

## SF 74: Tightened standards for new buildings and for modernization of buildings

Fr	B	C	NY	S	T	Total
9	6	7	8	9	8	47

### Beispiel:

**Freiburg**, as well as other cities in Germany, has developed a building energy standard for its own new buildings and new buildings in general on urban land, which goes beyond the requirements of the Energy Saving Ordinance (Energieeinsparverordnung – EnEV). Here, the heat requirement level of a passive house must be complied with (15 kWh/m<sup>2</sup>a).

With EnEV-30%, **Berlin's** increased level of requirements is a little less ambitious than that of Freiburg. As far as new buildings are concerned, the Federal Republic of Germany, as a building owner, has already committed itself to complying with the very low energy standard in line with the EPBD for the years 2019/2021.

**Copenhagen** is pursuing a similar path: the requirements for its own new buildings must already comply with next planned tightening of the law. That is to say that the new buildings must not only comply with the requirements of the Danish building regulation in 2010, but also the stringent requirements of 2015.

Unlike the German cities, with the „Green Building Programme“ it introduced in 2002, **Tokyo** has addressed both private and public buildings (above a certain minimum size of the area developed and regardless of the use of the buildings) with regard to new builds or refurbished buildings. Besides the demands made on the energy-related quality of the building, the programme is aimed primarily at transforming existing buildings into environmentally friendly buildings. This is achieved by the need to draw up an „environmental plan“ for the building, which, for example, identifies the measures undertaken on the building, and which is ultimately reviewed by the city.

In order to reduce greenhouse gas emissions by 30% by 2030, the energy-efficiency standards for new buildings and alterations to existing buildings are prescribed by the **New York** Energy Conservation Code (NYCECC). All new building and alteration applications filed after December 2010 must comply with the tougher 2011 edition of the NYCECC

### 1. Differentiated description of the key field

Requirements regarding the energy performance of buildings exist in most countries. In Europe, they are based not least on the Energy Performance of Buildings Directive

(EPBD) and its implementation (e.g. in Germany by means of the Energy Saving Ordinance). It should, however, be noted that in many countries, e.g. Germany and Denmark, energy requirements for buildings came into force much earlier, mostly in response to the oil crisis of 1979. The administration of individual cities can tighten these requirements further, or, if need be, introduce energy requirements in a federal state where no such requirements exist. The specifications must be submitted to the city council and passed by it (often called energy guideline or energy ordinance). However, the standards only have to be applied to municipal buildings. If the building owner can demonstrate that the costs of the requirements are not recoverable within a specified time, exemptions may ensue. On the whole, a city sets an example and leads the way with the more stringent building standards.

In some cities, private agreements are also concluded with buyers of municipal land, in which buyers undertake to implement more stringent requirements.

Alternatively, there are voluntary building standards that can be met by building owners who then in part receive a certificate regarding the quality of the building (e.g. passive houses or Efficiency House Plus). In addition, some countries have more favourable financing options for energy-efficient buildings (e.g. KfW Efficiency House 70, 55 or 40).

Beyond the purely energy-related requirements, cities also have the possibility of adopting sustainability requirements for buildings, such as those in force in Tokyo. This could entail compliance with various sustainability criteria or the prohibition of using certain materials in construction work. Requirements relating to water consumption (grey water) are also possible.

### 2. Reference to sustainability:

Due to the various options to define building standards, specific or even comprehensive sustainability issues can be addressed. The tightening of energy requirements leads to lower energy consumption and hence lower emissions. Exemplary planning, implementation and documentation may motivate more developers to build energy-efficient houses. However, the proportion of new buildings is quite low in many cities. Each new (additional) building basically increases the energy consumption of buildings in the city. The aim should be to reduce the increase in energy consumption as far as possible. With the existing legal requirements in most countries, more stringent requirements result in a relatively small savings potential.

The focus in most cities is, therefore, on the energy-efficient refurbishment of the existing building stock. Some cities also have increased standards for the buildings it owns.

From an economic perspective, lower energy consumption leads to reduced energy costs, which, however, are offset by increased investment costs for the improved building envelope or technical building equipment.

Experience shows that there is only a small risk that the more stringent requirements will not result in lower energy consumption, especially with good planning, a solution tailored to the building and taking user behaviour into consideration. Low-energy buildings, etc. are tested over many years and only with very new (innovative) technologies, incorrect planning or different user behaviour is there a risk of substantially different energy consumption.

Social aspects of sustainability can, for example, be taken into consideration by means of appropriate standards relating to security in the event of a disaster (earthquake, etc.). The obligation to set up specific protection zones in buildings that are located close to the junctions of public mobility (underground station, train station, etc.) and to train the users of the building creates trust and an appropriate sense of security in the city should an emergency occur.

### 3. *Relevance to industrial sectors?*

Mobility:	Medium
Energy:	High
Production & logistics:	Medium
Security:	Medium
ICT:	Medium
Water infrastructure:	Medium
Buildings:	High
Governance:	High

#### Brief description of the high level of importance:

The requirements for the more stringent building standards are established by the city administration and passed, for example, by the city council (governance). If the desired result is less energy consumption, the key field has strong significance for the energy sector. Other requirements may affect the security or water. Basically, however, it is the building sector that is affected.

In the case of positive-energy houses, there is a link to e-mobility, since the energy surplus generated by the house is partly used by electric cars.

### 4. *Impact (positive & negative)*

Positive:

- Energy saved and emissions reduced
- Savings in energy costs
- Appreciation of the value of the building
- Integrated planning - learning curve for the various plan-

ning teams

Negative:

- Higher investment costs that can be recouped through savings in energy costs
- Greater planning effort
- Greater need for coordination, e.g. in an integral planning team

### 5. *Implementation measures:*

When developing the more stringent requirements, studies are commissioned from research facilities or universities to estimate the financial impact of different levels of tighter requirements and to calculate the average amortization periods. The studies and requirements drawn up are then presented to and adopted by the decision-making body (e.g. city council) or have to be revised.

The standards may need to be defined, tested and anchored in law.

The putting into practice of the specifications can be supported by appropriate energy managers or other energy consultants.

For building standards which have voluntarily been made more stringent, the standard has to be defined and disseminated. Where certification is desired, planning and implementation must be reviewed.

### 6. *Actors: Who can shape things?*

The urban requirements can be designed by the city administration or by the institute it commissions studies from.

Building standards that have voluntarily been made more stringent are launched either by the federal state (improved financing conditions) or by private organizations for the purpose of certification after inspection in exchange for money (e.g. Passive House Institute) and are then dependent on their successful dissemination.

### 7. *Prerequisites:*

The logic and positive impact of more stringent requirements must be communicated to the city administration. For this purpose, it is important to look at the expense across the planned useful life or even lifetime of the building and not just at optimising the investment costs. If necessary, building owners and planners must be provided with information or trained.

## **8. Obstacles/barriers:**

- Higher investment costs
- Level of knowledge of the people in the city administration and participating planners should be increased
- Development of energy-efficient and economically efficient building technologies is necessary
- Quality monitoring in the planning and implementation stages

## **9. Indicators:**

- Statistics on the number of converted building, of the calculated and measured energy consumption of new buildings with more stringent energy-efficiency requirements
- With more complex sustainability requirements, the statistics are often based on the CO2 emission savings achieved – with water requirements on the water saved.
- Evaluation of the technologies used and experiences (user feedback)

## **10. Special features/remarks:**

Quality assurance and the further development of building technologies as well as the implementation of challenging pilot projects constitute one task field of both industry and research.