

ASIEPI - Assessment and improvement of the EPBD Impact (for new buildings and building renovation)

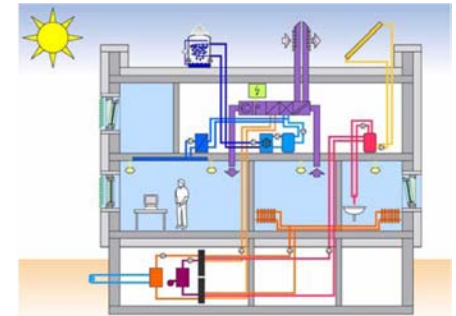


Impact, Compliance and Control of EPBD Legislation in Germany

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Impact of the EPBD on the national requirements

- last tightening of national energy performance requirements for buildings prior to the EPBD in 2002
- focus in the 2006/2007 EPBD implementation period was on kick-starting the building certification process and developing an advanced calculation standard for non-residential buildings taking into account all required energy components
- energy performance requirements were regarded to equal at least average level in Western Europe, further tightening was planned for later
- further tightening by about 30 % has been fixed by the new energy decree put into practice 01/10/09



-> EPBD implementation did not have an influence on the energy performance of the German building stock if we regard strictly the EP requirements

besides: - use of lighting and cooling energy was limited by integrating these shares in the total EP requirements

- requirements to the energy quality of A/C system have been fixed

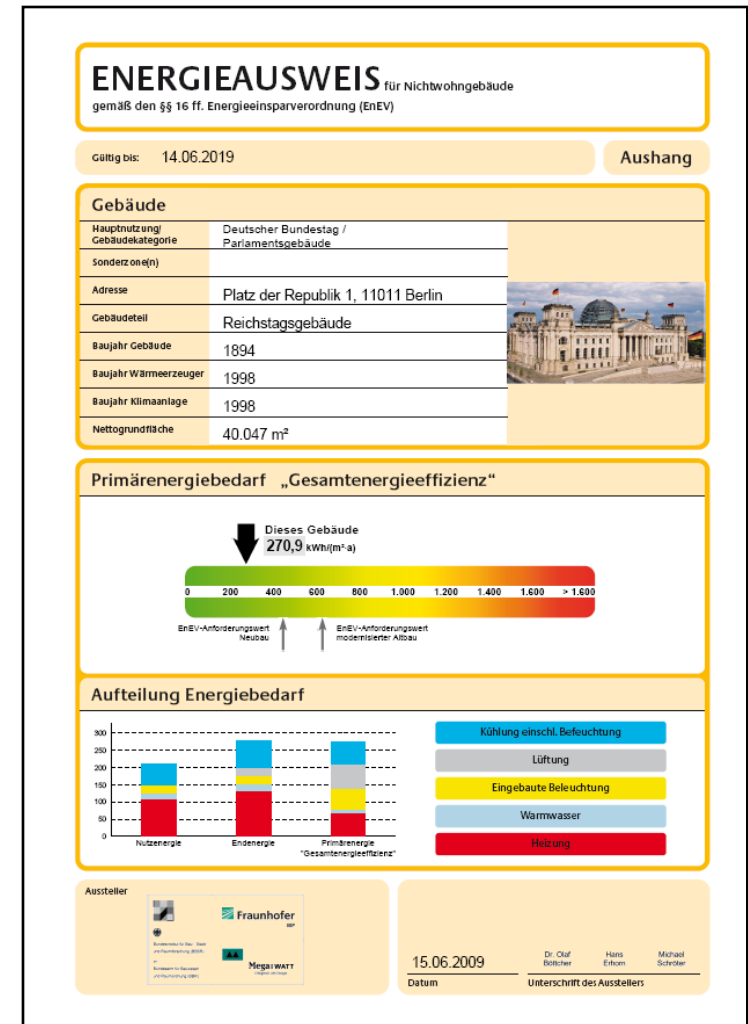
Impact of the EPBD on the national requirements

However,

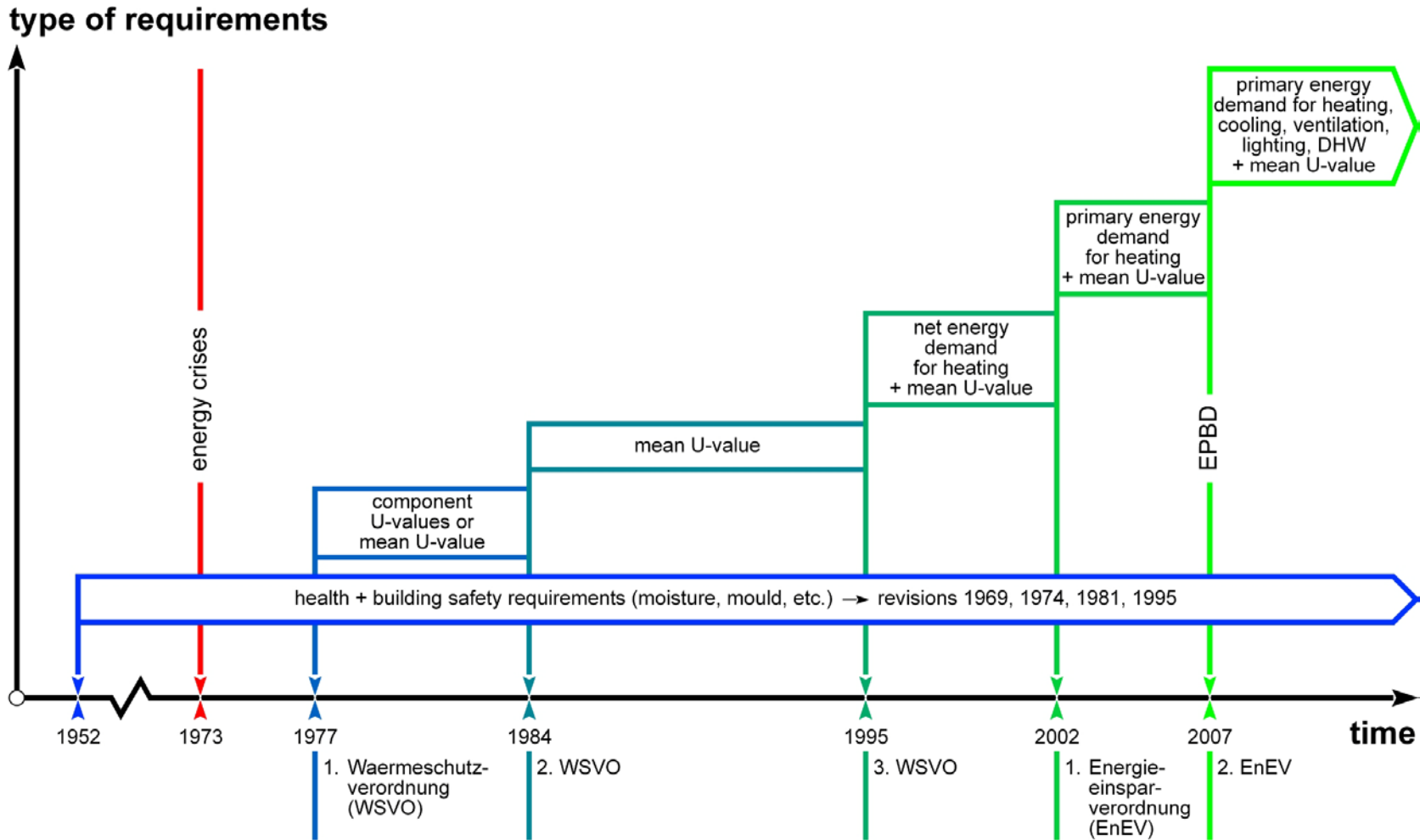
- certificates
- new calculation method
- consideration of renewable energy systems
- information and communication activities
- requirement for inspection of air-conditioning systems
- general discussion on these items

have placed energy efficiency of buildings in focus of the public, building owners and professionals

-> might have led to new and existing buildings with a better energy efficiency

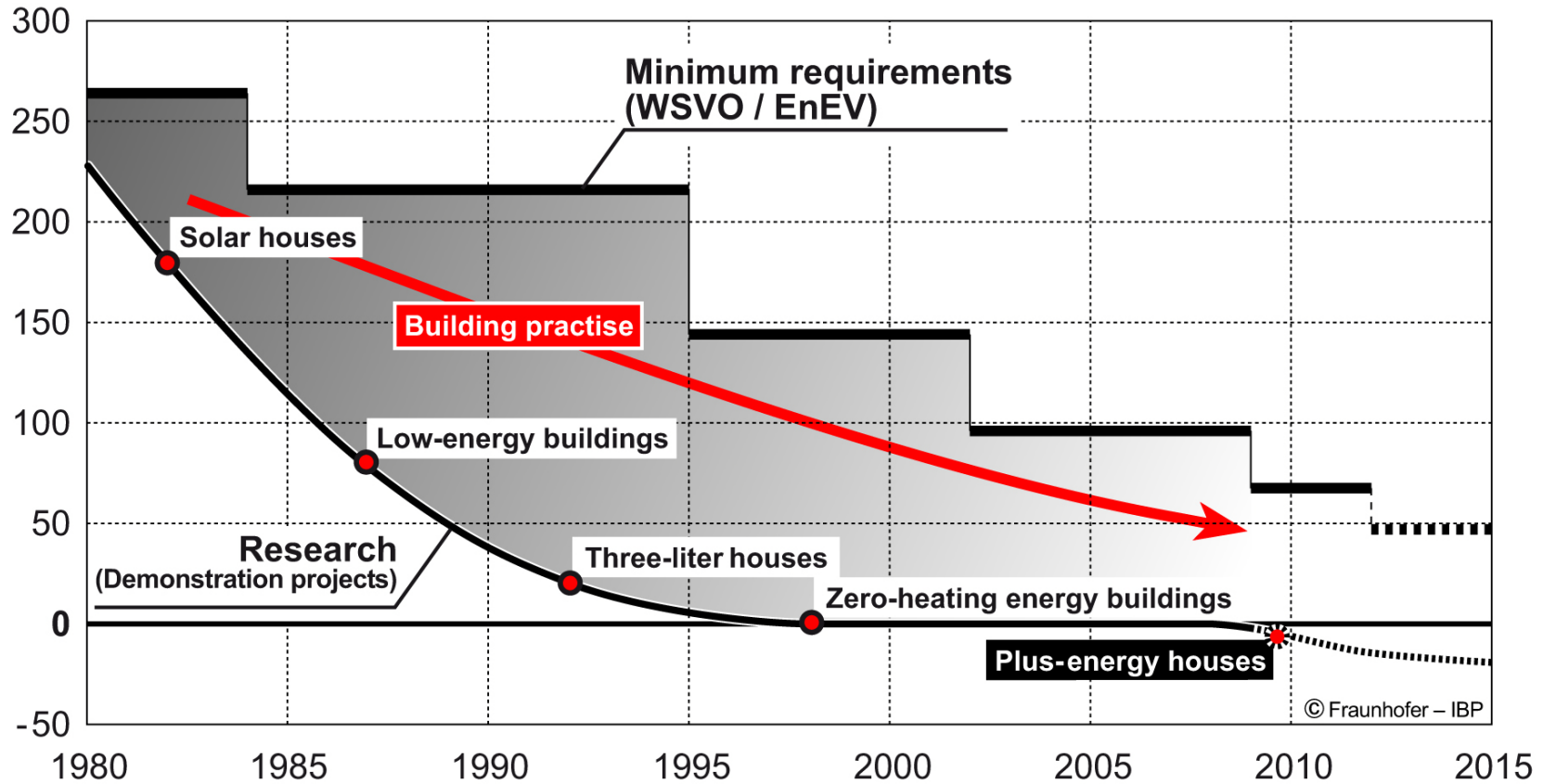


Evolution of energy performance requirements in Germany



Evolution of energy performance requirements in Germany

Primary energy demand – heating [kWh/m²a]



Additional requirements compared to the EPBD

- no 1000 m² threshold for buildings that undergo a major renovation.
- energy ordinance includes definitions for regulatory offences concerning inspections, insulation of heating pipes, the qualification for issuing an energy performance certificate and the completeness and punctual availability of the certificate
- Germany has stipulated a 15 % minimum use of renewable energy for all new buildings (“Erneuerbare Wärmegezetz”(EEWärmeG, Renewable Energies Heat Act)).
 - > ratio of renewables is dependent on the type of energy source and runs from 15 % (solar energy) to 50 % (biomass, geothermal).
 - > in some federal states the use of renewable energy is also required for major renovations of existing buildings.
- the 2009 energy performance decree sets timeline for the removal of electrical night storage heating systems from service.
 - > from 2020 onwards all existing electrical night storage heating systems have to be removed depending on the year of their installation.

Economic calculations as basis for tightening the energy performance requirements

- several versions of the energy decree have been accompanied by economic calculations before fixing the minimum requirements
- assessment of:
 - what kind of measures are necessary to make a building meet the new requirements?
 - how high are the additional costs compared to the previous requirements?
- additional costs have been contrasted with lower operational costs due to the energy savings and resulting payback periods have been calculated
- studies have been assigned by:
 - the responsible ministry
 - the federal states
 - the involved industry



Country policy on renewable energy

- Renewable Energies Heat Act (“Erneuerbare Wärmegezet”, 08/2008) shows:
- renewable energies have great importance in Germany
 - many small and medium sized companies manufacture renewable energy products (solar thermal collectors, photovoltaic cells, wind turbines, etc.)
 - especially PV production accelerated by law: high tariffs for feeding renewable energy into the grid. Nowadays tariffs are slowly decreasing



Conversion factors used

- fixed in DIN V 18599-1, based on calculation model of computer program GEMIS
- for EP certification: values for the proportion of non-renewables
 - renewable energies like solar and ambient heat: primary energy factor 0.0
 - wood used as fuel: 0.2
 - fossil fuels (e.g. oil, gas): 1.1
 - electricity mix: 2.7

Energy source		Primary energy factor	
		Total	Proportion of non-renewables
Fuels	Fuel oil EL	1.1	1.1
	Natural gas H	1.1	1.1
	Liquid petroleum gas	1.1	1.1
	Anthracite coal	1.1	1.1
	Lignite coal	1.2	1.2
	Wood	1.2	0.2
District heating by CHP	Fossil fuels	0.7	0.7
	Renewable fuels	0.7	0.0
District heating by heating power plants	Fossil fuels	1.3	1.3
	Renewable fuels	1.3	0.1
Electricity	Electrical energy mix	3.0	2.7
Eco-energy	Solar energy, ambient heat	1.0	0.0

Minimum requirements for ventilation and summer comfort

- Health and Safety at Work Act and Health and Safety at Work Guideline #5: minimum ventilation rates per person or m² for certain building usages (e.g. convention halls)
- DIN V 18599 for EP calculations: minimum default ventilation rates for usage zones (in earlier calculations: standard ventilation rate for dwellings used for all buildings -> this is critical, results do not mirror the reality!)
- DIN 4108-2 for summer comfort for buildings with and without A/C system:
 - solar gain factor limits maximum heat gain due to solar
 - incorporates different measures to reduce heat (solar shading, night ventilation, building mass, etc.)
- Health and Safety at Work Guideline #6: requirements for the indoor temperature, recommendation: maximum temperature 26 °C

BRITIA in PUBS
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SAVE COOLING ENERGY WITH SHADING

In part of shading on the cooling demand and of a standard office space

Month	Best Case (kWh/m ² /year)	With Shading (kWh/m ² /year)
M	10	15
J	15	20
J	20	25
A	15	20
S	10	15

You may feel cooler by using the room's shades to keep the sun out. Try this first, before you zap the air-condition through lower temperatures. You will reduce space cooling load by 14% to 15% and contribute in the global effort to save energy resources and protect the environment.

WEBSITE: www.britia-in-pubs.com

Impact of EPBD implementation on the qualification and independency of the experts for certification

- until 2007 EP certificates could be issued only by persons authorized by the state to present building documents
- those persons are defined in the ordinances of the different federal states and include mostly:
 - › architects and civil engineers
 - › experts for acoustics and thermal protection recognized by the state
- > same rules are still in force for **all types of new buildings**.
- for **existing non-residential buildings**:
 - › graduates of architecture, civil engineering, building system engineering, building physics, mechanical engineering and electrical engineering studies
- for **existing residential buildings**:
 - › graduates of architecture, civil engineering, building system engineering, building physics, mechanical engineering and electrical engineering studies
 - › graduates of interior design
 - › craftsmen for construction, interior fittings, buildings system mechanics and chimney sweepers
 - › technicians authorized by the state
- > all with specific further education.
- > educational programmes are offered by different institutions



Impact on the building market and building prices

- no measurable influence so far
- building prices are affected much more by regional, seasonal and general economic situation

CO₂ building report 2009 by German ministry for Transport, Building and Urban Affairs:

- EP certificates are becoming more and more important for marketing of residential buildings
- Internet portal www.immobilienscout.de: analysis of ratio of buildings being advertised including EP certificate
 - August 2008: 2 %
 - December 2008: 4 %
 - for 15 % of the buildings with attached EP certificate the characteristic energy performance value is indicated within the advertisement text



Compliance and control

- in the hands of the federal states (for both new and existing buildings that undergo major renovation)
- no authority checks EP certificates for existing buildings that are sold or let -> responsibility is with the building owner



Sanctions and penalties

German energy decree § 27: regulatory offenses

- › missing inspections or inspections carried out by unauthorised personnel
- › installation of boilers without CE label
- › lacking insulation of heating pipes
- › inappropriate control system for heating system
- › incomplete, incorrect or delayed energy performance certificate
- › issuing of EP certificates by unauthorized personnel
- › incorrect or lacking confirmation by construction companies regarding the compliance with EP requirements for major renovations and renewed building components or systems



Sanctions and penalties

Energy Saving Act of 2009: penalties between € 5,000 and € 25,000:

- › regulatory offenses against the thermal protection and energy efficiency of building systems requirements (EP requirements) and regulatory offences against the inspection of building systems and the installation of heating control systems: 50,000 €
- › regulatory offenses against the issuing of EP certificates (missing, delayed, incorrect or issued by unauthorised personnel): 15,000 €
- › regulatory offenses against the compliance check procedure or incorrect or missing confirmation of private construction companies concerning the compliance of EP requirements for major renovations or renewed building components or systems: 5,000 €



Compliance check by the public authorities

- organised differently in each state
- varies from the simple check of completeness of all documents and plausibility to random expert checks at the construction site
- CO₂ building report 2009:
 - 70 % of the German citizens support the compliance check of the requirements for energy efficient renovations

Certification market

- no specialised consultancy firm for EP certificate
- some companies might issue more certificates than others
- price for issuing certificates is mostly not high enough for companies wanting to specialise in that field
 - > efforts for certificates based on calculations are rather high
 - > prices for certificates based on measurements are rather low

Government incentives

- no incentives in Germany for the mere compliance with the EPBD or energy saving ordinance requirements
- incentives are only offered for buildings that go beyond the minimum requirements of the energy decree, given by the KfW bank (bank of the state) for:
 - › energy efficient retrofit of public buildings
 - › energy efficient retrofit of dwellings
 - › ecological new buildings
 - › energy efficient retrofit of social housing
- exemptions: market launch incentives for certain building technologies like wood pellet boilers, solar collectors, micro combined heat and power units, etc.
- German government's incentive policy is mostly realised as soft loans or subsidies. There are no more tax reductions for energy efficient buildings.
- third party financing used in Germany but not such a big impact as in the US.
 - new financing systems like intracting have been developed:
Intracting = form of “third party” financing where a city or community reserves a special fund for the energy improvement of buildings. ->
fund is spent as investment and paid back by the energy savings
in order to be used again for the next energy efficient renovation
- rather high tariffs for the renewable energy production to be fed into the local grid defined in the law for renewable energy for electricity

Interesting approaches of the German regulation



1. Very advanced, holistic and detailed EP calculation method

- > covers fully the required procedure by EPBD
- > fully CEN compatible
- > many innovative systems can be assessed that can't be assessed in other MS or need the principle of equivalence or similar methods

2. Covered field of buildings bigger than requested by the EPBD

- no 1000 m² threshold for buildings that undergo major renovation
- definitions for regulatory offences concerning inspection, insulation of heating pipes, qualification for issuing EP certificates, completeness and punctual availability of certificate
- 15 % minimum use of renewable energy for all new buildings (Renewable Energies Heat Act). In some federal states also for major renovations
- timeline for the removal of night storage heating systems from service

3. Economic calculations as basis for tightening the EP requirements for a long time:

- what kind of measures are necessary to meet the new requirements?
- how high are the additional costs compared to the previous requirements?
- contrasted with lower operational costs due to energy savings, resulting payback periods have been calculated

Bottlenecks of the German regulation

1. Slightly different control system between the federal states

-> complicates the process for issuers and building owners acting in more than one federal state

2. No performance check of the issuers regarding more than one wrong EP certificate

-> good example: Denmark

-> not easy to find out which issuer is in general not capable of producing correct certificates

SBi 2009:02

Thresholds related to renovation of buildings

EPBD definitions and rules



Statens Byggeforskningsinstitut
AALBORG UNIVERSITET



	AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	EP	SE	UK	HR	NO	CH		
	Austria	Belgium (Flanders)	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovak Republic	Slovenia	Spain	Sweden	UK (England&Wales)	Croatia	Norway	Switzerland	EU27	EU27+3
1.1	Describe your national definition of a major renovation																															
More strict									x	x			x						x				x		x						6	6
As EPBD	x			x	x	x				x				x								x			x						8	8
More loose							x					x				x					x					x		x	x	5	7	
None		x						x												x							x			3	4	
1.2	How are the terms "technically, functionally and economically feasible" as stated in Article 6 of EPBD interpreted in the national implementation?																															
Definition	x					x			x	x			x	x	x				x			x			x	x		x	x	12	14	
No definition		x		x	x		x	x			x	x								x	x		x		x			x		11	12	
2.1	Describe your current national regulation regarding the implementation of the 1000 m² limit including any other requirements related to area limits:																															
More strict		x			x	x		x	x	x				x	x					x						x	x	x	x	x	12	15
As EPBD	x			x			x				x					x				x		x				x				8	8	
More loose												x											x							2	2	
2.2	Planned national regulation regarding the implementation of the 1000 m² limit including any tighter requirements																															
Tightening planned							x	x							x															3	3	
No additional tightening	x	x		x	x	x			x	x	x	x		x		x				x	x	x	x	x		x	x	x	x	x	19	22
3.1	Definition of energy performance requirements for renovated buildings																															
Building performance	x				x		x		x	x		x								x		x	x						x	x	9	11
Zone performance												x														x	x			x	3	4
Component requirement	x	x			x	x			x	x	x			x	x	x				x	x	x	x	x			x	x		17	17	
None				x				x																						2	2	
3.3	Are the national requirements based on the CE labelling of the component or system, if it exists for the component or system?																															
CE	x					x			x	x	x				x	x				x	x	x	x	x		x	x			14	14	
National, overruling CE					x									x														x		2	3	
None		x		x			x	x				x															x		x	x	6	8
3.6	Are there fines or similar penalties when the requirements are not met?																															
Yes		x		x	x		x			x		x			x	x					x	x	x			x	x	x	x	x	14	17
No	x					x		x			x			x										x	x					8	8	
3.11	Describe whether there is a link between renovation of buildings and your national certification scheme																															
Link					x	x	x				x					x					x	x	x	x			x			10	10	
No link	x	x		x				x	x	x		x		x	x									x		x	x	x	x	12	15	



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More information can be found at
the ASIEPI project website:
www.asiepi.eu

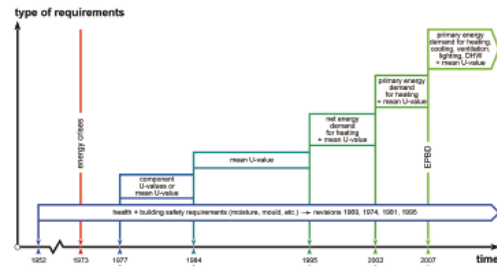
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Germany: Impact, compliance and control of legislation

The implementation of the Energy Performance of Buildings Directive (EPBD) did not change the national energy performance requirements in Germany, but it has had a ground-breaking effect on energy certification. In consequence, the German building stock has not become more energy efficient, but energy efficiency has reached a higher level of visibility with certificates for new and existing buildings and especially for public buildings. The main change besides the certificates though was the development of a new holistic calculation method that includes heating, cooling, ventilation, domestic hot water and lighting. This paper describes the way in which Germany is handling EPBD compliance and control. The overall implementation status of Germany is described in greater detail in IP 73 [1].

1 > Impact of the EPBD on the national requirements

Germany had tightened the national energy performance requirements for buildings the last time before the Energy Performance of Buildings Directive in 2002. With the 2002 energy decree, maximum primary energy demands for heating, domestic hot water and ventilation have been fixed. The calculation method (consisting of two standards, namely DIN V 4108-6 [2] and DIN V 4701-10 [3]) had to be applied to all types of buildings.



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