



ComBridge Studio Evolution

Smart Building Concepts



ComBridge Studio
— EVOLUTION —

Smart Buildings – Buildings become more intelligent

The first words that come to mind when talking about building technology and networks are *smart home* or *smart building*.

But what does this really mean? The world we live in and especially our large international cities are exposed to ever increasing environmental pollution. Fine dust, CO₂ and many other environmental pollutants have a negative impact on our health and our lives. Our ever increasing energy demands are largely responsible for this situation. Our industrial civilisation cannot exist without energy. But how much energy do we really

need? Is energy used efficiently? Can our energy consumption be reduced without compromising on comfort? Often the sources of energy consumption are unknown. In the commercial field we know many situations where energy is lost. Air ducts that are not tight enough often lead to compressors being switched on. Old light bulbs require more energy than necessary. Lights are left on even if there is enough daylight. Heating and air conditioning are not running in the best operating mode. The list of examples is long. Often we are not even aware of where and how much energy is used.



However, the situation has started to change since intelligent installation technology has made our buildings digital. Whilst before the connection between a light and its energy source may have been a manual switch, it is now a digital command that connects the two and brings light into the darkness. But this is not everything. Digital commands also regulate heating, control sun screens, secure a building, etc. This means the usual functions in a building are now linked with each other. But not only are the functions linked. The different systems are linked, too. Information from the installation system is now also available in the TCP network. Suddenly resources from different networks can be used for many different tasks.

When these systems and functions are linked, we talk of a *smart building*.

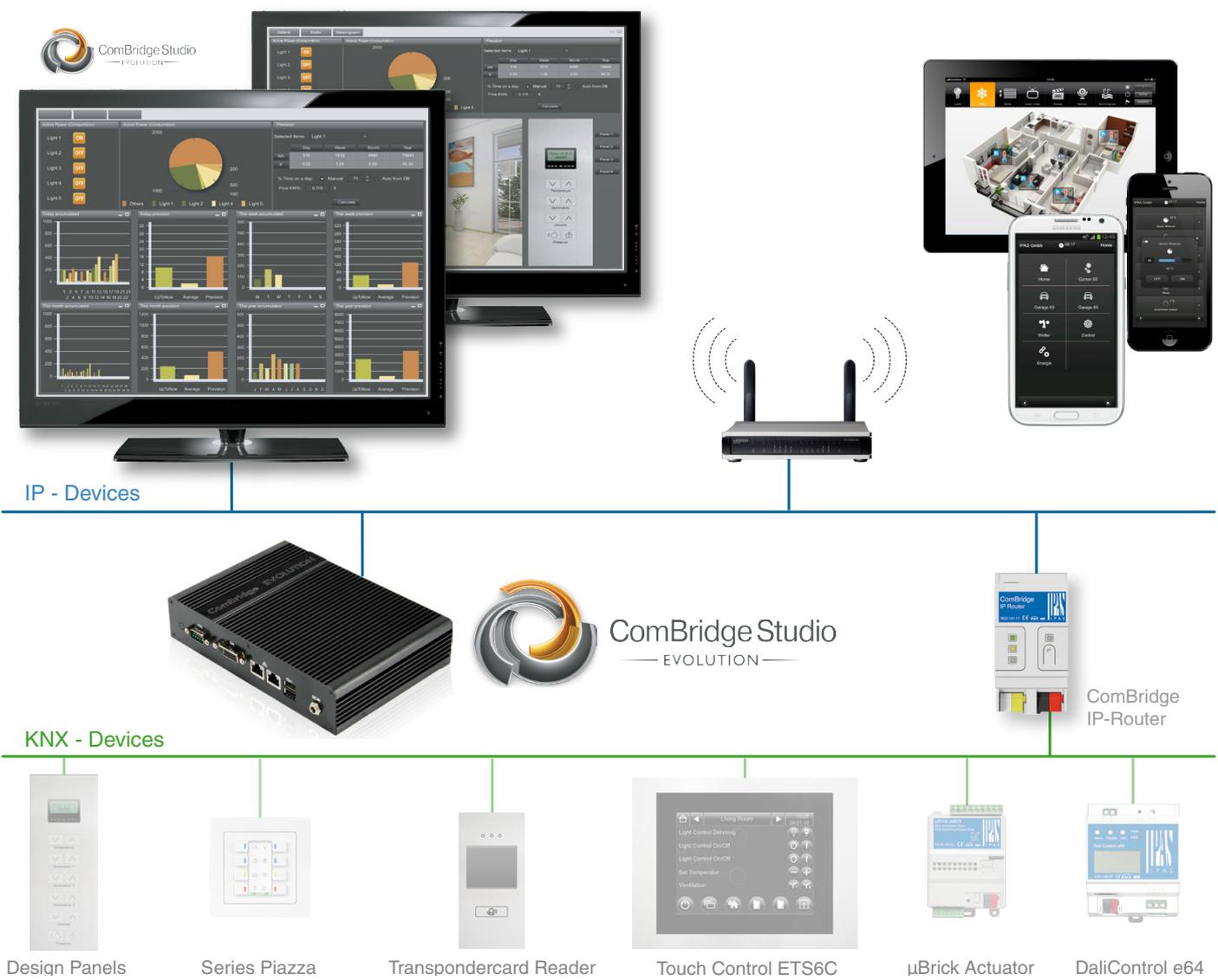
But what does a smart building have to do with the environment and with energy consumption?

The answer is simple. If a system or an installation provides digital data about the current status of a building, they can be processed in a great variety of ways. Evaluation and analysis of building data are the basis for well-functioning monitoring systems, which enable the cost-effective and efficient running of a smart building. And observation, analysis and optimisation of smart buildings that focus on safety, cost effectiveness and efficiency are exactly the strength of ComBridge Studio Evolution.

ComBridge Studio Evolution – Special features

IPAS has been developing web-based visualisation systems for over 15 years. During this time we have developed methods that make it possible to integrate many different systems and installations in one visualisation. At the same time web technology enables the simultaneous use of a visualisation by many different users. Experience and the complexity of our projects have made ComBridge a leading national and international brand for web-based visualisations.

With ComBridge Studio Evolution we offer the next generation of IPAS web-based visualisations. The well-established communication modules are passed on to the next generation. New elements and functions have been added. The entire software including the new CB Editor is already pre-installed on a suitable PC. ComBridge Studio Evolution is a package of software and hardware. No installation is required. As soon as CBS Evolution is *networked*, you are ready to go



IP - Devices

KNX - Devices

Design Panels

Series Piazza

Transpondercard Reader

Touch Control ETS6C

µBrick Actuator

DaliControl e64

CBS Evolution – a well thought through and tested concept

IPAS is well-known for its visualisation software that is based on HTML technology. In HTML technology, however, the realisation of important functions can be very complex. The display of values and the display of round design elements, especially animated ones, are only some examples of problematic areas.



or

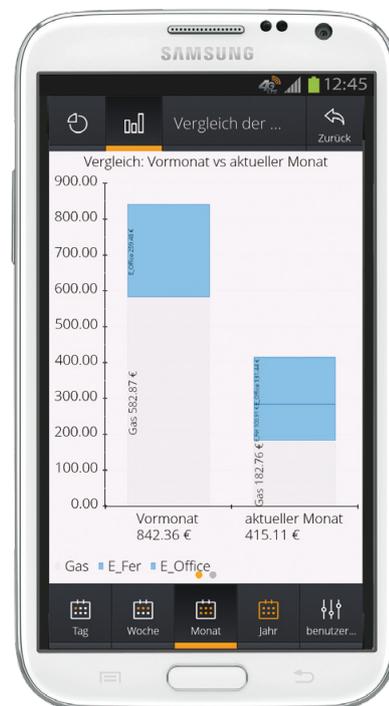
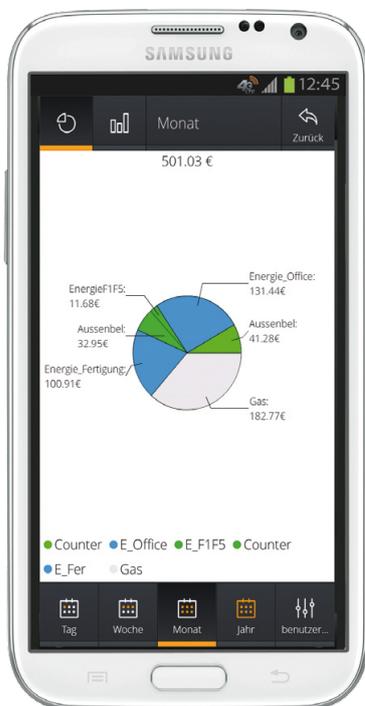


With Adobe Flash these challenges can be solved very easily. With CBS Evolution IPAS makes use of the advantages offered by Flash applications. CBS Evolution users can decide whether they want to take advantage of the benefits of an Adobe Flash visualisation or whether they prefer to stick to the traditional and more universal HTML technology, despite some drawbacks in terms of design. Both technologies can also be used simultaneously.

CBS Evolution – keeps up with the time

With the continuous further development of CBS Evolution, technological differences become less and less important. IPAS always tries to incorporate the most up-to-date technological developments into its products. There are some operating systems that do not support Adobe Flash so that software modules such

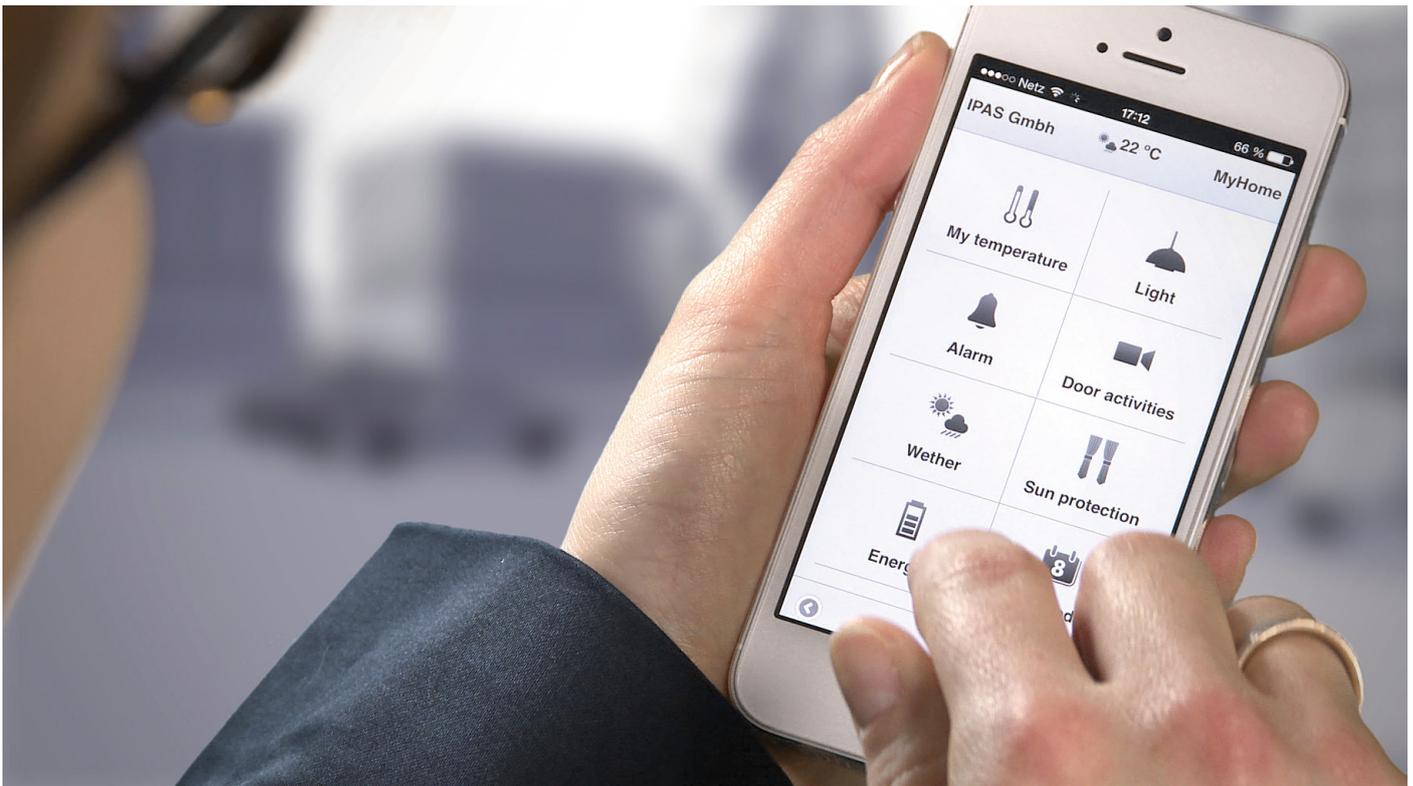
as Smart Metering cannot be used. However, IPAS software APPs, that are compatible with both Android and Apple, can be easily downloaded and installed so that smart metering results can also be displayed on mobile end devices without additional configuration.



CBS Evolution Smart – for a quick, mobile visualisation

We increasingly use mobile end devices such as smart phones and tablet PCs in our daily lives. The mobile all-rounders are already helping us with many everyday tasks. However, they are seldom used to control a building. The screen is often too small for graphical visualisations or the number of control functions is too

big. This is why we have added a Smart Editor to our CB Editor. With the Smart Editor, numerous functions can be configured on simple pages with only very few clicks. The application is automatically displayed with the right resolution, no matter whether the display is held vertically or horizontally.



CB Editor

The CB Editor is used to set up users and desktops and to create and design web pages. Navigation elements are used to load web pages in the application. Because of the wide range of available functions, control elements and different design templates, almost all requirements can be realised. If you are already familiar with

ComBridge devices such as the CB HCC you will notice that there are many similarities because all ComBridge visualisation devices are configured with the same Editor. A major advantage when time is an important factor.

CBS Evolution – Process Point Control

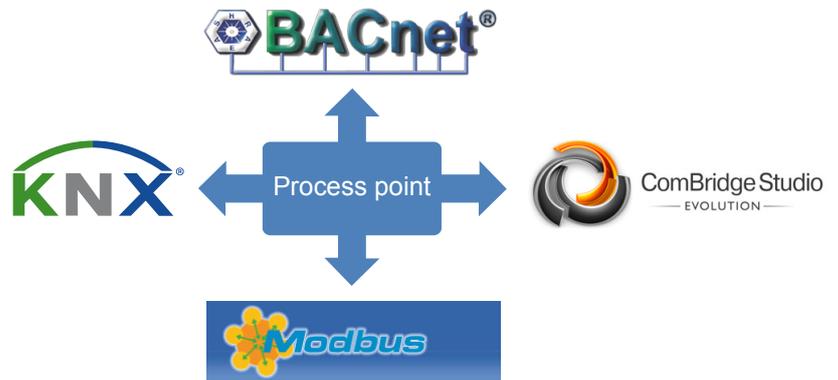
A special feature is the process point control. Events in the application are passed on to process points. Events often need to be manipulated before they can be sent to a system such as KNX. This manipulation is done in the process point environment.

With just one click the values of an event can be converted from one unit to another. In the same way, KNX events can be connected at process point level via an OR function. Within seconds, a collective fault notification is received without having to configure complex, logical functions.

The process point control makes it possible to import events from and export them to different systems.

Energy values from a Modbus system, for example, can be easily added to a KNX energy value in the process point environment.

The result is the total energy from two very different systems, directly configured without complex external interfaces. Different data points can be calculated with both simple and complicated mathematical formulas before the result is passed on to the



application. Whilst it may sound complicated, thanks to the clear structures it is very simple.

CBS Evolution – automation services run unobtrusively in the background

Does the visualisation need to remain active at all times so that scheduling commands can be executed, logical events calculated and alarms activated?

The answer is no. Even if a visualisation is not open on a client PC, all these typical automation functions can still be performed because they are realised by the automation service, which runs in the background of CBS Evolution. This service reliably activates

each scheduling command, runs every scene, calculates all logical events, forwards every alarm and checks whether e-mails have reached the sender. The automation service also registers BACnet, Modbus and OPC events that reach CBS Evolution via the TCP connection. The CBS Evolution automation service makes sure that there is no data congestion in the system.

CBS Evolution – Configuration Manager

CBS Evolution allows for the connection to individual KNXnet/IP lines and sections as well as the connection between different buildings via KNXnet/IP and the Internet. A quick search via Multicast finds all accessible KNXnet/IP gateways in a network and integrates the selected gateways with their individual names and IP addresses. The connection is immediately ready for the exchange of data. This concept enables access to individual

lines for data exchange. This is a great advantage which helps to reduce the amount of data in the KNX lines as filters in the ETS can be programmed for an optimal use. Of course, CBS Evolution also supports functions which check whether the configured connections actually exist. If a connection has been interrupted, the alarm service is activated and informs about the current status.

CBS Evolution – all services for Smart Buildings



Time

In CBS Evolution an unlimited number of weekly and annual schedules can be configured. Depending on user rights, scheduling commands can also be changed on-line.



Alarm

CBS Evolution offers a complex alarm management module. Any event can trigger an alarm which is then displayed in the visualisation and forwarded by e-mail. An authorised person can check the alarm history at any time.



e-mail

Each alarm event can lead to an e-mail being sent which contains all the important information about the alarm. All alarms are saved in an internal database. This means the history of an alarm is always available. Details such as when the alarm happened, who acknowledged it and what measures were taken as a result, are all consistently recorded.



Scene

With the CBS Evolution scene editor an unlimited number of scenes can also be configured. The system supports any type of scene trigger to start, save and stop a scene.



Logic

CBS Evolution is also equipped with a powerful graphical logic editor. The logic editor enables the realisation of the most complex logic functions.



User control

Is or should a user be allowed to have full access to a visualisation? No matter which user rights are required, CBS Evolution will individually adapt itself to users and user groups. This means that unauthorised use can be completely ruled out.

CBS Evolution – Smart Building concepts

One of the most important objectives of a new building is to reduce running costs and increase energy efficiency. Building automation therefore becomes increasingly important. However, with each new building, general energy consumption also goes up. As mentioned earlier, increasing energy consumption leads to more environmental pollution, for example through greater CO₂ emissions

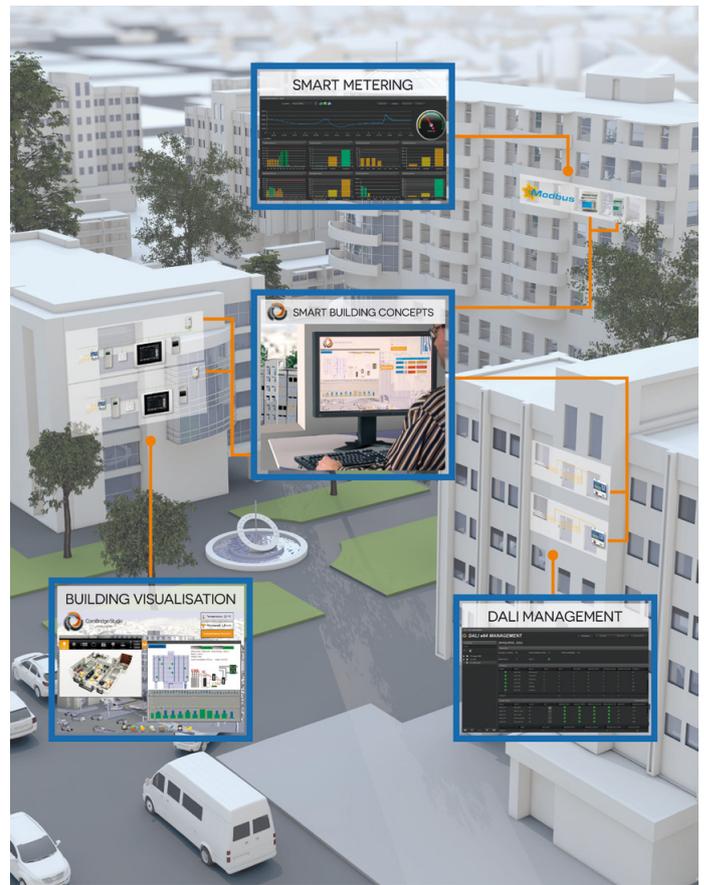
43% of the entire annual energy consumption in Germany comes from the areas industry, trade, commerce and service (Source: German Ministry for Economy and Technology, Guideline for the Support of Energy Management Systems (EnMS), on 22nd July 2013). Companies in Germany therefore provide a large

potential for energy savings. In order to be able to use this potential, energy management systems (EnMS) are required which are able to display and to analyse consumption figures and reduce energy consumption through continuously improved processes. The international ISO DIN 50001 supports companies and organisations in the systematic set-up of an effective energy management system.

With its Law for Renewable Energies, the German government offers incentives to companies that are planning to establish an energy management system in accordance with the international norm ISO DIN 50001.

The aim of ISO DIN 50001 is to support organisations in improving their energy-related performance (e.g. their energy efficiency) through the required systems and processes. Unused energy efficiency potentials are to be exploited, energy costs reduced and the emission of greenhouse gases (such as CO₂ emissions) to be reduced. An energy management system thereby makes an important contribution to the protection of our environment and climate. ComBridge Studio Evolution together with the CBSE Smart Metering Module fulfils all the requirements of an energy management system in accordance with ISO DIN 50001 in order to record and analyse energy consumption, calculate reference and performance figures and compare consumption intervals with each other.

CBSE Smart Metering also supports the user in evaluating optimisation measures and in estimating their cost effectiveness. If certain conditions are met, the Government will subsidise the set-up of an energy management system according to ISO DIN 50001 in connection with CBS Evolution Smart Metering.



CBS Evolution – Smart Metering

Meters record the consumption of different types of energy. Gas and water volumes are often recorded through an impulse counter. Electrical energy is derived from electrical potential energy. The results of such measurements are made available in different communication protocols. CBSE Smart Metering can process

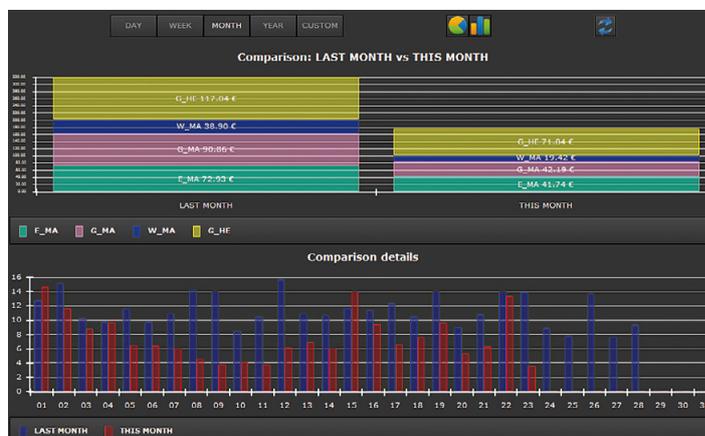
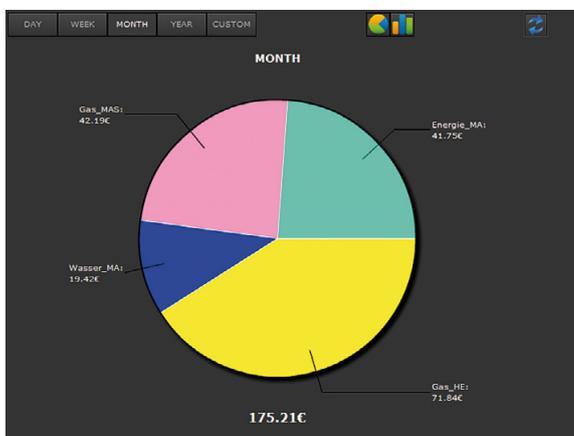
Phase name	Process point	Unit
Phase	(WCI:0/5/3) Wirkleistung Phase 1	W
Phase	(WCI:0/5/4) Wirkleistung Phase 2	W
Phase	(WCI:0/5/5) Wirkleistung Phase 3	W

consumption data from different systems in a simple manner. KNX consumption meters can be directly connected via KNXnet/IP. But even Bacnet consumption meters (Bacnet IP) and Modbus consumption meters (Modbus IP) can be connected with CBSE Smart Metering without additional gateways. The respective meter licence expansions allow for the analysis of many different consumption meters within CBSE Smart Metering. To analyse consumption data, all you need are the performance and energy values and the costs per energy unit.

Thanks to the process point structure in CBS Evolution it is easy to convert volume sizes into performance related units such as kWh. A simple mouse click converts units from e.g. [W] into [kW]. You only need a few clicks to calculate performance and energy values from the dim values in a lighting system or the electricity values in a switch actuator. These can also be analysed as virtual meters in CBSE Smart Metering.

As soon as consumption meters have been set up, the recorded data is saved in the CBS Evolution database. CBS Evolution thereby prepares the data automatically and without any extra work for a variety of observation periods. One particular data processing feature is that CBSE Smart Metering not only analyses

the past but also calculates future trend developments. This means that at any point the estimated consumption of a particular energy source can be displayed graphically at the end of an observation period. The trend estimation is, of course, dependent on the current consumption and is therefore continuously updated.

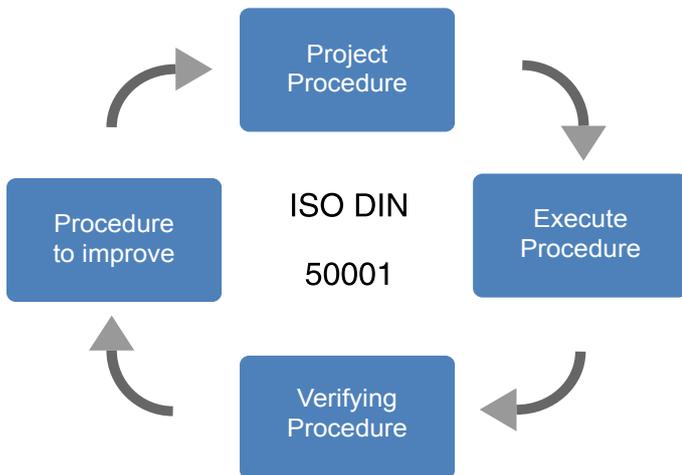


In addition to the individual consumption analysis the total energy consumption during a certain observation period can also be displayed and compared with other observation periods. The consumption data analysis is a powerful tool to display the

typical energy-related behaviour of an object and to compare it with other consumption units. Based on this data, suitable measures can be taken to improve the energy performance of an object.

CBS Evolution – Smart Metering effectiveness analysis

The ISO DIN 50001 emphasises the continuous improvement process as a means of reaching the set targets. It describes a constant circle of the following processes: planning of measures, execution, effectiveness of the execution, further measures for improvement.

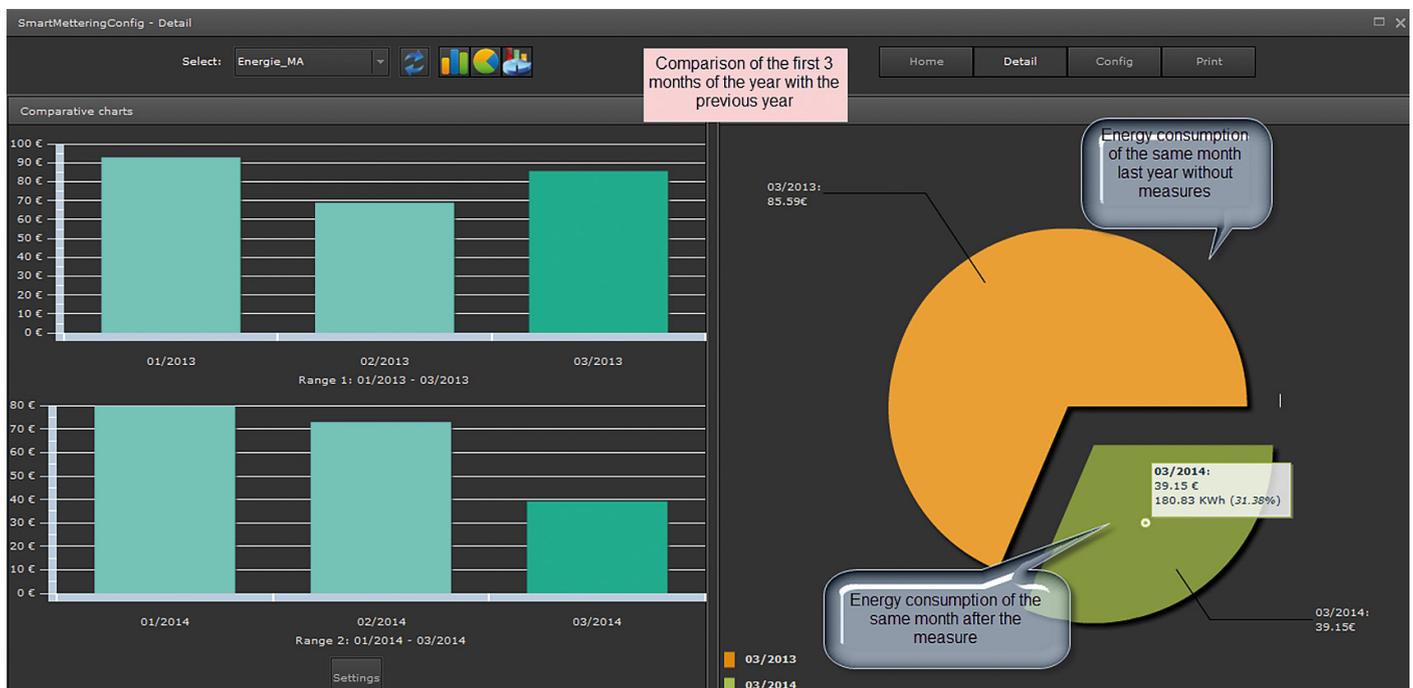


The consumption data analysis is a tool that monitors and records

measures that have been taken. It can monitor the effectiveness of a measure, for example, by comparing it with a similar observation period in the previous year or month. CBSE Smart Metering offers a solution which makes data protected consumption data comparable. The user is able to compare days, weeks, months, years and other freely configurable time periods with each other.

The result of the comparison can be printed as a pdf file for an energy management analysis.

Of course, you are able to create process points for such an analysis, which can calculate performance related consumption figures at any time. Measurements in the unit [KWh], for example, are calculated in [KgCO₂]. The CBS Evolution communications concept is also able to integrate different sites and buildings into the energy management system. This makes CBS Evolution Smart Metering a perfect solution for linked buildings. In this context, CBS Evolution can become an important element in a smart city concept.



CBS Evolution – DALI light management

In purpose-built buildings DALI (Digital Addressable Lighting Interface) and KNX are popular solutions for lighting and lighting control. Switching, dimming, value setting - standard KNX functions, which in combination with DALI lights that are assigned to different groups, make it possible to create cost-effective lighting concepts very easily. Special functions in DALI technology, such as detecting light failure complete the functional advantages of this solution. A DALI lighting system in combination with the IPAS DaliControl e64 and CBS Evolution provides a complete system solution.

A unique feature of the DaliControl e64 is the IP Interface. In the ETS, the DALI Control e64 with its switch, dim and value setting functions is configured like a commonly used switch actuator. But the DALI lights can be configured remotely via a smart phone or tablet PC and an IP connection, which is the fastest possible option. Powerful KNX / DALI gateways can provide an array of additional information that is of great importance for the efficient and cost-effective running of a building. Operating hours of the equipment, light and ECG failure, total failure rates, operating modes and burn-in times for new lights are only some of the information that is available in a DALI system. In addition, DALI has become increasingly important in the emergency lighting business. Especially with regards to battery-operated emergency lights the question of safety arises frequently. To address this issue, the DaliControl e64 automatically and regularly performs

light, battery and system tests. Moreover, CBS Evolution and the CBS DALI Management Tool (CBSE DMT) can save and document test results. All that CBS Evolution requires are the IP addresses of the connected DaliControls e64. The rest happens automatically and at the push of a button. The CBSE DMT connects via IP, exports all available information and displays it in a table in the CBSE DMT. Process points are created automatically in CBSE so that individual information, for example, in the CBS Evolution alarm management tool can be processed easily.

As a rough estimate 30 DaliControls e64 can provide around 15,000 pieces of information. If the configuration of each data point were to take 2 minutes, the whole configuration would take 500 hours. Assuming that the configuration of a DaliControl e64 IP address also takes 2 minutes, the configuration time for 30 DaliControls e64 is only one hour for exactly the same amount of information. Of course, the CBSE DMT distinguishes between different ECGs so that ECGs for emergency lighting can be immediately identified. It only takes a few clicks to select the time period and the test results that are needed. The results of all the tests during this time period are provided in form of a report or CSV file. A simpler and more reliable way is hardly possible. In addition, the CBSE DMT provides data about the operating times of individual lights and groups of lights. This is important information if you want to increase the cost-effectiveness through preventive maintenance.

The screenshot displays the DALI e64 MANAGEMENT software interface. The main window shows a topology tree on the left with the following structure:

- /IPAS/
 - 17:Lager_CNC
 - 18:Test
 - 21:IPAS_OG1

The main content area is titled "/IPAS/IPAS_OG1" and contains the following sections:

Overview:

- Normal Lights: 49
- Failed ECG Count: 0
- Failed ECGs Rate: 0 %
- Emergency Lights: 3
- Alarm: (Green indicator)

Groups:

Status	Device	Name	Index	ECGs	Converters	Failed ECGs	Failed Lamps	Failed Conver	Value[%]
●	e64_OG	OG Ausstel	1	2	0	0	0	0	0
●	e64_OG	SchAudit	2	3	0	0	0	0	0
●	e64_OG	SchLeinw	3	6	0	0	0	0	0
●	e64_OG	K_Fen	4	3	0	0	0	0	0
●	e64_OG	K_Mitte	5	3	0	0	0	0	0
●	e64_OG	K_Wand	6	3	0	0	0	0	0
Total				41	3	0	0	0	

Single- ECGs:

Device	Name	Index	Type	Failed ECGs	Fail lamp	Failed Conver	Lifetime Exce	Value[%]	Operation[h]
e64_OG	Heizung	57		●	●	●	●	0	504
e64_OG	Server	58		●	●	●	●	0	113
e64_OG	OG_FIL1	59		●	●	●	●	0	427
e64_OG	WC_Herr	60		●	●	●	●	0	107
e64_OG	Waerch_Herr	61		●	●	●	●	0	161
Total				8	0	0	0	0	0%

A physical DaliControl e64 device is shown in the foreground, displaying the IPAS logo and various status indicators.

IPAS – for buildings of the future

Since its establishment in 1996, IPAS stands for innovative products and solutions in building automation. Based on the global KNX standard, IPAS develops and manufactures devices and software for buildings of the future.

Every day our highly-qualified IPAS team rises to the challenge of developing the best technological and economical solutions for our clients. Knowledge, experience and creativity direct everything we do from development to production and distribution.

Informed by our project management experience and the global use of our products, IPAS today stands for sustainable values. It is our company policy to create and sustain employment, to assume responsibility for the community and to train young people.

Our relationship with our clients is based on fairness, cooperation and integrity.

In the manufacture of our products, we strive for the upmost quality taking into consideration resource saving technologies and manufacturing processes. Sustainability and environmental awareness are integral to our work. Our certified quality management system in accordance with DIN/ISO 9001, guarantees that all our processes meet these requirements.

It is our aim to always realise the individual wishes of our clients and to offer the best-possible solutions for your requirements, true to our maxim:

"A satisfied client is the best reference".

The information in this brochure contains details and features that may differ from those described in individual cases or may be subject to technical changes.

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