

Green Buildings

Energy savings:

- up to 40% with KNX shading control
- up to 50% with KNX individual room control
- up to 60% with KNX lighting control
- up to 60% with KNX ventilation control

Movie Download



The entire content of this booklet is available in three languages as a downloadable movie from the Internet.

English:

www.knx.org/fileadmin/movies/en.html

German:

www.knx.org/fileadmin/movies/de.html

French:

www.knx.org/fileadmin/movies/fr.html

Efficient & intelligent

Buildings that are energy efficiently planned and operated are no longer unique. Even the description “an intelligent building” is beginning to lose its exotic nature. Both trends are presently revolutionising the increasingly ambitious architecture and setting a course in the worldwide fight against climate change.

In reality, energy conservation in the building sector has, to a great degree, become a trend and has slowly become an everyday concept for architects as well as for building constructors. Due to the recently recurring annual natural disasters, both large and small, we can see the impact of the increasing imbalance. We are, therefore, forced to look to the future and take responsibility for the actions of our society.

During the construction of a building, as well as during its operation, large amounts of energy are used, for this reason targeted usage in this area is especially effective. This does not necessarily mean the ultimate goal should be a “zero-energy house”; alone the intelligent networking of all devices to a decentralised complete system brings unforeseen savings. The networking of all electrical functions in a single installation bus system provides the opportunity for optimal coordinated control. The operation of heating, air-conditioning, lights and blinds for example can be aligned with external climate conditions and be controlled from an interface. Energy consumption is thereby kept within minimal boundaries. Since all electrical driven equipment and installations can be flexibly combined with one another and can be controlled by touch panels or by public networks (telephone, Internet), in the area of design and comfort this opens up almost unlimited possibilities.

The creativity of the designer is now called upon, thereby bringing closer the goal of creating expressive and thrilling architecture which is both ecological and profitable. One thing is clear: **We control climate change!**

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Sustainable design with KNX

Unlimited scope for design in lighting, higher energy efficiency and reduced life cycle costs due to the worldwide STANDARD for home and building control.

Whether it is in Terminal 5 of Heathrow airport or an ambitious house on Lake Zurich, a uniformed standard for the control of different devices within a building would make the implementation of innovative and complex architectural ideas much simpler. Here, the failure-free and cross functional networked operation as well as the economical usage of energy are important criteria for the cost effectiveness of such buildings.

International Uniform Standard

Standard electronic installations alone can only fulfil these requirements to a certain extent, while also requiring increased work and material input. Planners and investors, therefore, increasingly choose home and building system technology based on the international standardized KNX (formally EIB). By using cross functional sensors and actuators the heating, air-conditioning and safety installations can be operated in a convenient, cost-effective and exceedingly flexible network system, which can also be expanded at any time. The KNX home and building system technology is today already revolutionising traditional building utilities. This is shown by increased implementation in both new and renovated buildings. Industrial, business, public and private properties have been fitted with this technology for more than 15 years.

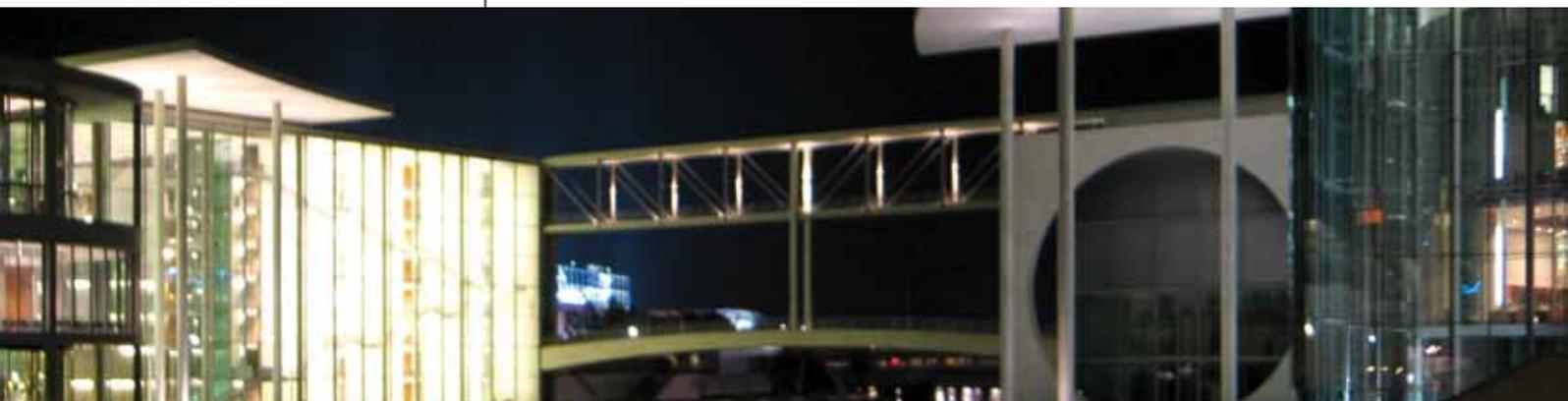
Flexibility in Usage

Often during construction planning the subsequent usage and future modified space requirements are not considered. This negligence can rapidly become costly as subsequent alterations usually involve enormous costs. This is where the KNX standard offers a high level of flexibility. The bus system can be simply reprogrammed with little expense. A property can thereby quickly be altered to accommodate new demands or completely new uses can be introduced.

The Strengths of the System

While in operation the strengths of the system are clearly visible: be it through higher operating reliability; almost unlimited possibilities in building control; due to increasing communication demands; or security and energy efficiency. KNX intelligently solves issues dealing with the reduction of energy requirements: the goal being the individual room control of heating and air-conditioning. KNX regulates and controls global temperatures in connection with individual rooms and time periods. In non-occupied rooms the temperature is reduced, resulting in a maximum of energy savings.

Lighting and sun blinds also work together: either the blinds block the sun to prevent the room from overheating or they allow the sun's warmth to heat the room to save heating energy. The lighting would also be dimmed dependent on the sun blinds' position. Also, the position of the windows, whether open or closed, as well as the number of



people in the room would be detected influencing the control of both heating and lighting.

In terms of the integrated building system technology a security system can be installed via KNX. Over the bus it would be indicated if doors or windows were closed, if equipment was switched off, if unwanted guests were in the building or if a fire had broken out.

Besides being used in lighting, sun blinds, heating, audio/video, metering, security and energy management, KNX can also be implemented for the building's own internal communication system. Over designer touch panels all relevant home and building states are indicated. Additionally, data can be transmitted externally via an interface to a superior control system for security or maintenance services. Problems or breakdowns can, therefore, quickly be resolved.

Additionally, KNX reduces wiring requirements and the associated risk of fire. The bus technology can be correctly implemented from the beginning compensating for its own costs. The investment alone can be written off after a short period of time as a result of reduced energy and operating costs, increased income from rents, additional comfort and optimal security. Higher cost-effectiveness with higher yields results in increased market opportunities, especially when reselling.

International Manufacturer Association

Behind the KNX home and building system technology is the KNX Association with a membership of over 150 firms. This major manufacturer association ensures a wide range of available products, which are one hundred percent compatible. All products carrying the KNX logo are accredited according to uniform technical and quality guidelines set out by the KNX Association. This makes KNX unique when compared to other bus systems. Likewise, KNX stands for continual further development of future installation and equipment generations as well as for the further education of specialist within the industry.

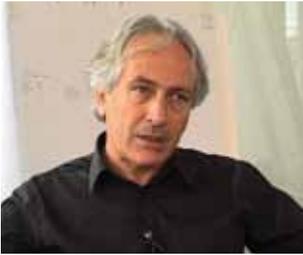


«If buildings are not loved by people then it is most probably detrimental for the complete sustainability.»

«... that one tries, to run the building so it always runs in the ideal situation, the building regulates itself in the ideal situation.»

Life cycle costs

Neutral energy consumption



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«The sustainability is in three areas: society, the world of business and the environment. The situation here is that we behave in such a way that the next generation can live in these three areas. The central point is most certainly the well-being of the people who live in these buildings. When a person feels good, when cosiness is present, then that person will look after it and everything will belong to society's sustainability.»

«The façade is the most important part of the building's shell. It divides the outside from the inside, that means, the complete loss of heat through the shell of the building is, of course, via the façade. This could provide a very big contribution. The façade must also, of course, protect against too much heat in the summer – it has, therefore, various functions.»

«As we are today aware, the life cycle costs are, after 15-20 years, as high as the construction costs. Furthermore, the life cycle costs are continuous. And here the principle of provision is applicable: we should build in such a way that the life cycle costs are not too high for the next generation. Otherwise we will not be able to operate these building anymore.

The life cycle costs are, in my opinion, of central importance in regard to economics.

If I were to now try to reduce the subsequent costs, life cycle costs, then I may possibly have a slightly higher investment but there will be less maintenance costs.

We want to show: if you build a building which has certain sustainability criteria, then this will be profitable in the long run!»

«... the whole situation is, certainly, lighting, which defines much cosiness. A very important point is the outside view – a reference to the surroundings.

Then the acoustics of a room – a very important point. Nowadays a very big subject: how much noise can I tolerate?»

«I am, in general, of the opinion that the shell of a building has the same function as human beings' skin.

I am of the opinion that differentiating between the façade and the building is irrelevant and that it should be a single factor.»

«The static façade has gone in favour of a dynamical façade.

People in the space industry are now talking about using textiles in the living quarters.

... When you look at what these textiles can do, what they achieve:

that one even thinks about using these materials for façade, a crazy idea – maybe long-term we will be living in tents!»

«... for me it's obvious, that the system may not control the people, it simply is there silently in the background, I don't really care.

... either we use speech recognition, so one can simply go in and say: I want room to heat up or cool down or I want more light.»



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«I believe that architecture will experience a small revival and will gain a certain existential importance for the care of people, not just accommodation but also with the energy they will require.»

«... Then one realises that almost half of the total energy consume flows into the infrastructure, into buildings for example.»

Buildings producing their own energy

Sustainability for generations



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«As you can see, the complete hall of this station is covered by glass.

As a result of the electrical unit, the solar cells, a multitude of which are in a solar module, we have a repetitive character, similar to tiles, and these are very usable patterns in the world of architecture.»

«We are experiencing, at this moment in time, how far energy political themes have climbed up the agenda.

We can, therefore, say that architecture has become political. And I find this extremely exiting

A building which does not use too much fossil energy is, therefore, also a contribution in helping a country become independent. We would then have a civilisation which does not hang on a pipeline or injection, but can provide for itself.»

«It would be optimal if the sustainability was also sustainability of energy. A building should not be a «gobbler» and always having energy pumped into it and then giving out warmth. It should be a building which has a slow energy flow as a result of energy efficiency and, on the other hand, also a part of the energy is available from the shell of the building.»

«... With the satisfaction of the present generation's needs – ours – in such a way that the satisfaction of future generations' needs are not reduced.»



«The question here is: what is comfort? This is very extensive, if one wants to philosophize.»

«It's an overall trend, that these trades become integrated, so that the data will always be available for the proprietor.»

Integrated home control

Coordination and networking



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«I believe that this would not necessarily mean that I look upon comfort only from the point of view of technical values but it also has to do with the impressions given by the rooms, the effect the room has on me and the perception as such.

And not that rooms are only built which are purely defined according to their function and then the rooms just function. For human beings there is much more to it.»

«I think, people often try to build a transparent building with glass facades. Glass is always tantamount to transparency, but much more is required than just using one material, this is often underestimated.

Of course, one can also use new materials. For myself, however, it is always the case of questioning the materials which are used, if this could not also be solved in another way.»

«In order to conserve energy, we must know, where the energy is being used and to which amount, and that's where networks come in, so we can offer information to those responsible for energy, so they can see, what the various consumptions are.»

«With each optimization measure, one should really check, whether they have the desired outcome, and networks can be useful in order to supervise this. It allows an efficient and correct control of the energy flow.»



«There are probably few areas, which are so exciting and swing back and forth between design and technology like lighting.»

Lighting design and energy efficiency



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«Energy efficiency is generally an issue, and the lighting planners have noticed that... we are probably affected by the fact, that anyone can see the light, anyone who passes the building, can see that the light is on, but for example not, that the air conditioning is running.»

«To save energy and to develop intelligent and efficient concepts, we must mainly focus on the life span, on the availability of operating systems, that offer use in these areas and turn on the light, there where it's needed.»

«With the construction or redevelopment of buildings, the first question always is, whether lighting planners should be needed.»

«... it's a big problem, an probably it's also the conflict that we always face – it's a good conflict, for it leads to creativity and energy! – the conflict, that we must develop something on the artistic, architectural level, but on the other hand to found it on a technical base, so that it actually works.»

Study: Energy efficiency, Bremen

Closely connected with the KNX building system engineering is the comfort of controlling shutters, blinds, lighting system, audio system, heating system, air-conditioning system and other technical installation.

Furthermore this comfort brings energy savings of up to 50% as new researches documented.

The 2002 new constructed center for Information and Media Technology (ZIMT) at the University of Bremen, was equipped with KNX controls for heating and lighting..

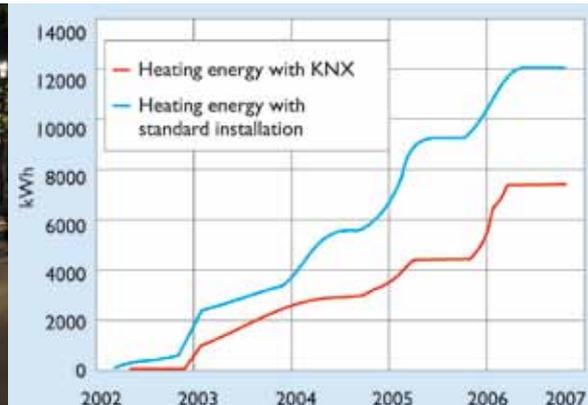
The logged data was evaluated and a "normal" case was compared to the "KNX" operation. The building has a specific energy demand of 60-75 kWh/m²a.

Two identical class rooms to select for their experiments.

One of them was equipped with standard thermostats for the heaters and the other one was equipped with KNX control.

The KNX controlled room was installed with window switches, valves on the heaters, a room temperature control system and a heating meter.

The result of the data analysis is very positive as the KNX controlled room could save up to 50% energy as compared to the room with standard installation.



Terminal 5 Heathrow, London

Electrical Engineer:
AMEC, Crown House
& Balfour Betty

KNX system integrator:
Andromeda Telematics
Limited, Surrey

Architect:
Artok group, Kairo

KNX system integrator:
El. Eatemad Co., Kairo

Terminal 5 Heathrow is designed to receive more than 30 million passengers in a year. Its infrastructure needs to be well-lit and safely maintained.

After careful evaluation, the British Airports Authority BAA decided to use KNX for the bus system which offers safety, stability and interoperability. The decentral location of KNX device massively reduces the amount of necessary wiring.

Furthermore it was decided to use IP as the backbone for the KNX system and to use the local area network for the communication over long distances. This combination allows a reliable KNX network over long distances. All the KNX components were delivered on pre-wired control panels for rational installation.

One of the BAA demands was the monitoring and operating of all sub systems from a single building management system.

Villa Artok, Cairo

The home is built in a fairytale oriental style and leaves nothing to be desired. Aside from the beautiful architecture, there is appropriate KNX technology to provide indulging comfort.

The advantage of a complete KNX network: all data points can be used from any part of the network, e.g., for a central visualization system. The visualization system for this villa is available on a touch panel and offers daily, weekly or yearly scheduled controls depending on the demands of the residents.

For the operation and control, there is a graphic representation of all KNX applications. The visualization system also controls logical links like the shading control based on temperature.

For this project the contractor El. Eatemad Co. could draw from past experience with many projects like hotels, office buildings, gymnasiums and movie theaters that have been built in recent years in Egypt.



Low energy consumption house, Innsbruck

**Concept
and KNX system integrator:**
Rene Rieck, Austria

IMPRINT
Green buildings

**Accompanying booklet
for videoinstallation
from Christoph Oertli**
www.christophoertli.ch

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Eik Frenzel
Christoph Oertli

Concept and design:
I/E/U AG Consulting
www.ieu.ch

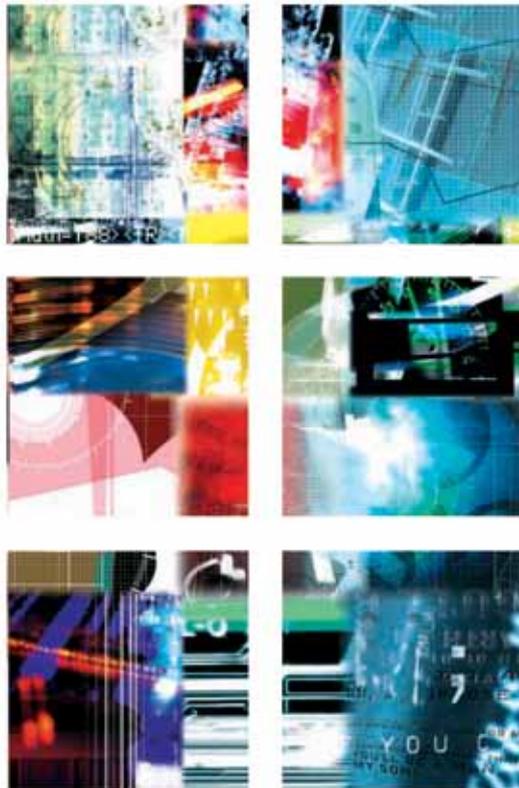
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The control of environmentally friendly heating technology with KNX turns out to be a key factor for profitability. Efficient heating systems like the heat pump are further optimized through KNX.

The building owner wanted to invest into a modern, comfortable and energy saving technology that would stand the test of time. It was important to him to have central control functions and a heating control system that would allow standby operation. The expandability of the system with audio and video control was also one of the customer's demands, along with access control of certain areas with visual display, automatic sun shading control, the individual room temperature control of the radiant floor system and a controlled ventilation system.

The challenge for the KNX control system was the interaction between the shading and the heating system. The low heating energy costs of this building with 150 m² totalling between 250 to 300 Euros per year could only be reached through the smooth interaction of these systems.





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