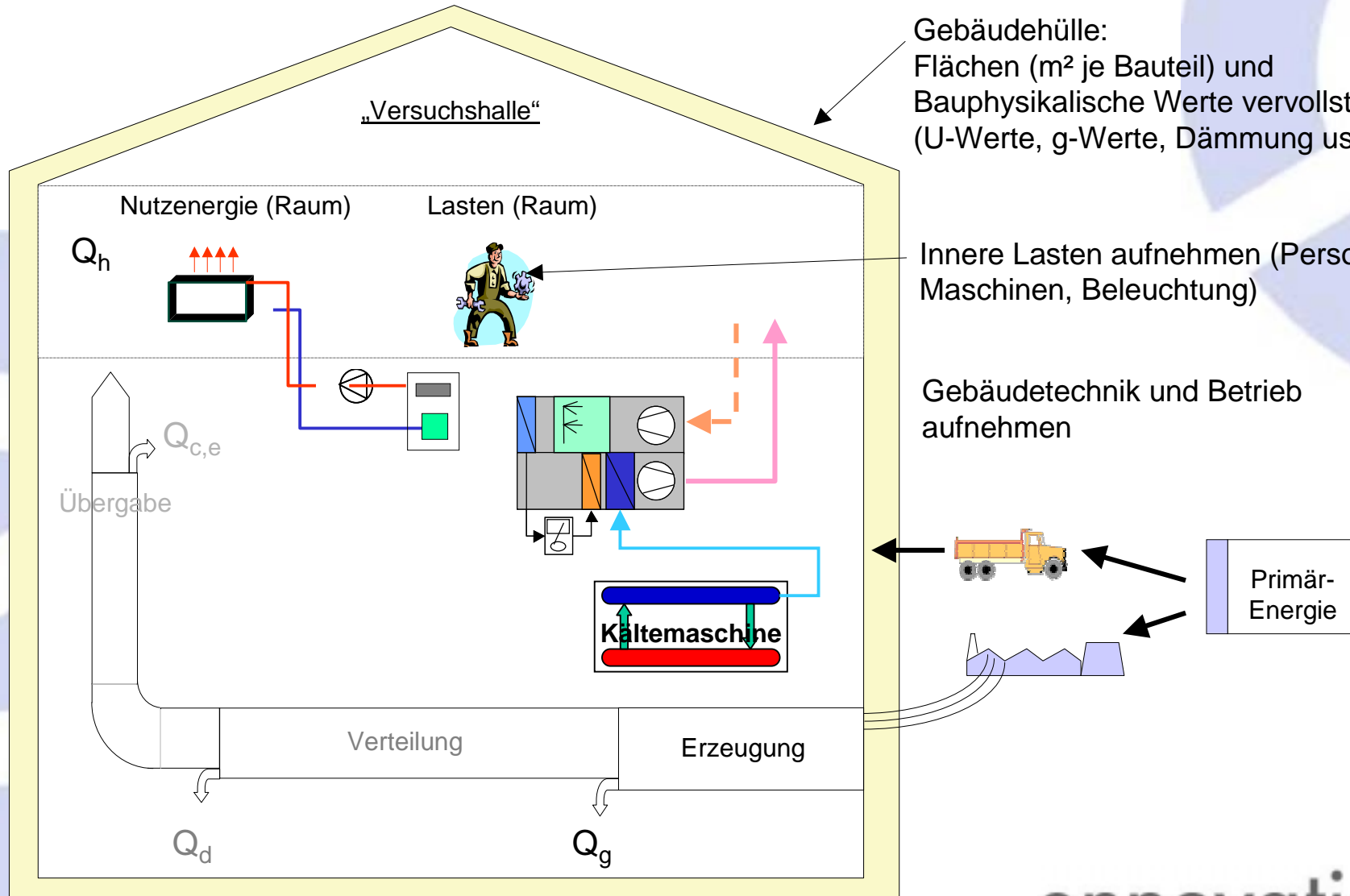
- Reliable
- Functionality
- Scalability
- Low TCO (Total Cost of Ownership)
- Right Price

Original graph developed by [COMSEL](#)



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# ennovatis solution - building analysis



Gebäudehülle:  
Flächen (m<sup>2</sup> je Bauteil) und  
Bauphysikalische Werte vervollständigen  
(U-Werte, g-Werte, Dämmung usw.)

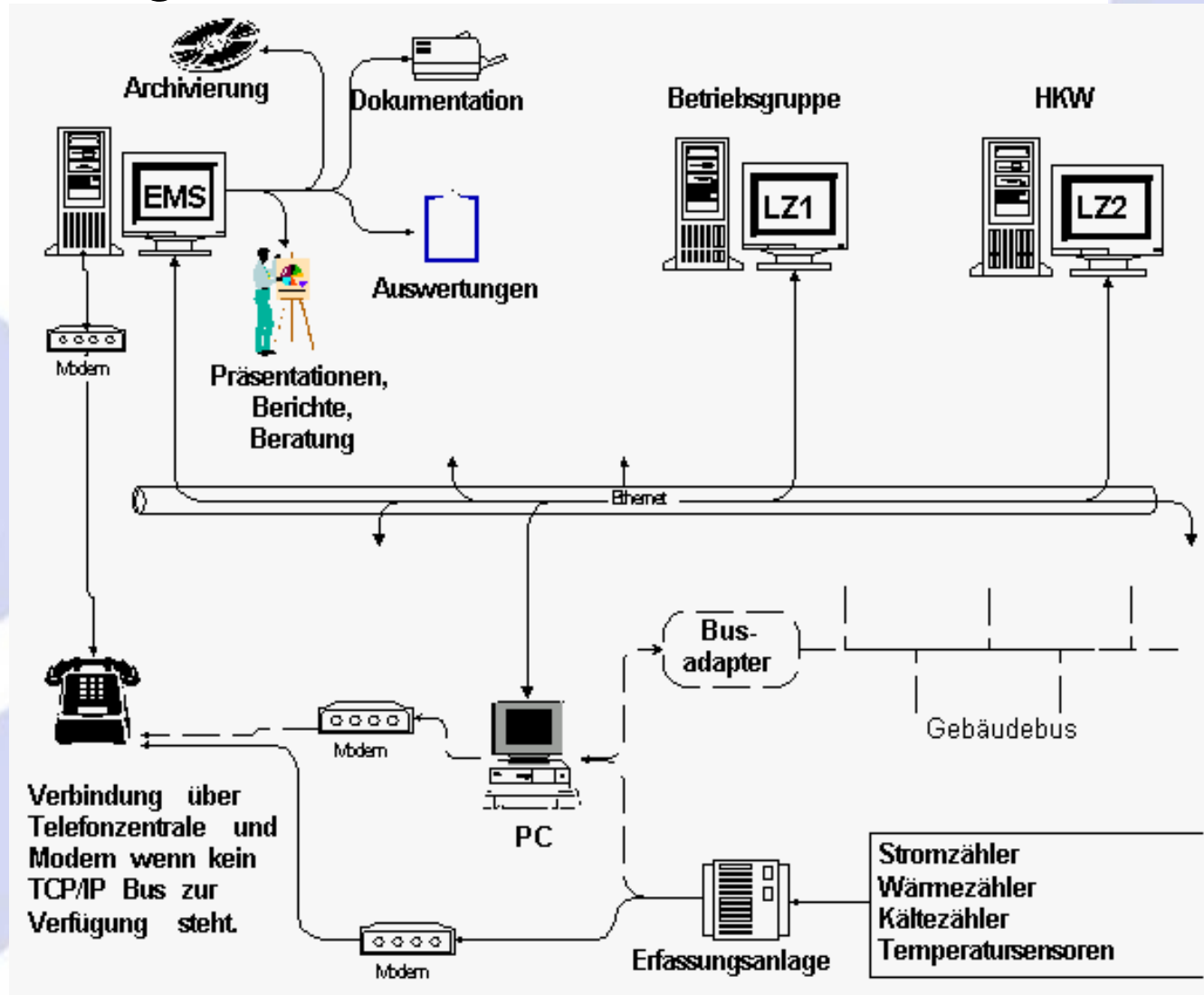
Innere Lasten aufnehmen (Personen,  
Maschinen, Beleuchtung)

Gebäudetechnik und Betrieb  
aufnehmen

Primär-  
Energie



# ennovatis solution - monitoring and quality control with VEC-controlling

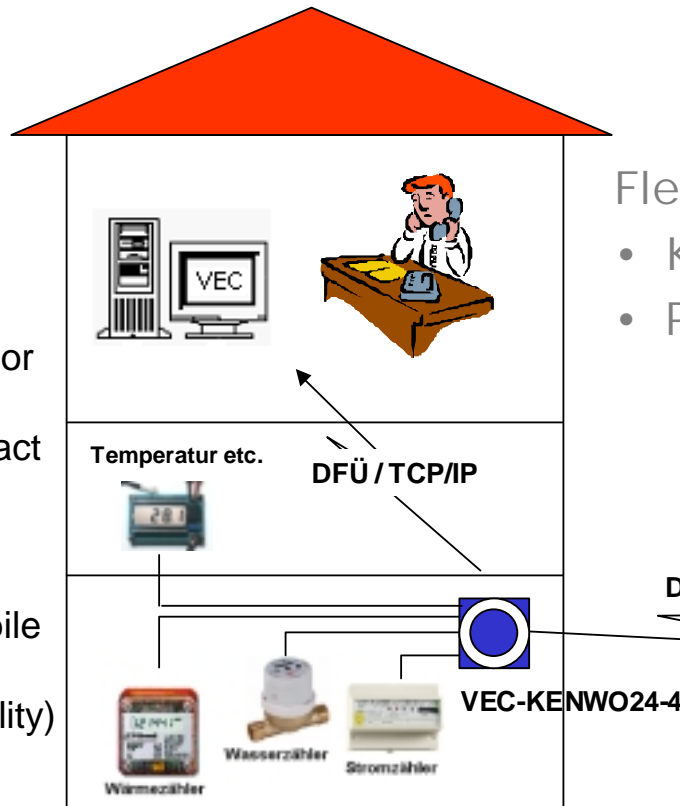


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# ennovatis solution - VEC SmartBox (KENWO 24-4s Prototyp)

- ++ Ethernet (TCP/IP 10/100MBit)
- ++ 8 temperature ports
- ++ 8 analog ports( 0-20mA, 0-10V)
- ++ 8 pulse ports
- ++ 4 state ports (230~V)
- ++ 4 relais switches (230~V, 10A)
- ++ RS232 z.B. für MBus (Master)
- ++ RS485 (ModBus)
- ++ additional RS232 for Modem, ISDN or Bluetooth
- ++ mass memory extension via compact flash card
- ++ each chanal can be programmed individually
- ++ optional display und keypad for mobile device
- ++ onboard calculation (DDC-functionality) samples:
  - heatmeter
  - heating controll
  - lightning controll
  - Email notification on treshold violation, fire signals, burglary warning, etc.



Flexibler Einsatz für:

- Kurzzeitmessungen
- Permanentüberwachung

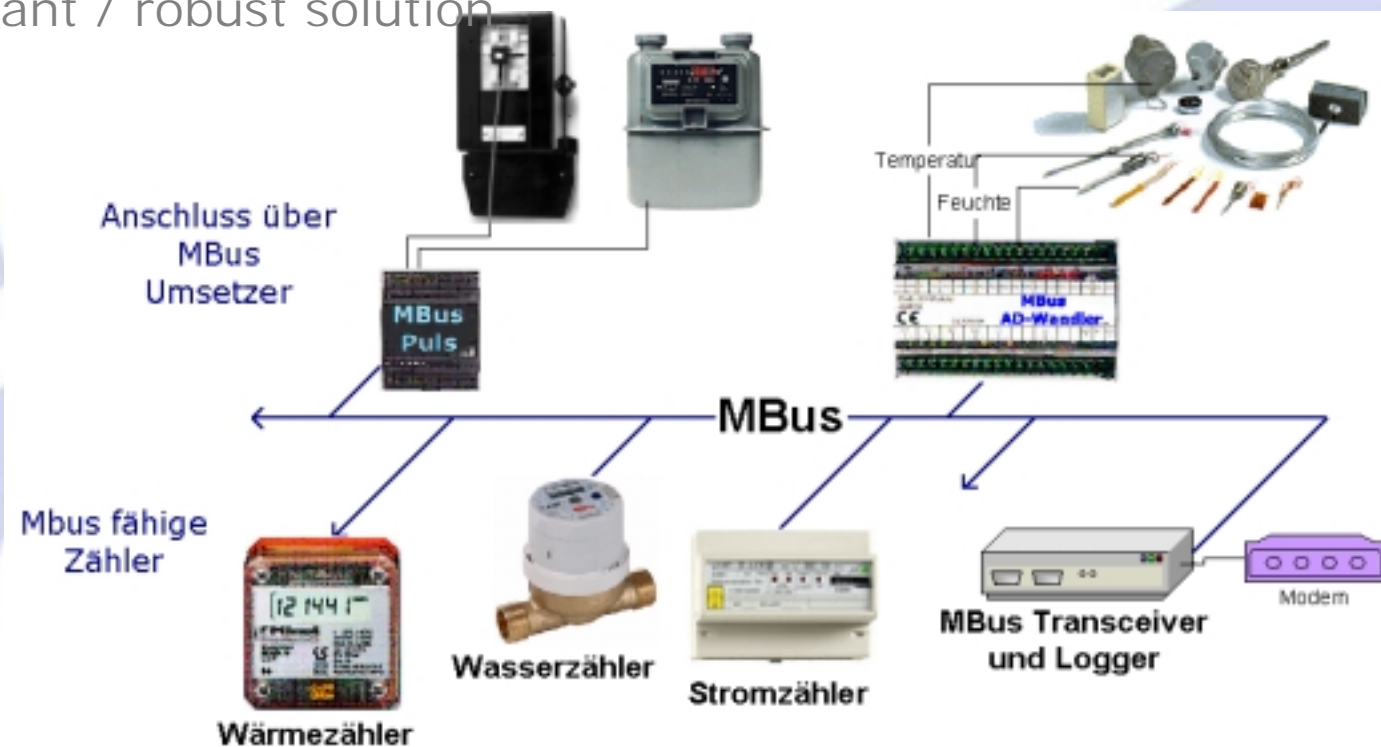
Verbrauchsanalyse



# ennovatis solution - automatic meter reading using MBus

## M-Bus

- european norm, free of licences
- simple connections through telephone line
- direct meter reading
- distances up to 10 km
- failure tolerant / robust solution



# ennovatis solution - KENWO24-4 basic



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# ennovatis solution - KENWO24-4 energy monitoring for apartment buildings

- Develop simple model to describe energetic behaviour of building
- Install basic version of KENWO including simulation model
- During operation KENWO will indicate status (good - satisfactory- bad)
- For the status bad possible measures are given
- The user has to decide which measure should be taken

## ennovatis solution - KENWO24-4 energy monitoring for office buildings

- Develop detailed model to describe energetic behaviour of building
- Install KENWO cluster to collect meter and sensor readings
- Install VEC control to monitor building
- During operation VEC control will indicate ways for better operation
- The energy manager has to decide which measure should be taken

# ennovatis solution - workflow for concept development

## 1. Step

model building, technical systems and usage

## 2. Step

investigate alternatives for usage, operation  
and building envelope

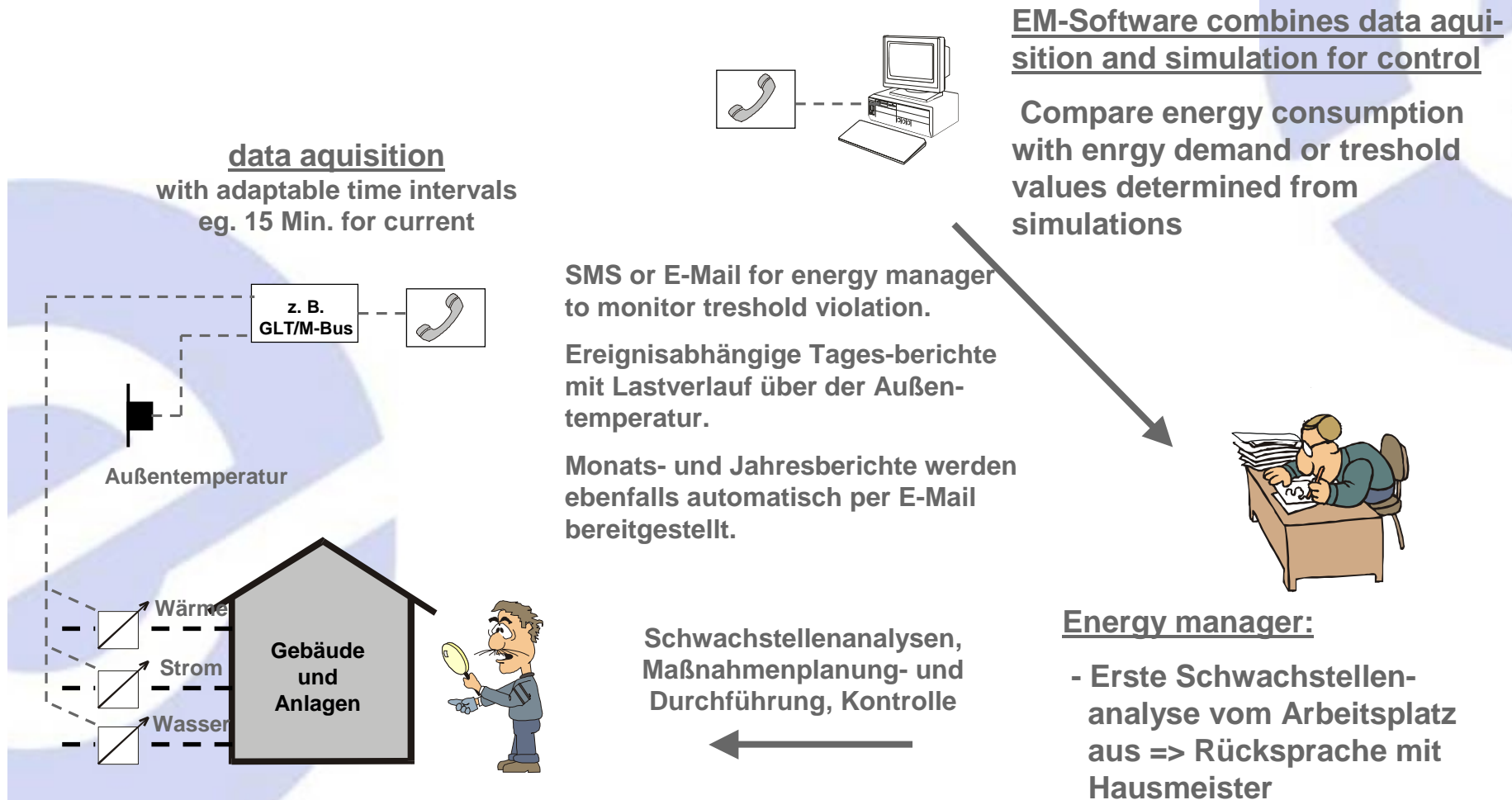
## 3. Step

choose and implement measures

## 4. Step

establish control system with FDD component

# How KENWO Improves Energy Management



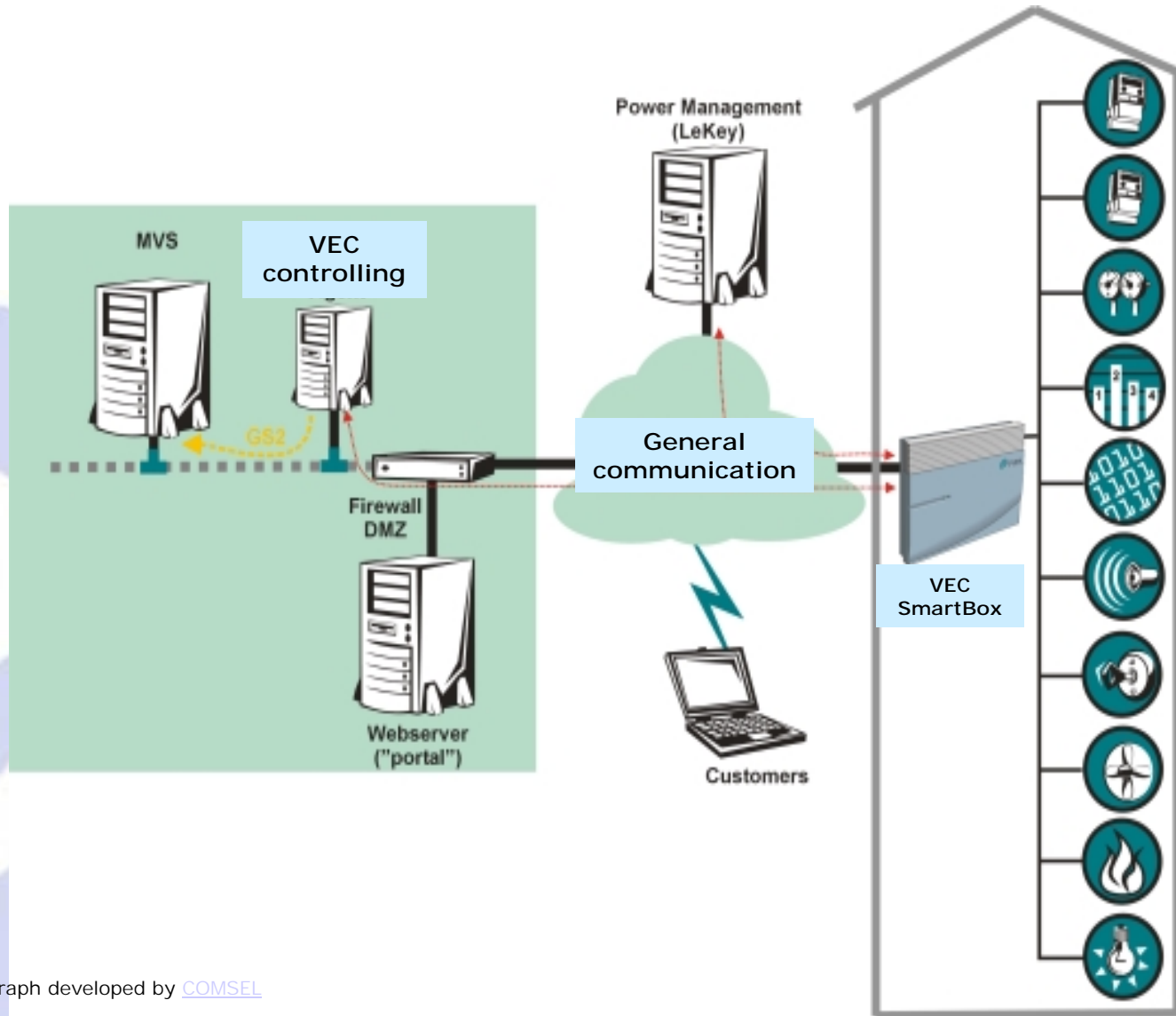
## ennovatis solution - workflow for short term controlling

- Analyse energetic behaviour of building by developing 3D simulation model
- Identify main sources of energy losses
- Develop and evaluate counter measures
- Develop and install sensor concept for temporary measurements
- Collect sensor and meter data using KENWO
- Analyse data using simulation model

## ennovatis solution - workflow for long term controlling

- Simplify 3D simulation model to treat main zones
- Determine most sensible input data
- Install sensors for long term measurements of most sensible data
- Collect sensor and meter data using KENWO
- Control data using simulation model including simple FDD

# How KENWO improves facility management



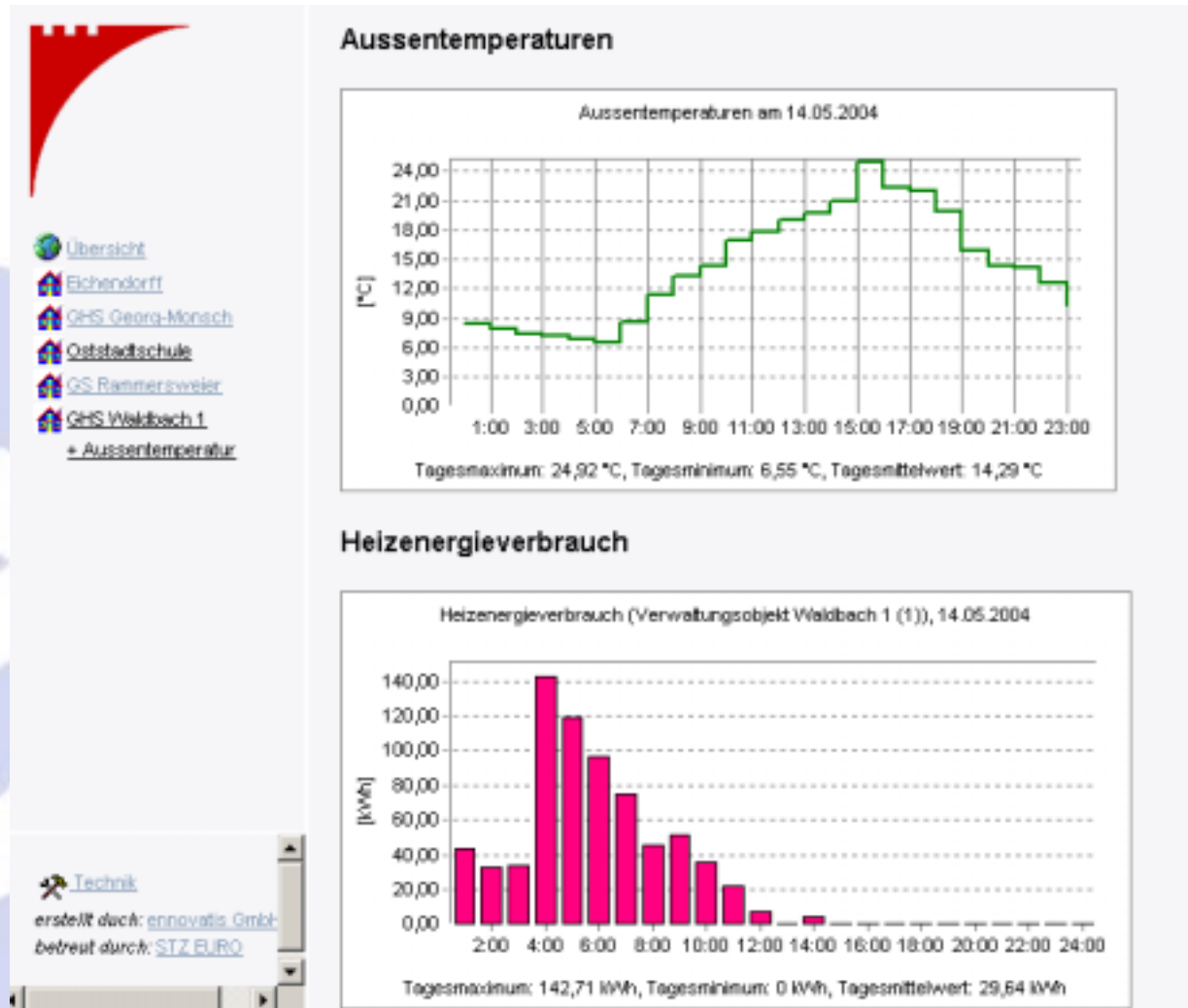
Original graph developed by [COMSEL](#)

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# Sample 1- Offenburg: Waldbachschule

[http://www.offenburg.de/bbuero\\_bauen/ftp/](http://www.offenburg.de/bbuero_bauen/ftp/)



Internet  
presentation  
of  
aggrega  
ted  
meter  
and  
measurement  
data

## Sample 2 - 23 Schools in Ludwigslust

data will be available in the heating period 2005/2006



School building Hagenow: energy used in 2002: 235 kWh/a/m<sup>2</sup>

Goal of Investigation:

**demonstrate cost-effective energy management in rural  
community**

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# Sample 3 - Appartement Building Minol

data will be available in the heating period 2005/2006



Appartment building Stuttgart: energy used in 2002: 150 kWh/a/m<sup>2</sup>

Goal of Investigation:

**develop cost-effective energy services for tenants and**

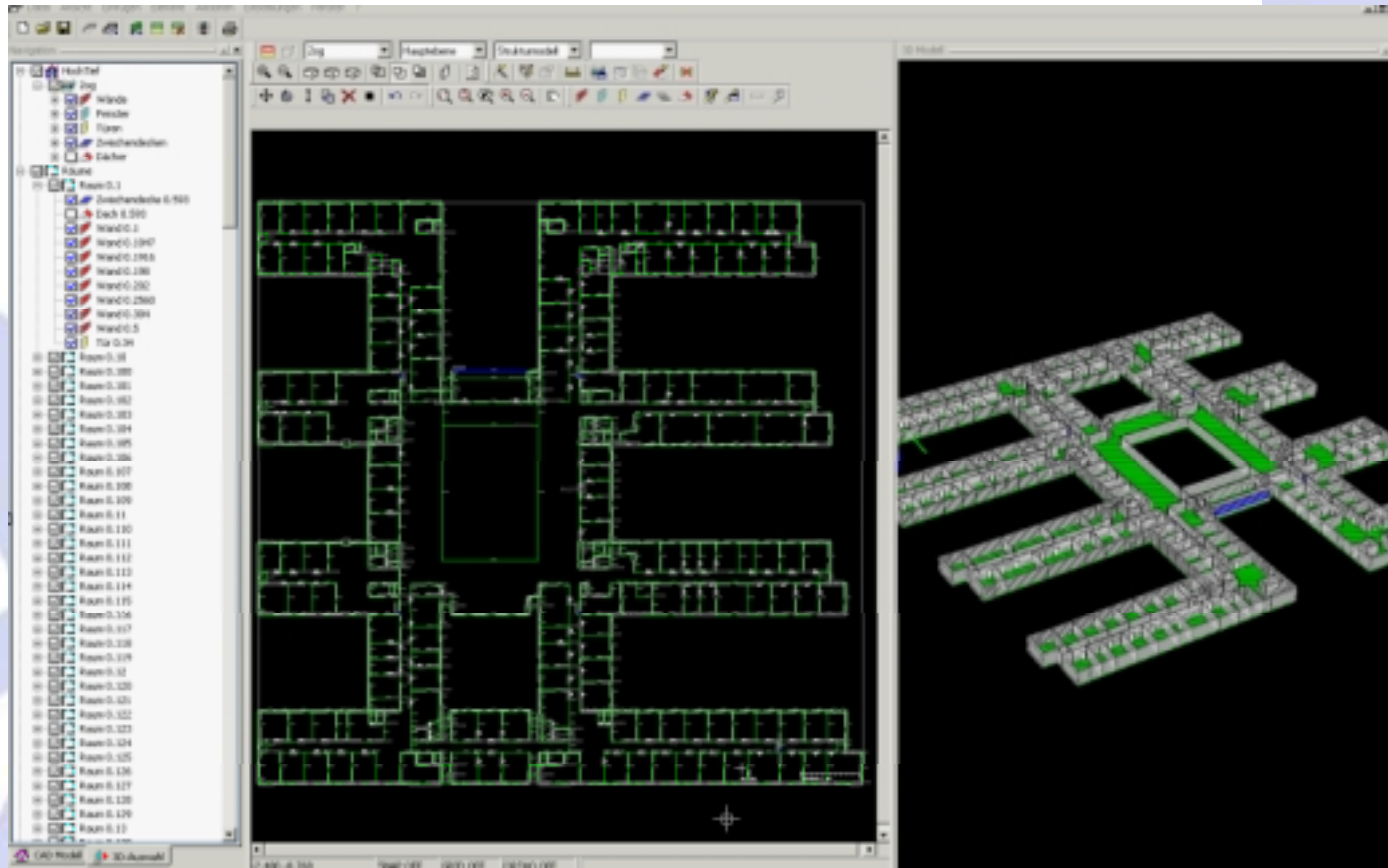
**owners**

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# Sample 4 - Office Building HOCHTIEF

data will be available in the heating period 2005/2006



Office building Essen: energy used in 2002: 235 kWh/a/m<sup>2</sup>

Goal of Investigation:

install cost-effective energy management as part of facility management

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**Sample 5 EnSan Demo Buildings**  
data will be available in the heating period 2005/2006  
<http://www.ensan.de/>



Goal of Investigation:  
install cost-effective short and long term energy monitoring

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