

BUSINESS PLAN
CEN/TC 371
Energy Performance of Buildings project group

EXECUTIVE SUMMARY

Business Environment

Climate change and the environmental degradation affect every human being. This needs a global solution; The Paris Agreement is key for tackling climate change
Buildings are responsible for 40% of energy consumption and 36% of GHG emissions in Europe
Buildings shall contribute significantly to GHG emission reductions of around 90% compared to 1990 by 2050 (EU Green Deal)

Benefits

Energy performance standards help:

- designing more energy efficient buildings and retrofitting existing ones; this will
 - help to reduce the energy demand
 - create significant job opportunities world-wide;
- to reduce the greenhouse gas emissions – for which the building sector has great potential;
- to decarbonize the building sector;
- raising awareness on indoor environmental quality.

Priorities

- CEN/TC 371 activities aim to ensure development and maintenance of a coherent set of standards for the determination of the energy performance of buildings (EPB) using the holistic or systemic approach, by developing standards at overarching EPB level and coordinating the work on EPB related standards being developed by the CEN/TC's and their specialists responsible for developing EPB related standards to ensure a harmonized approach.

1 BUSINESS ENVIRONMENT OF CEN/TC 371

1.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this CEN/TC, and they may significantly influence how the relevant standards' development processes are conducted, as well as the content of the resulting standards.

Why is the holistic approach important for the energy performance of buildings (EPB)?

In the past, energy performance requirements were set at component level – minimum thermal insulation levels and minimum efficiencies of products. This, however, leads to sub-optimal solutions and creates a barrier to the necessary technological transitions.

The holistic approach to assessing the overall energy performance of buildings and the built environment, provided by the set of EPB standards, is a key tool to overcome these barriers.

The set of EPB standards enables the assessment of the overall energy performance of a building. This means that any combination of technologies can be used to reach the intended energy performance level, at the lowest cost.

Due to this 'competition' between different technologies, the holistic approach is a key driver for technological innovation and change. Countries using the approach for several years have experienced large scale implementation and cost savings on a variety of new technologies.

And there is the economic benefit: Energy expenditures account for a substantial part of a building's total operating costs.

Who are the potential users of the set of EPB standards and what should they be aware of?

With the set of EPB standards:

- **Policy makers** acquire an instrument that enables them to take coordinated measures in the built environment and to quantify how much these measures would reduce the amount of energy consumed in buildings.
- **Building industry, engineers and designers** can improve the energy-efficiency of their designs, building products and systems. The set of EPB standards takes these current and future products, systems and designs into account. Due to the holistic approach the risk of suboptimum solutions at component level is minimized. This way industry knows in what direction to innovate.
- **Building owners and occupants** can benchmark against other buildings and predict the energy saving potential of improvements.

The energy assessment of buildings is carried out for various purposes, such as:

- ✓ Judging compliance with building regulations expressed in terms of limited energy use or a related quantity.
- ✓ Increasing transparency in real-estate transactions through an energy performance certification and/or display of the level of energy .
- ✓ Monitoring the energy-efficiency of the building and its technical building systems.
- ✓ Helping to plan retrofit or renovation measures through predicting energy savings that would result from various actions
- ✓ Raising awareness on indoor environmental quality.

In general, the holistic approach means that the energy performance is assessed as the total energy used for heating, cooling, lighting, ventilation, domestic hot water, and, in some cases, appliances. It ensures that all technologies are treated equally and balanced.

European directives

The set of EPB standards has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480¹), and supports essential requirements of EU Directive 2010/31/EC on the energy performance of buildings (EPBD)². The EPBD has been amended in 2018³. This amendment states that: "Member States shall describe their national calculation methodology following the national annexes of the overarching standards, namely ISO 52000-1, 52003-1, 52010-1, 52016-1, and 52018-1". The possibility of national annexes was provided in Annex A and Annex B of all EPB standards for use in the context of national or regional legal requirements. They may give mandatory choices at national or regional level for such specific applications, in particular for the application within the context of EU Directives transposed into national legal requirements.

For this purpose, the set of EPB standards takes into account differences in national and regional climate, energy infrastructure, culture and building tradition, as well as policy and legal frameworks. Different options are given for procedures, input data and boundary conditions. For each option, a clear template (Annex A) is provided that can be used to tailor the energy performance assessment to a specific situation. An informative ("default") set of choices (Annex B) is also suggested.

Another important amendment of the EPBD is the introduction of the Smart Readiness Indicator (SRI), which is dealt with under the lead of CEN/TC 247.

Also worth noticing is the introduction of electromobility infrastructure in the EPBD. Electric vehicles constitute an important component of a clean energy transition based on energy efficiency measures, alternative fuels, renewable energy and innovative solutions for the management of energy flexibility. At the moment the input and output of recharging stations is not considered in the set of EPB standards, but discussions have started about the possible addition of recharging points, since these could be seen as an on-site electricity generation and storage system of a building.

Specific other European target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD art.11.9) and any other regional (e.g. Pan European) parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

¹ Mandate M480, Mandate to CEN, CENELEC and ETSI for the elaboration and adoption of standards for a methodology calculating the integrated energy performance of buildings and promoting the energy efficiency of buildings, in accordance with the terms set in the recast of the Directive on the energy performance of buildings (2010/31/EU) of 14 December 2010 and amendment (2018/844) on 30 May 2018.

² EPBD, Recast of the Directive on the energy performance of buildings (2010/31/EU) of 14th December 2010

³ Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency

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Besides the EPBD, also the Ecodesign directive⁴ and the Energy labelling regulation⁵ might to some extent affect the work of CEN/TC 371. The Ecodesign directive provides consistent EU-wide rules for improving the environmental performance of energy-related products. The directive sets out minimum mandatory requirements for the energy efficiency of these products. The energy labelling regulation may complement those ecodesign requirements with mandatory labelling requirements. Products like heating and cooling equipment and ventilation systems fall under the Ecodesign directive. These products also play a role in the EPB. Some of the parameters used in relation to the Ecodesign directive are also used in the EPB standards. Most of the parameters cannot be the same due to the different scopes: product as-is versus product as part of a system. But further harmonization would benefit both directives and should be investigated.

European political developments

On December 11, 2019, the European Commission presented the European Green Deal. This deal describes the Union's ambition to be climate-neutral by 2050. In order to achieve this the following objectives were set:

- The energy sector needs to become free of CO₂.
- The mobility sector ought to transform towards cheaper and healthier forms of transportation.
- Industry needs to be incentivised to become international frontrunners in sustainable and circular production.
- The building sector has to stimulate renovation in order to improve the energy performance.

Subsequently, in Januari 2020, the European Commission and Parliament captured this objectives into the Union's first ever Climate Law, which was presented on March 4, 2020 and is yet to be ratified by the European Council.

As part of this law a 'Renovation wave' initiative for the building sector will be proposed late 2020. The renovation wave consists of three key elements:

- existing legislation must be implemented with determined focus, including proper monitoring and verification to ensure that energy savings from buildings are real
- create synergies among different pieces of climate and energy legislation.
- new policies in order to drive demand for building retrofits, like reformed property transfer taxes and minimum energy performance standards.

Therefore, the initiative prescribes requirements⁷ to turn the sector more energy efficient.

- Price mechanisms should stimulate the use of certain energy sources of others.
- Buildings' design should be circular.
- Increased digitalisation.
- Improve buildings' climate adaptation.

This political development stresses the importance of the EPB standards and their implementation in the different countries of the European Union. Moreover, it could be anticipated that as a result of the Green Deal, the EPB standards will have to be tightened up.

⁴ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

⁵ Regulation (eu) 2017/1369 of the european parliament and of the council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU

⁷ Bouwen en renoveren. De Europese Green Deal, december 2019

https://ec.europa.eu/commission/presscorner/api/files/attachment/859221/Building_and_Renovating_nl.pdf
[.pdf](#)

1.2 Quantitative Indicators of the Business Environment

The following quantitative indicators describes the business environment in order to provide adequate information to support actions of the CEN/TC:

The Energy Performance standards have proven to be an incentive for innovation. The figure below⁸ shows the uptake of innovatieve ventilations systems is related to higher Energy Performance of Building standards in the Dutch Building regulations.

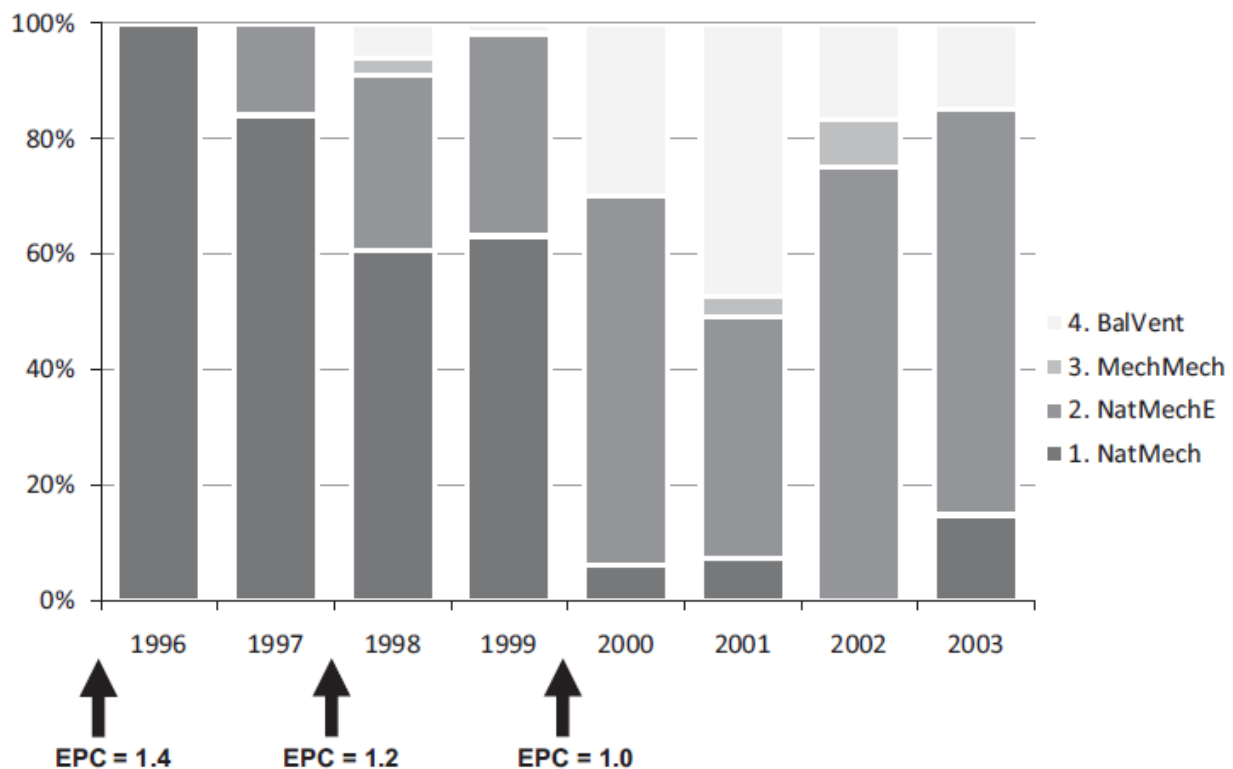


Fig. 3. Market shares of ventilation systems.

2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC

Energy performance standards help:

- designing more energy efficient buildings and retrofitting/renovating existing ones; this will
 - help to reduce the energy demand
 - and to create significant job opportunities;
- mapping which energy performance measures are the most effective for the building and its systems;
- creating a level playing field for the evaluation of energy efficiency of real estate;
- giving legislators the opportunity to set real goals to reduce greenhouse gases;
- decarbonizing the building sector.

3 PARTICIPATION IN THE CEN/TC

⁸ Taken from: Impact of changes in regulatory performance standards on innovation: A case of energy performance standards for newly-built houses, Henk J. de Vries, W. Pieter Verhagen.

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All the CEN national members and the involved TC's listed in 4.2, are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organization in your country.

4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of the CEN/TC

CEN/TC 371 will ensure the development and maintenance of a coherent set of standards on Energy Performance of Buildings.

This set is largely developed in the relating TC's, where the expertise is. CEN/TC 371 aims to coordinate between the involved TC's and develop the standards at overarching EPB level..

The set of EPB standards...

take into account

- indoor climate
- thermo-physical properties (of walls, windows, etc)
- heating
- cooling and air conditioning
- domestic hot water
- ventilation
- lighting
- (de)humidification
- building automation and control (BAC/BMS)
- renewable energy sources

and include:

- needs (incl. IEQ levels)
- use
- distribution and storage
- calculation
- measurement
- inspection
- building & system design
- new & existing buildings
- certification/labelling
- simple & complex buildings

4.2 Identified strategies to achieve the CEN/TC's defined objectives

To guard the coherency of EPB-standards, central coordination by CEN/TC 371 is required, combined with active involvement and commitment of the five parallel CEN/TC's who have the technical expertise and competence regarding specific technological fields under the holistic approach:

- TC 089 *Thermal performance of buildings and building components;*
- TC 156 *Ventilation for buildings;*
- TC 169 *Light and lighting;*
- TC 228 *Heating systems and water based cooling systems in buildings;*
- TC 247 *Building automation, control and building management.*

CEN/TC 371 is responsible for the overall consistency and horizontal harmonization of the set of EPB standards. This includes the preparation and maintenance of overarching EPB standards and other EPB framework documents and the management of the overall consistency and other common quality and usability aspects of the subseries of EPB standards that are developed and maintained by the other CEN Technical Committees as listed above. CEN/TC 371 will comment upon standards intended to be part of the set of EPB standards, during Enquiry.

The responsibility for the technical content of the standards remains with the CEN/TC which initiated the corresponding Work Item.

CEN/TC 371 closely collaborates with ISO:

An increasing part of the set of EPB standards is developed and maintained under the Vienna Agreement in collaboration with ISO, in particular with ISO/TC163/WG4, *Energy performance of buildings* using holistic approach, the Joint Working group of ISO/TC 163 *Thermal performance and energy use in the built environment* and ISO/TC 205 *Building environment design*. The collaboration aims at a coherent and complete set of EPB standards as the (EN) ISO 52000 family of standards. Since 2017 various standards and technical reports under the ISO 52000 family have been published, including the overarching EPB standard (EN-ISO 52000-1). Standards for support of the EPBD may be developed in CEN and after completion offered to ISO for adoption at global level. If ISO is interested, they may be developed in collaboration with ISO (Vienna Agreement), to decrease the risk that incompatible ISO EPB standards will be developed and used in the rest of the world, without influence from European side.

Only standards that meet the specific requirements of the overarching standard, Basic Principles (CEN/TS 16628) and Detailed Technical Rules (CEN/TS 16629), will be awarded the term "EPB standard". CEN/TC 371 has recently (May 2020) initiated the revision of both documents. In ISO, the numbers ISO 52000 through ISO 52150 are reserved for these EPB standards. A Joint Advisory Group between ISO/TC 205 and ISO/TC 163 on the coordination of the ISO 52000 family of EPB standards has been set up for an initial term of 3 years (autumn 2018 – autumn 2021), in which CEN/TC 371 is represented.

The CEN-ISO cooperation aims to avoid serious duplication of work, incompatibilities in (input) product data and in procedures and (output) energy performance data in the global arena. Solutions have been developed to ensure that opposing interests (if any) can be taken into account without jeopardizing the collaboration aiming at combined EN ISO standards.

CEN/TC 371 aims at a modular structure of interconnected standards. The idea is that the modules can be replaced by other versions, as long as the input/output connection with the related modules is maintained. This modular structure is needed to make the set future-proof. At the same time this makes software applications easier and gives the opportunity to validate software by checking the input/output per module.

In order to further stimulate the exchange of input data used for the calculation of the EPB standards, CEN/TC 371 is also actively supporting the usage of open source data. The energy performance of buildings is calculated in a dynamic way, making use of input or user data, which could be made available through a Building Information Model (BIM). *In that sense, the above mentioned overarching standards of CEN/TC 371 comprise definitions and specifications for the data used for building models. These data are necessary for any calculation, and therefore must be accessible from BIM software. Making the input data available through open data sources will stimulate the implementation of the EPB standards and increase the comparability of energy performance calculations between countries.*

CEN/TC 371 established a liaison with CEN/TC 442 'Building Information Modelling (BIM)'.

4.3 Environmental aspects

The work of CEN/TC 371 focuses on developing standards connected to the assessment of energy performance and energy conservation in buildings.

From an environmental point of view, a substantial amount of the total greenhouse gas emissions in Europe is related to the energy use in the building sector. Currently, 36% of CO₂ emissions are

from the building sector⁹. A substantial part of the energy used in buildings is obtained from fossil fuels. The use of all fossil fuels gives rise to greenhouse gas emissions.

The building sector is accounting for approximately 40% of the total energy¹⁰ end-use in Europe. Efforts to reduce the use of energy in the sector are crucial in order to achieve the goals of reducing greenhouse gas emissions.

Harmonised standards developed for the assessment of energy performance of buildings, the energy performance certification and for inspection, are essential for providing a sound and fair basis for energy conservation in buildings in Europe.

On top of that, the set of EPB standards gives a standardized way to assess how much of the energy used is provided by renewable sources. This RER (Renewable Energy Ratio) is an important tool for benchmarks and to set targets, in order to reach the goal of 100% RER in the built environment.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME

Factors that could negatively impact the completion of business community acceptance and use of the CEN committee's standards are:

- Only a limited group of experts have the overview on all the standards and how they interrelate;
- Work has been mandated by the EC, but given the current standardization requests related to energy using products and systems used in buildings, there is still a need for coordination and support;
- A strong and active TC is needed to be able to guard the coherency of EPB-standards, preferably with real power, like joint decision on publication of EPB standards developed in the parallel TC's.

⁹ 'Sustainable buildings for Europe's climate-neutral future', 2019. *European Commission*.
<https://ec.europa.eu/easme/en/news/sustainable-buildings-europe-s-climate-neutral-future>.

¹⁰ 'Sustainable buildings for Europe's climate-neutral future', 2019. *European Commission*.
<https://ec.europa.eu/easme/en/news/sustainable-buildings-europe-s-climate-neutral-future>.