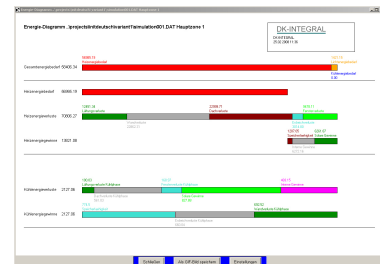
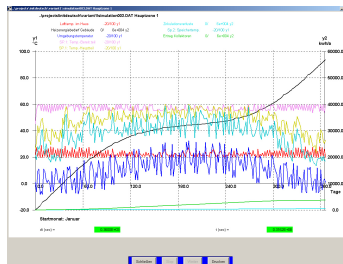
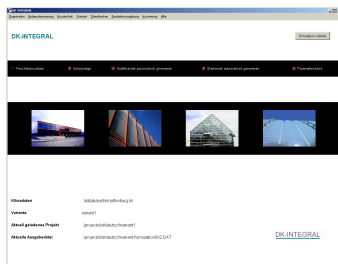


## Make a practical test – already at early level of your design process

In future, responsible handling with fossil fuels and the reduction of pollution will get more and more important. During the design process of buildings, architects and engineers are challenged by increasing efficiency demands in economic and energy issues coupled with restrictions for environmental protection.

DK-INTEGRAL from Delzer Kybernetik is a software, which allows to simulate every relevant parameter concerning energy technology right from the beginning of the design process. This way of working offers you an efficient possibility to optimize dimensions of construction materials and plant components with the aim of cost effectiveness and low energy consumption. This strategy can be applied for new buildings as well as for reconstructions or extensions of existing buildings. The dynamical simulation and calculation program DK-INTEGRAL contains the following items: building geometry, construction materials, energy facades, components for Heating, Ventilation and Air Conditioning (HVAC) including heat pumps, solar, geothermal and cogeneration systems, location, climate and user profiles. The optimal interaction between these factors is the key to an efficient use of energy and the fundament of a successful, integral building concept.



In addition to profound theoretical knowledge, Delzer Kybernetik can look back on nearly 25 years of practical experience in the field of energy and solar technology. DK-INTEGRAL is already successfully used by R&D companies for product development, architects, planning engineers and many leading universities. Because of the accurate forecast of energetically relevant parameters, plant components can be optimized precisely and practically, but also adapted to each other. Oversizing of HVAC-components and construction materials can be almost excluded.

## Validity

DK-INTEGRAL is already successfully used by many scientific institutes and universities. Detailed comparisons of simulation results of many new and already existing buildings have shown consistent results for building temperature as well as for energy demand for heating, cooling and lighting. Simulations for cooling of office buildings have as well shown consistent results with standards of VDI (Association of German Engineers).

## Practicality and universal usability

DK-INTEGRAL is useful for both, reconstruction of existing buildings and planning of new buildings complexes. Furthermore, its range stretches from private houses and office buildings to public buildings with high demands on building climate and energy management.

A short extract from the possibilities of DK-INTEGRAL on the basis of already realised projects with excellent cost-benefit-ratios by Delzer Kybernetik:



### **Salt-water therapy spa – Auggen, Germany**

Energy concept: High requirements to building physics – salt water with high temperatures and humidity, high energy demand due to overhead-dehumidification and heating of the spa.  
control technique/energy management: cogeneration, heat pump, minimised plant



### **Mobimo multistory building – Zürich, Switzerland**

Extension and reconstruction of an existing office building:  
energy concept with double cladding, use of daylight and building control system



### **Masuala hall – Zürich Zoo, Switzerland**

The intention was a man-made tropical climate.  
Complete simulation of building envelope, plant components and energy concept.



### **Market hall with multistory building – Basel, Switzerland**

Conversion planning of the historic market hall and planning of a multistory extension building  
energy concept, control technique and realisation of the building control system.

## **The excellence of DK-INTEGRAL**

### **Usability**

- Basic functions of DK-INTEGRAL are easy to understand and to learn in a few hours only
- complicated buildings or constellations can be described conclusively after only one day of input and simulation
- DK-INTEGRAL training for the use of the software and the development of conclusive energy concepts
- Phone support, if there are any questions or problems
- Clients modules or special requirements can be integrated into the software quickly and economically

### **Software package including data library and guideline-models**

- All libraries are easy to complete and individually adaptable
- building materials and layer compositions
- solar heat, geothermal systems, combined heat and power generation etc.
- User profiles
- National and regional standards
- Climatic regions: arbitrary geographic and climatic conditions (annual and monthly means)
- Comfort criteria

## **Flexible simulation**

- Simulation, dimensioning and graphic documentation of energy supply, installations for thermic and photovoltaic use of solar energy, insulation- and ventilation measures
- Multi zone model with different occupancies for each zone
- Coupled zones for complex buildings
- Free arrangement of construction elements (azimuth and inclination)
- internal heating and cooling loads
- Various heat-transfer situations can be shown in detail:  
Inner/outer surface –temperatures, transfer layers
- Arbitrary building location
- topographic and shading situations.
- user behaviour
- Simulation runs over user-defined time periods

## **Coupled simulation of building and plant components**

The interaction between solar and geothermal plants and building just as the exact consideration of solar and internal gains are provided by coupled simulation of building and plant components.

Ecological buildings with low energy demand or solar architecture buildings can be calculated in interaction with the building's thermal mass only.

Dependant on this, solar room heating can be dimensioned. Besides, waste heat of warm water distribution and buffer storage can decrease heat energy demand of an ecological, low energy building effectively. DK-INTEGRAL is able to link these parameters dynamically.

## **Energy management of multi-storage systems**

Flexible input of effective controlling strategies for multi-storage systems.

The loading of every single storage is controlled depending on climatic conditions, users profile and characteristics of the plant. For example, solar collectors in combination with a one-storage-system can achieve 50% solar fraction, while solar collectors in combination with three-storage-system can increase solar fraction up to 75%.

## **DELZER KYBERNETIK**

Delzer Kybernetik GmbH  
Ritterstraße 51  
D - 79541 Lörrach

Telefon 07621 95 77-0  
Fax 07621 95 77-20  
E-Mail [info@delzer.de](mailto:info@delzer.de)  
Internet [www.delzer.de](http://www.delzer.de)