



**Kieback&Peter**

**EU BUILDING DIRECTIVE**

**SMART BUILDINGS**

**“EPBD Update Places Greater Value on Building Automation”**

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**In July 2018 the amendment to the EU Building Directive came into force. It seeks to increase energy efficiency in both new and existing buildings. European Union member states must now implement the requirements of the “Energy Performance of Buildings Directive” (EPBD) in their national law by March 2020. In Germany, these requirements have mainly been implemented via the Energy Conservation Ordinance (EnEV). This ordinance will be incorporated into the new Buildings Energy Act (GEG), which is currently up for a vote. We spoke with Eva-Maria Metz, expert on energy efficiency management at Kieback&Peter, about the importance of this update for building planning.**

Eva-Maria Metz: “In non-residential buildings, ‘building automation and control systems’ with extensive energy management functions will become mandatory by 2025—this applies to heating, air conditioning, or combined heating and air conditioning systems with a rated output greater than 290 kW.”



Eva-Maria Metz (born in 1990) studied industrial engineering and management in Reutlingen and Berlin, with a focus on energy and environmental resources. Since 2014, she has worked at Kieback&Peter as a market manager in the Building Lifecycle division. She advises customers on how to correctly handle energy data in compliance with legal requirements.

**TGA: Ms. Metz, the update of the EU Building Directive / EPBD continues the goal of ensuring a decarbonized building stock by 2050. Is that realistic?**

Metz: It is certainly an ambitious goal, as one third of the building stock in the EU is over 50 years old. The German Energy Agency (dena) calculated that the renovation rate in Germany is currently only around 1% per year. This means that many properties have not been sufficiently renovated or lack smart technology for efficient energy use. And because existing buildings still largely use fossil fuels, CO<sub>2</sub> emissions are correspondingly high. The German government calculated that buildings make up 40% of the country’s total energy consumption. They are

thus responsible for a large part of the total CO<sub>2</sub> emissions. dena assumes that an annual renovation rate of at least 1.4% is necessary to achieve Germany’s climate protection goals, which were chosen to meet the EU requirements

**TGA: Those are the figures for existing buildings. What about new buildings?**

Metz: Here, too, Germany is behind on its homework. The Federal Ministry of Economics and Energy (BMWi) still has not defined the requirements for nearly zero-energy buildings. Back in 2010, the EPBD stipulated that private non-residential buildings must be nearly zero-energy buildings starting in 2021. For the public sector, this requirement has been in effect since 2019. The requirement will not become mandatory until the new GEG takes effect.

**TGA: The current standard in Germany roughly corresponds to the KfW Efficiency House 70, generally referred to as a “low-energy building.” How is this different from a nearly zero-energy building?**

Metz: To put it simply, a KfW Efficiency House 70 has a maximum primary energy demand of 75 kWh/(m<sup>2</sup> a). On the other hand, the nearly zero-energy house has very low or “nearly zero” energy demand according to the 2010 EPBD. The directive further stipulates that this energy demand must be covered “to a very significant extent by energy from renewable sources.” In addition, heat and electricity should be generated in the immediate vicinity of their consumption if possible.

This is formulated rather vaguely because the EPBD provides only the framework, leaving the specifics to each individual state. The governments of some federal states in Germany believe that the current energy standard is already reaching the limits of

economic viability. In the first GEG draft, these states vetoed a proposal making this standard stricter.

But postponed does not mean canceled. The nearly zero energy standard will probably be here soon: The BMWi has announced that it will publish a new draft bill for a Buildings Energy Act in 2018. This bill is intended to unite the Energy Conservation Act (EnEG), the Renewable Energies Heat Act (EEWärmeG) and the EnEV.

For operators of existing buildings, this means implementing projects that cost little but have a large impact. Low-investment efficiency measures are a major focus of the EPBD amendment, and it rightly emphasizes building automation (BA). And it formulates concrete, binding measures—which doesn't go without saying.

### **TGA: What are these measures exactly?**

Metz: The directive explicitly states that “building automation and control systems” will become mandatory in non-residential buildings by 2025. This applies to heating, air conditioning, or combined heating and air conditioning systems with a rated output of greater than 290 kW. Commercial buildings of average size quickly exceed this value, especially existing buildings.

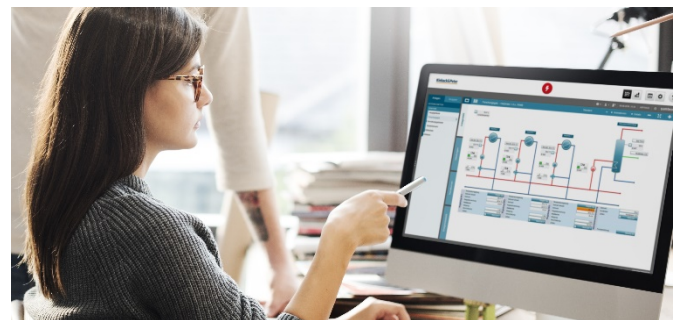
In addition to classic BA functions, the directive also sees energy monitoring as an aspect of building automation. For example, the directive states that the above-mentioned building automation and control systems must be able to continuously monitor, log and analyze energy consumption, and building operators must be able to adjust it.

These systems should also set energy efficiency benchmarks for the building, identify efficiency losses in building services, and inform the building manager about how these losses can be minimized. And finally, BA systems should be able to control interconnected building management systems from any manufacturer and enable communication between them.

According to the update, member states can require residential buildings to be equipped with a “continuous electronic monitoring” function. This function is intended to measure the efficiency of the

system and inform the operator or manager of the building if system maintenance is required. Member states can also choose to require open-loop control functions that ensure optimal generation, storage and use of energy.

Inspections of heating and air conditioning systems remain in place. For air conditioning systems, these inspections are now binding only for systems with a rated output of 70 kW and higher, instead of the previous value of 12 kW. However, states again remain free to replace the inspection obligation with other appropriate measures. They could require the installation of building automation systems instead.



A Qanteon user takes a look at the heating system. In addition to the classic building automation functions, the updated EU Building Directive also sees energy monitoring as an aspect of building automation.

### **TGA: Does that mean there will be increased demand for systems that integrate all the different building services into one comprehensive energy and building management system?**

Metz: I think so, although there is a reason for pause: the government has not yet decided whether such installations will become mandatory. Both a gradual implementation until 2025 and a sudden introduction before the “starting in 2025” implementation deadline are possible. Based on my experience, I think the latter is likely.

### **TGA: Wouldn't such a sudden implementation pose risks due to the extremely tight implementation window?**

Metz: Yes, and for planners this would mean informing their customers about the upcoming mandate in good time. After all, planners need enough time to develop and implement tailor-made solutions. Otherwise, it's possible that a building completed in 2024 would no longer meet the legal requirements in 2025.

Building operators should avoid what happened with the Energy Services Act. This act was also announced well in advance by the EU. However, Germany implemented it so late that many companies were unable to implement the relevant measures. The federal agency responsible for compliance audited



Energy and system data displayed in the Qanteon building and energy management system from Kieback&Peter. Starting in 2025, non-residential building automation and control systems for heating and air conditioning systems with a rated output of 290 kW or higher must do the following: meet benchmarks regarding the building's energy performance, detect efficiency losses in building services, and inform the building manager about possible improvements in energy performance.

6,000 companies and found that approximately one third of them could not meet the requirements. Some are facing steep fines.

**TGA: The current mandatory targets show that the EU wants to tackle the renovation backlog in non-residential buildings. Is that enough?**

Metz: I agree with the EPBD that deficits exist in this area, and we urgently need to catch up. The EU is requiring its member states to submit long-term renovation strategies by March 2020. Among other things, these strategies should reduce the “perceived risk of investments.” Unfortunately, there are no concrete specifications.

That's because too little is known about building automation's potential for increasing the energy efficiency and profitability of buildings. For example, let's take the value that goes into the energy performance certificate to indicate the efficiency of a building. This is a theoretical construct based on a DIN standard. But we need real numbers, and we need to obtain them via sub-metering that records the energy requirements of individual systems. These measurements provide us with key performance indicators for the most important consumers and thus

concrete information about the effectiveness of the measures.

Building users must be able to compare the predicted energy demand with the actual consumption. This is the only way to find out whether the individual building services and technologies actually save energy as planned. And it's the only way to focus renovations on the areas with the greatest possibilities for reducing consumption.

The industry certainly has the knowledge needed to plan and implement such changes. After all, recording and evaluating measurement data is one of the core competencies of building automation. I wish there had been more of a push in this area. The EPBD does mention smart meters as an indicator of a building's intelligence. Unfortunately, the directive does not go so far as to make sub-metering and automatic meter readings mandatory.

**TGA: How does the EPBD define a building's intelligence?**

Metz: It is the ability to use information and communications technology to adapt operations to users' needs and the requirements of the grids in order to improve energy efficiency. The EPBD defines a “Smart Readiness Indicator” that is intended to measure precisely this intelligence.

For planners, this Smart Readiness Indicator will probably not be relevant in the coming years. The EPBD stipulates only that a system for assessing a building's “smart readiness” should be developed by the end of 2019, and even that is optional. The European Commission is currently working on this.

I doubt that the indicator will have any substantial impact, if only because our buildings are already becoming smarter. Room automation systems are already adjusting building services to users' needs. They create individual user profiles and automatically control key functions such as lighting, heating or ventilation.

And in many places the interaction of buildings with the public power supply is already a reality. New buildings are increasingly generating some of their electricity demand themselves, for example with photovoltaics. If this production is insufficient at peak

times, the buildings require a smart control system to draw energy from the grid to accurately meet demand. It gets really complicated when entire neighborhoods are integrated. Such systems then consist of different producers, consumers and storage technologies. Many also include charging infrastructures for e-mobility. Such neighborhood solutions are still pilot projects, but their development will continue even without the Smart Readiness Indicator.

**TGA: According to the directive, charging infrastructures for electric vehicles are indeed an indicator of a smart building. How are new mobility concepts related to smart building technology?**

Metz: If you don't have a charging station that is in the immediate vicinity of your home and always available, you won't buy an electric car. These stations are powered through the electrical outlets of the building where you live or work. This requires a system for managing charging loads so that the outlet is not overloaded and sufficient power is available to charge multiple batteries. Billing systems also need to be integrated. And finally, it must be possible to use car batteries to store energy. This opens up new opportunities, but it makes the energy systems even more complex.

In this case, the EPBD sets surprisingly clear guidelines: if a new or completely renovated building has more than ten parking spaces, it must have a charging station. For non-residential buildings, cable ducts must lead to at least every fifth parking space. For residential buildings, they must lead to every single space. This ensures that cables can be laid in the future without great expense.

**TGA: Building automation companies therefore benefit from the precise specifications for non-residential building automation and e-mobility. What is your overall assessment of the EPBD update?**

Metz: The EU is no longer waiting to see how the countries implement the directive and is instead defining concrete measures itself. Even if it is only in certain areas, this is still a new and surprisingly positive development. Previously, there were mandatory renovation quotas only for existing government buildings, in addition to mandatory inspections and energy audits.

Previous versions of the EPBD had mostly neglected building services. With the update, however, the EPBD is now focusing on low-investment measures in existing buildings. It thus significantly elevates building automation within the discussion on energy efficiency and renovation.

However, we urgently need instruments that clearly quantify the efficiency of smart building technology. I was hoping that the EPBD update would make a stronger push in this regard. After all, building operators need to see that building automation is not an unwanted cost that is legally imposed on them. Rather, the opposite is true: relative to a building's entire life cycle, these investments will quickly pay for themselves.

**TGA: Ms. Metz, thank you very much for talking with us.**

**“Extended deadline” in the German version**

The amending directive for the EU Building Directive (EPBD) comprises 17 pages, and the first six pages contain a total of 45 recitals. In the German version, there is an error in the addition to Article 2a, “Long-term renovation strategy,” which is not without a certain irony given Germany's previous delays in defining the nearly zero energy standard for buildings:

“By 2050, each member state shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonized building stock, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings.”

They actually meant: “Each member state shall establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonized building stock by 2050 ...” In reality, all member states must submit the renovation strategy by March 10, 2020, including a report on the results of the mandatory public consultation.

