Review of the Bulgarian legislation in the field of energy efficiency of buildings

Assoc. prof. PhD Koycho Atanasov
e-mail: koycho_atanasov@abv.bg

Assoc. prof. PhD Radostina Petrova
e-mail: rpetrova123@abv.bg

Head assist. prof. PhD Neven Kystev
e-mail: nkrystev@yahoo.com

Bulgaria
Technical University of Sofia
SLIVEN Faculty of Engineering and Pedagogic

www.tu-sliven.com
tel.: +359 44 66 77 09
fax: +359 44 66 75 05

Review of the Bulgarian legislation in the field of energy efficiency of buildings

Where is Sliven

Sliven is in southeast Bulgaria

Review of the Bulgarian legislation in the field of energy efficiency of buildings

Main building of

the Faculty of Engineering and Pedagogy

Technical University of Sofia
SLIVEN Faculty of Engineering and Pedagogic

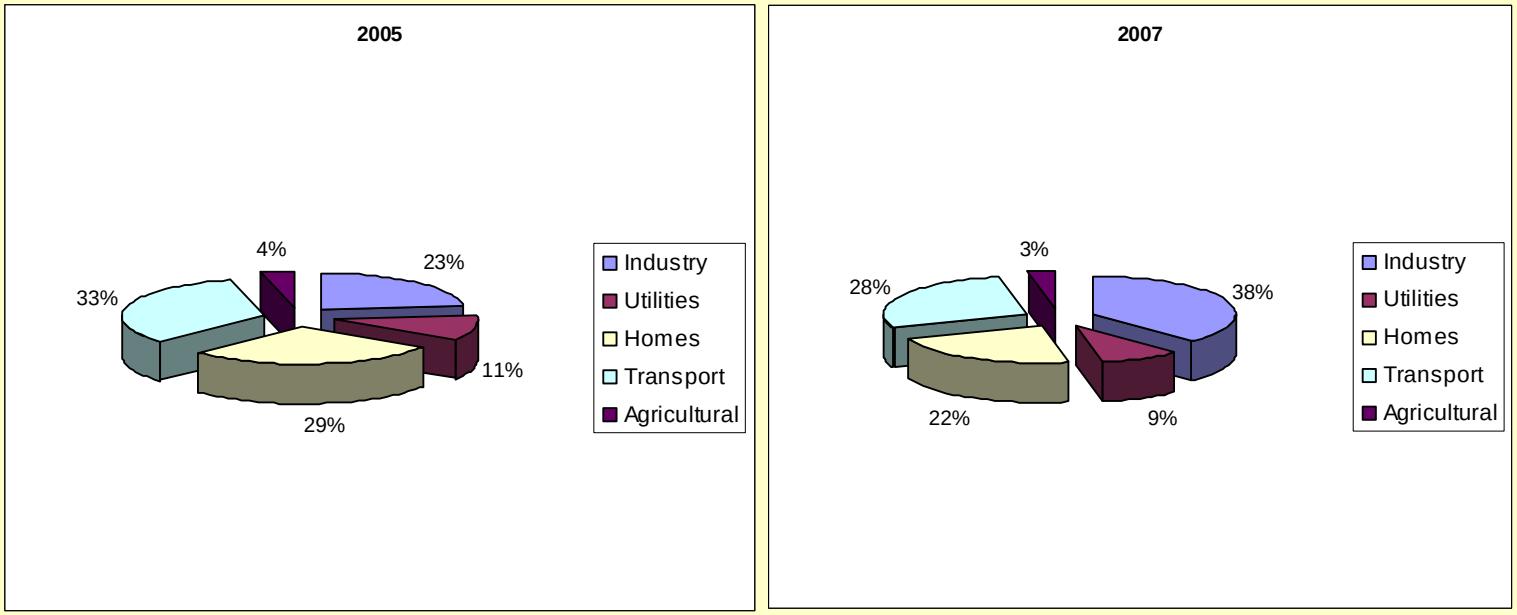
Review of the Bulgarian legislation in the field of energy efficiency of buildings

Energy efficiency of buildings - what is the essence of the problem?

Between 20-30% of final energy consumption is spent in households, most of it is used for heating and air conditioning.

En Ef

Review of the Bulgarian legislation in the field of energy efficiency of buildings



Final energy consumption by sectors in 2005 and 2007

En Ef

Review of the Bulgarian legislation in the field of energy efficiency of buildings

En Ef

How to define the energy efficiency of buildings?

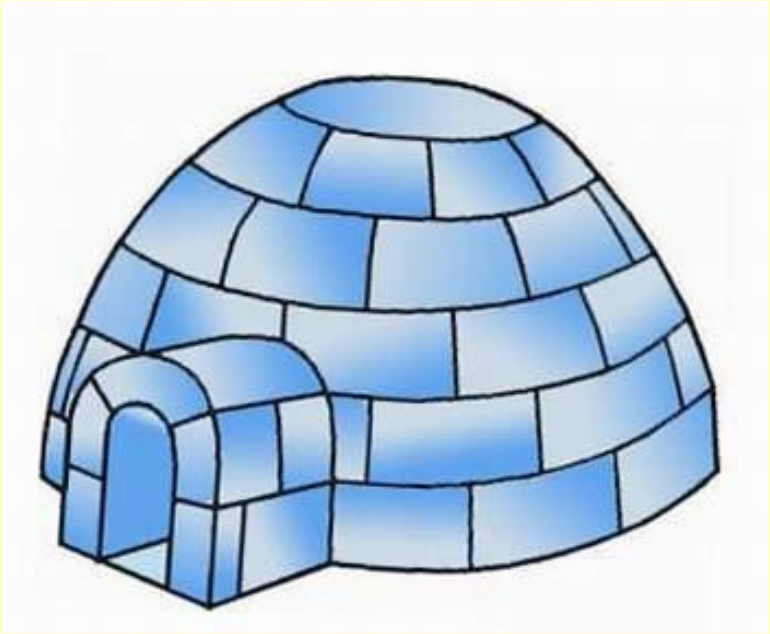
It can be defined as the quality of the microclimate in the buildings relative to the cost of energy is received:

$$EnEf = \frac{Q\ MC}{En}$$

Review of the Bulgarian legislation in the field of energy efficiency of buildings

One question for reflection?

If we think about that, what will be the energy efficiency of this building?



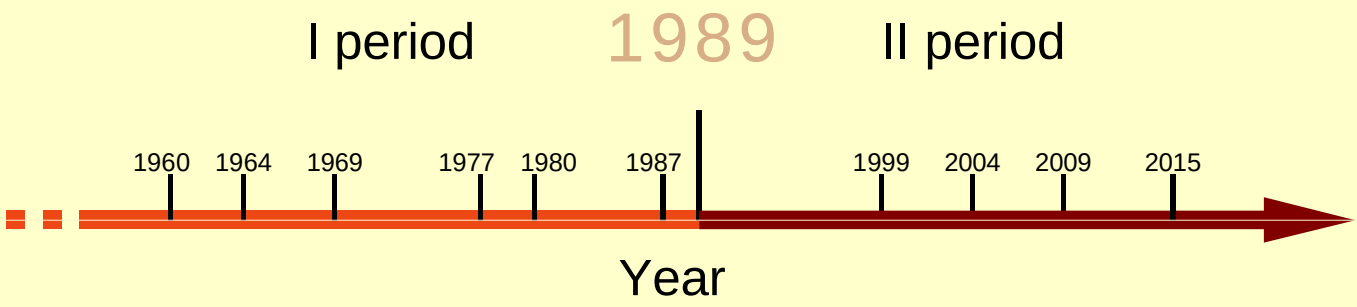
En Ef

Review of the Bulgarian legislation in the field of energy efficiency of buildings

Flashback of the regulations on energy efficiency in buildings

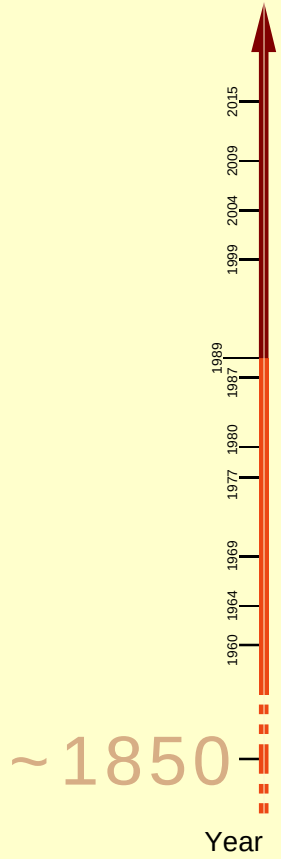
Periods

I period – up to Changes 1989
II period – after Changes 1989



En Ef

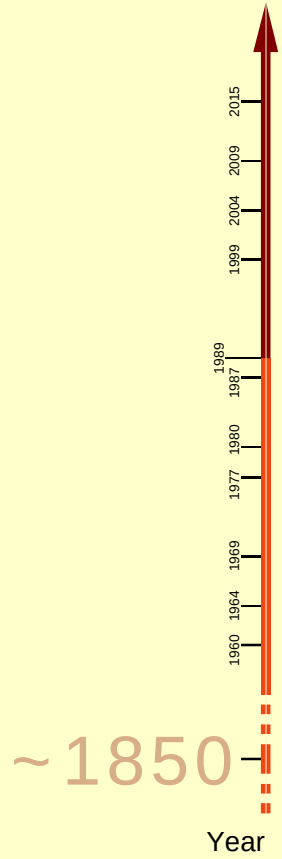
Review of the Bulgarian legislation in the field of energy efficiency of buildings



Bulgaria in middle of XIX century

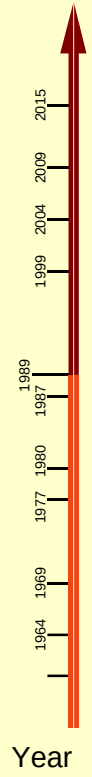
At that time energy efficiency was based on people's past experience. Houses in Bulgaria during that period were made of stone, sun-dried brick and wood. The walls were usually overlaid with wood. Then the houses were characterized also by small windows to reduce heat losses and there were large eaves for sun protection.

Review of the Bulgarian legislation in the field of energy efficiency of buildings



Bulgaria in middle of XIX century

Review of the Bulgarian legislation in the field of energy efficiency of buildings



1960

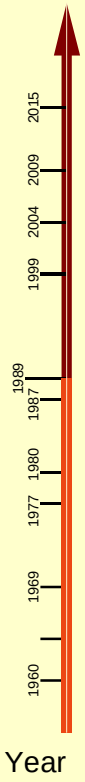
1. Temporary instruction for design and implementation of thermal insulation in Building Constructions

Normative values of temperature drop between the internal air temperature and the temperature of the inner surface of the surrounding constructions.
Necessary values of thermal resistance of heat transmission R* ($m^2h°C/kcal$) for premises in residential, public and industrial buildings with internal air temperature of 20 °C.
Heat resistance, steam resistance and air transfer of constructions.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

Buildings from that period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

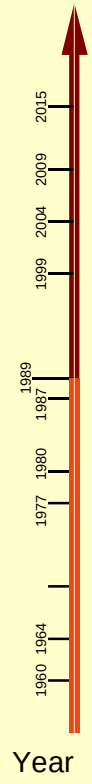


1964

2. Insulation in Building Construction. Standards for design

Normative values of temperature drop between the internal air temperature and the temperature of the inner surface of surrounding constructions.
Necessary values of thermal resistance of heat transmission R* ($m^2h°C/kcal$) for premises in residential buildings with the internal air temperature of 20 °C.
Heat resistance and emission of moisture condition of surrounding constructions.
Air transfer standards of the surrounding constructions.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

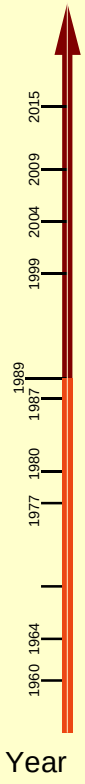


1969

3. Insulation in Building Construction. Standards for design (in heated residential, public and industrial buildings).

Necessary values of thermal resistance of heat transmission R* ($m^2h°C/kcal$) for premises in residential buildings by internal air temperature of 20 °C and temperature of the surrounding constructions.
Heat absorption by floors.
Heat resistance and dimensioning moisture regime of surrounding constructions.
Air transfer standards of the surrounding constructions.

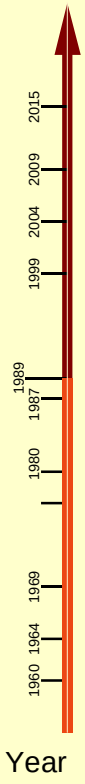
Review of the Bulgarian legislation in the field of energy efficiency of buildings



1969

Buildings from that period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

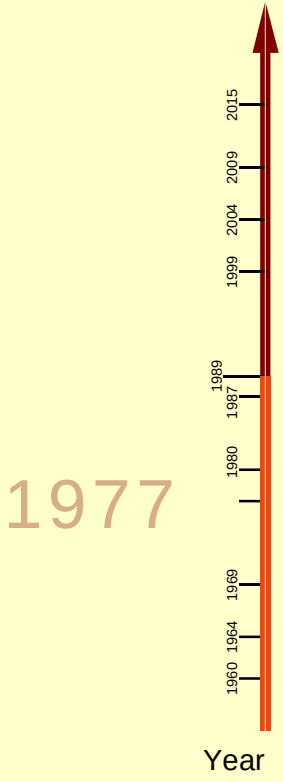


1977

4. Insulation in Building Construction. Standards for design (in heated and unheated residential, public and industrial buildings).

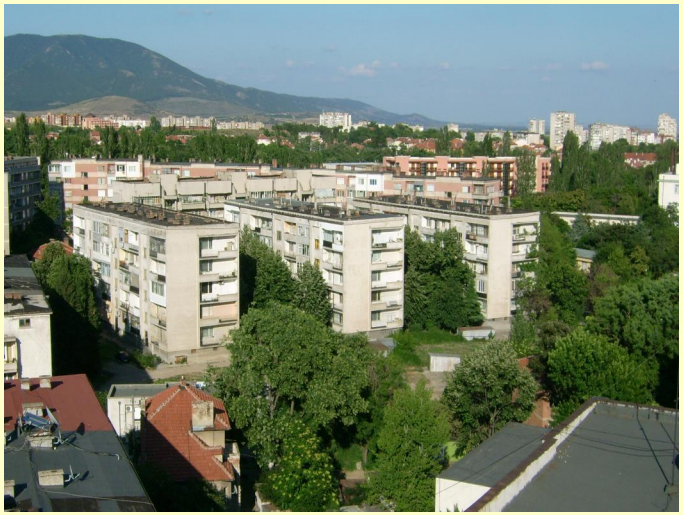
Necessary values of temperature drop between the internal air temperature and the temperature of the inner surface of the surrounding constructions.
Minimum required thermal resistance of heat transmission R^{ik} and temperature of the surrounding constructions.
Heat absorption by floors.
Moisture regime of surrounding constructions.
Air transfer standards of the surrounding constructions

Review of the Bulgarian legislation in the field of energy efficiency of buildings

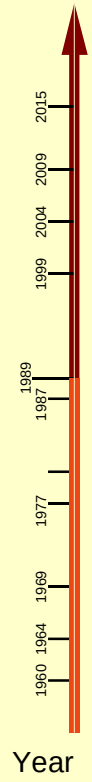


1977

Buildings from that period



Review of the Bulgarian legislation in the field of energy efficiency of buildings

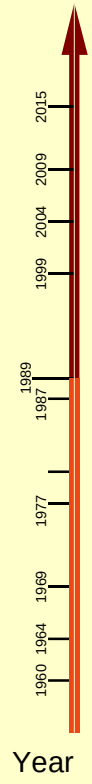


1980

5. Insulation in Building Construction. Standards for design (in heated and unheated residential, public, industrial and agricultural buildings).

Normative values of temperature drop between the internal air temperature and the temperature of the inner surface of the surrounding constructions.
Minimum required thermal resistance of heat transmission R^*, providing normal indicators of hygienic terms and limits on the overall coefficient of heat transmission K_o, W/m^2 for residential and public buildings depending on the circumferential surface of buildings.
...

Review of the Bulgarian legislation in the field of energy efficiency of buildings



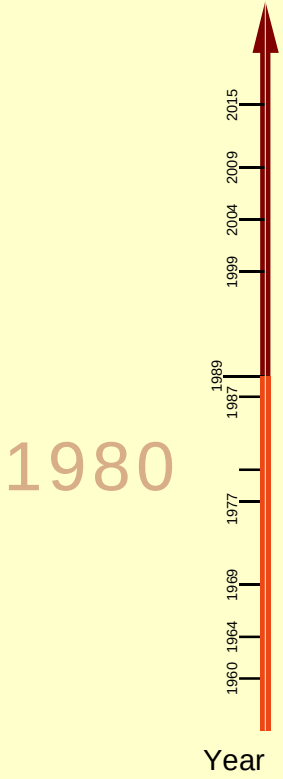
1980

5. Insulation in Building Construction. Standards for design (in heated and unheated residential, public, industrial and agricultural buildings).

...

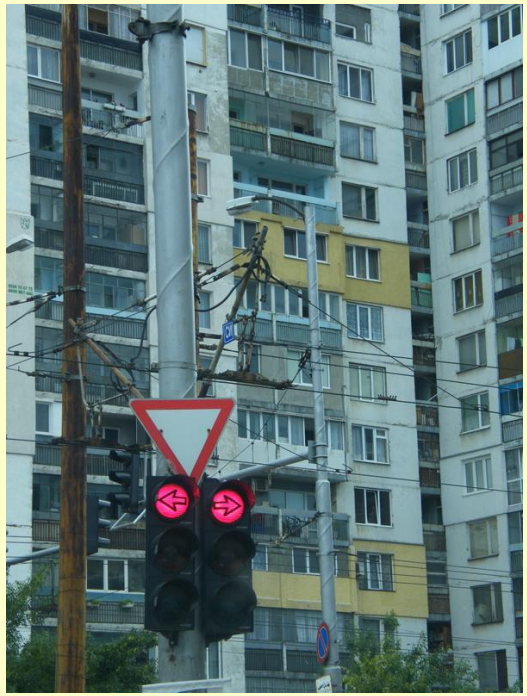
Heat resistance of the surrounding constructions.
Dimensioning humidity regime of the surrounding constructions.

Review of the Bulgarian legislation in the field of energy efficiency of buildings



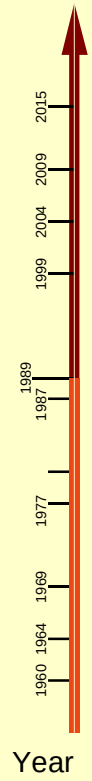
1980

Buildings from that period



Technical University
SLIVEN Faculty of Engineering and Pedagogic

Review of the Bulgarian legislation in the field of energy efficiency of buildings



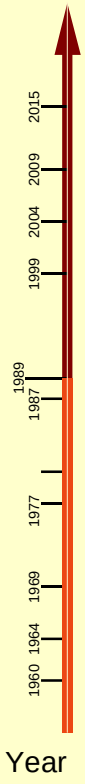
1987

6. Standards for design of thermal insulation of buildings.

Normative values of temperature drop between the internal air temperature and the temperature of the inner surface of the surrounding constructions.
Limits on the overall coefficient of heat transmission K_o, W/m^2 for residential and public buildings with conventional heating sources or new sources of energy depending on the ratio of the total surface divided by the heated volume.
Minimum required thermal resistance of of heat transmission R^{ik}.
Dimensioning moisture regime surrounding constructions.

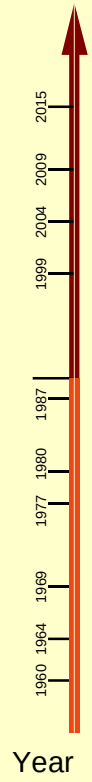
Review of the Bulgarian legislation in the field of energy efficiency of buildings

1987



Buildings from that period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

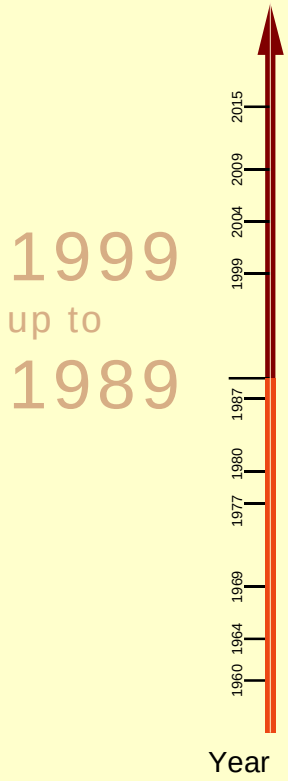


Beginning of II period

Changes in the social-economic life.

Since 1989 Bulgaria has experienced radical changes in social-economic life. Due to worsening economic situation there was a significant reduction in new construction and renovation of existing residential and public buildings. For a long time, more than 10 years there haven't been any changes in the legal framework for energy efficiency of buildings.

Review of the Bulgarian legislation in the field of energy efficiency of buildings



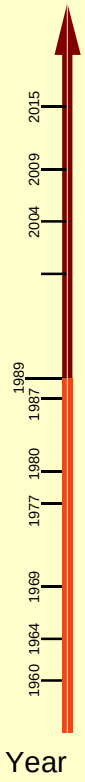
1999
up to
1989

Energy strategy in Bulgaria

Progressive liberalization and normalization of the economy and the willingness of Bulgaria to be actively involved in Common European process and the continued rise in prices of energy has brought about a state energy efficiency strategy and launch the phase of European standards implementation in this area. By the proposal of the Council of Ministers in 1999 and 2002, Bulgarian National Assembly accepted the Energy Strategy of the country.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

1999

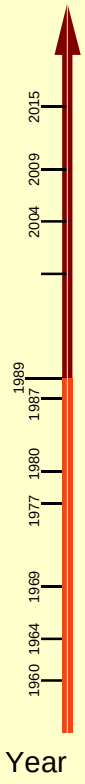


7. Regulation 1 For Designing Thermal Insulation of Buildings

The maximum values of the heat transfer coefficient of external structural elements of buildings k_m, and maximum normative values of the overall coefficient of the building as a whole $K_{m\ max}$, depending on the ratio A/V.
Minimum thickness of heat insulation - 5cm.
Protection from sunshine in the summer.
Moisture resistance of heated buildings.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

1999



Buildings from that period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
to
2001

TERRITORY REGULATION LAW

With effect from 31.03.2001

Publ. SG. ed.1 January 2 2001., amend. 24 April 2001. to 13 March 2009.

This law regulates the social relations associated with planning, design and construction investment in Bulgaria, and sets restrictions on the property for constructional purposes.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
up to
2003

LAW on POWER ENERGY

Publ. SG. ed.107 of 9 December 2003., amend. 5 March 2004. by 29 April 2008.

This law regulates the public relations aspects of the activities of production, import and export, transfer, transit, distribution of electricity, heat and gas, transport of oil and petroleum products by pipeline, trading electricity and heat and gas and the powers of state bodies in defining the energy policy, regulation and control.

This law repeals the Law on Energy and Energy Efficiency (promulgated, SG. 64 of 1999;., No. 1 of 2000, issue. 108, 2001, issue. 63 of 2002 and ed. 9 / 2003), with the exception of chapter thirteen.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
to
2004

LAW on ENERGY EFFICIENCY

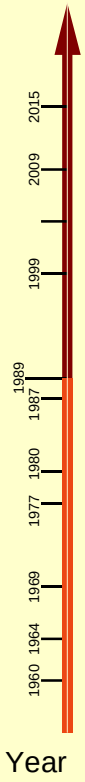
Publ., SG. 98 of 14.11.2008, endorsed 14.11.2008, suppl.,. No. 6 of 23.01.2009, endorsed 1.05.2009, amend., No. 19 of 13.03.2009, endorsed 10.04.2009.

This law regulates the social relations associated with the implementation of state policy for improving energy efficiency in consumption of energy and provision of energy services.

This law repealed the LAW ON ENERGY EFFICIENCY (promulgated, SG. 18 of 2004, amend., No. 74, 2006, issue. 55 of 2007).

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2004

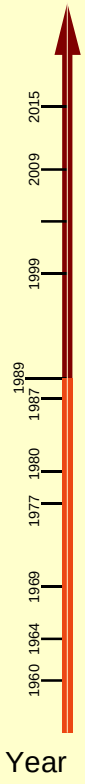


8. Regulation 7 For Heat Preservation and Energy Saving in Buildings.

The maximum values of the coefficient of heat transmission U_{max} for different surrounding constructions.
The maximum annual values of heat consumption for heating of 1 m^2 useful living space depending on the form factor and day-degree in the internal air temperature higher than 19 °C.
The maximum values of the coefficient of specific heat losses from thermal to non-residential buildings according to the form factor and the percentage of glazing with regulations of indoor air temperature higher than 19 °C.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2004

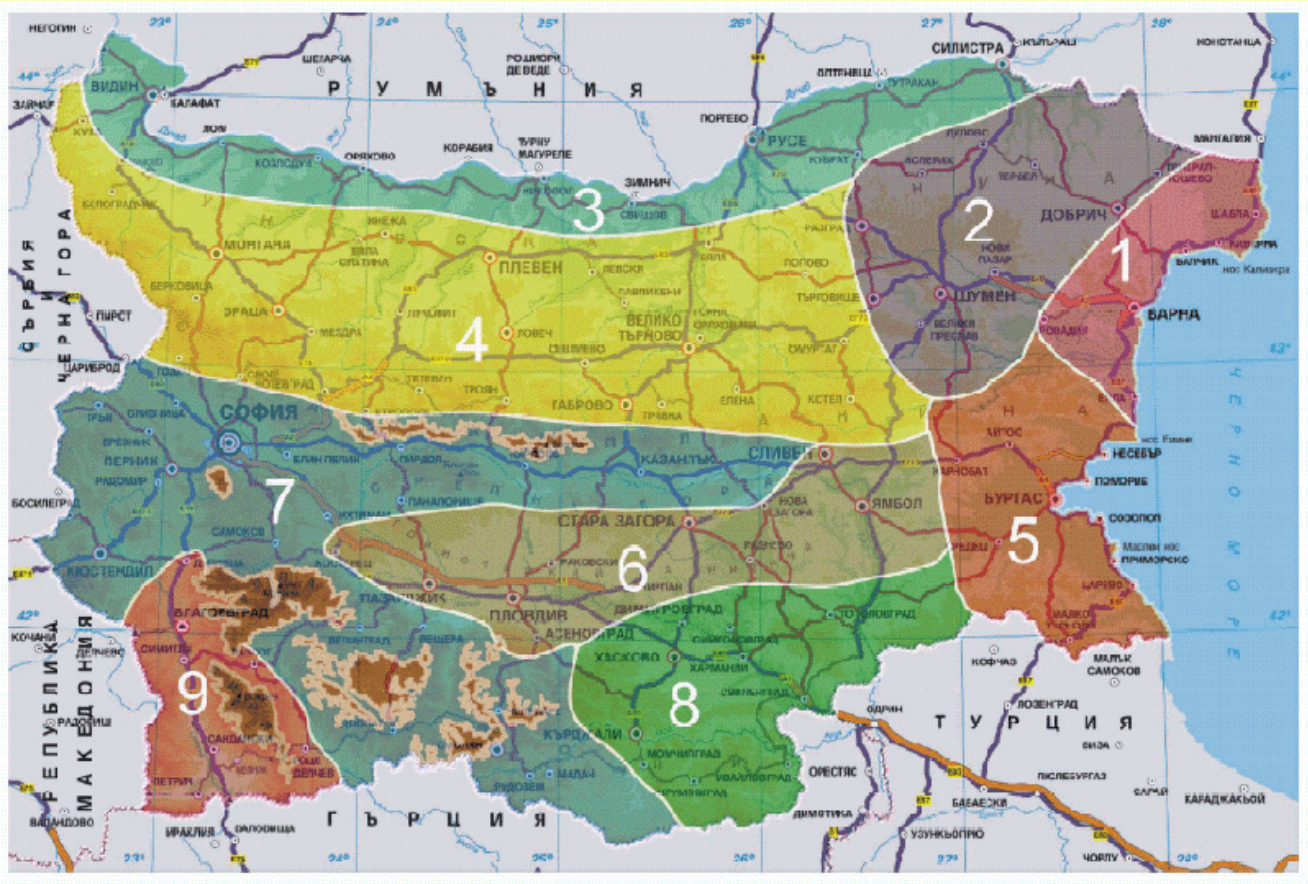


8. Regulation 7 for heat preservation and energy saving of buildings.

..... The maximum annual values of usage of heat consumption on 1 m^3 of administrative buildings, heated more than three months a year.
Technical requirements for moisture resistance.
Thermal transmittance and water resistance.
Protection of glass facades from sunshine.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

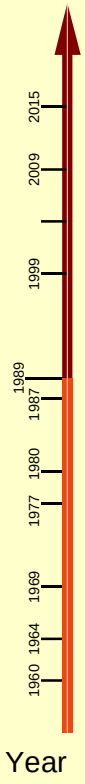
Map of Climate zones in Bulgaria



Technical University
SLIVEN Faculty of Engineering and Pedagogic

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2004



Buildings from that period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

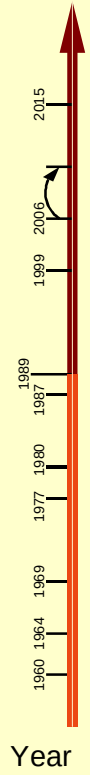
2008
up to
2007

9. Regulation №5: For the Technical Passports of Constructions

This Regulation determines the scope and content of technical passports of buildings and structures, and since 2008 the order of making and content of energy passports of buildings as part of technical passports.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2008



Energy passport of the building must contain at least the following information:

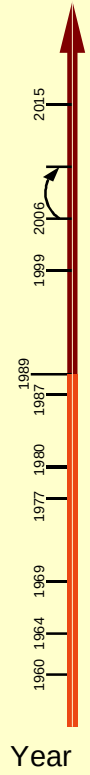
Value of the integrated energy performance of buildings and normative value, including specific annual energy consumption in kWh/m^2. expressed in primary energy consumption or the total annual energy consumption in MWh, or expressed in primary energy consumption, CO_2 emissions savings.

Classification of the building and its belonging to the class of the scale of energy. Heated area. Gross heated volume. Geometrical and thermal characteristics of the surrounding buildings structures and elements and assessment of their condition.

Energy sources, the values for annual energy consumption of the technical installations for heating and hot water, measures to improve the energy performance of buildings and their feasibility assessment.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2008

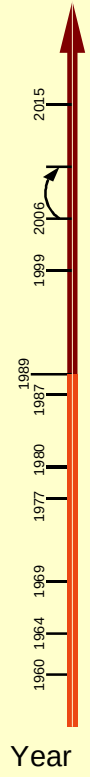


Energy passport

Energy passport of a building is made in order to assess compliance and establish the energy performance of buildings regulatory requirements for energy efficiency and the current situation of energy consumption of buildings.
Energy passport of a new building must be made before its practical use.
Energy passport of an existing building is composed by individuals or legal authorities who meet the requirements of the EEA, based on data from the report (summary) conducted a survey of their building.
Classification of buildings depending on the class of energy is Class A (more efficient) to Class G (less efficient).

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2008

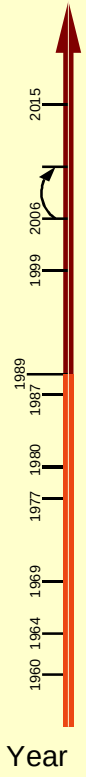


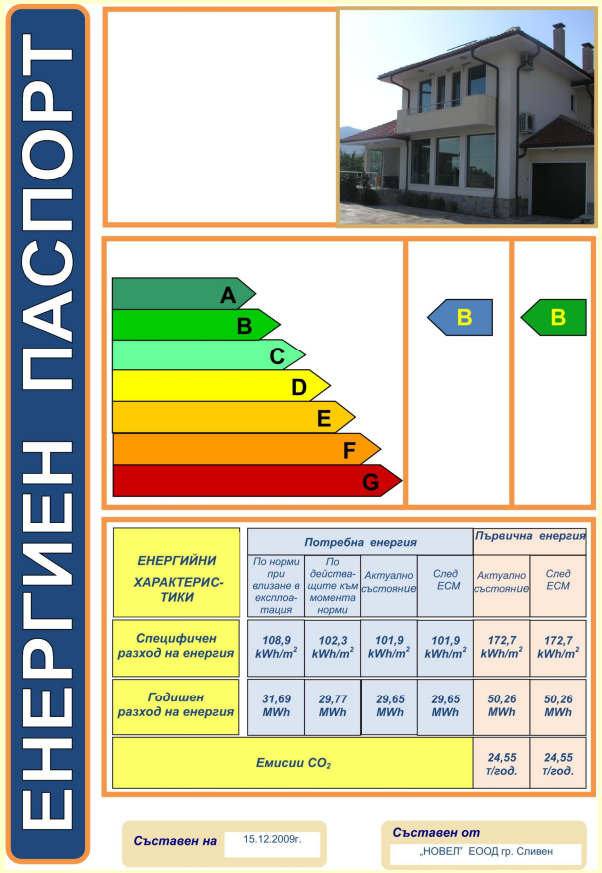
Energy passport

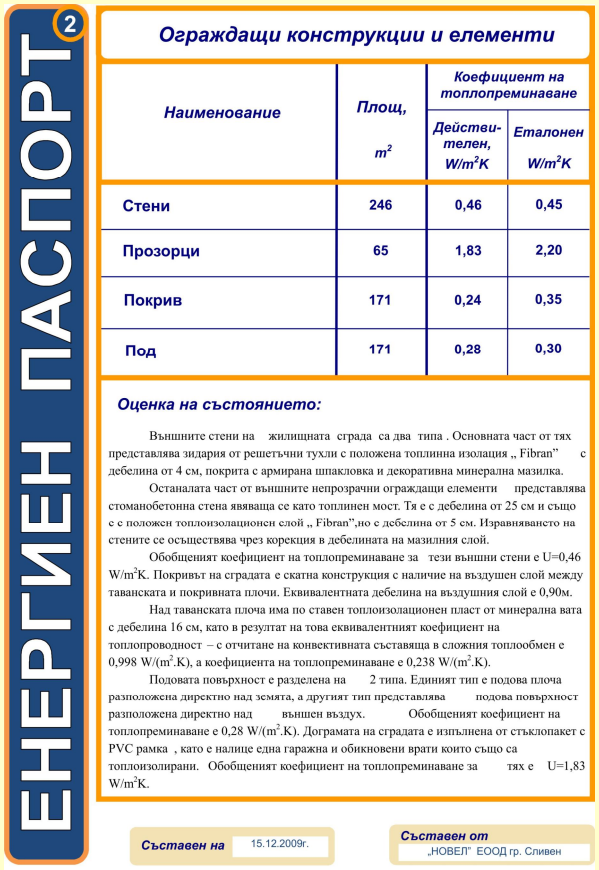
Energy passport consists of four pages, inseparable one from each other, drawn after each survey. The scale of energy passports for investment projects for new buildings (before practical use) or for existing buildings contain two columns:
In the first column (the current status) introduces the estimated primary energy consumption of the building in compliance with the requirements of Regulation № 7 from 2004 or the value (measured and calculated) of energy after an appropriate investigation.
The second column introduces the estimated value of the energy of the most cost-effective combination of ESM.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2008

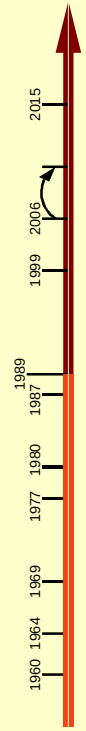






Review of the Bulgarian legislation in the field of energy efficiency of buildings

2008



ЕНЕРГИЕН ПАСПОРТ 3

Системи за отопление, вентилация, охлаждане и гореща вода

Система	Енергиен източник	Годишен разход на енергия	
		Специфичен, kWh/m²	Общ, kWh
Отопление	Водогреен котел	58,3	16972
Вентилация	-	-	-
Охлаждане	Климатични сплит системи	3,1	902
Гореща вода	Водогреен котел	11,7	3411
Отоплителни/охладителни денградуси		2144,5 /1290.....	
Общ годишен специфичен разход на енергия за отопление и вентилация		0,007kWh/m³DD	
Общ годишен специфичен разход на енергия за охлаждане		0,0007kWh/m³DD	

Оценка на състоянието:

Еднофамилната жилищна сграда притежава локална отоплителна инсталация с топлоносител – гореща вода. Чрез отделен клон се захранва битов бойлер– двувалентен.
В сградата липсва вен тилационна инсталация. Има монтирани два термопомпени агрегата тип „въздух-въздух" – сплит системи, които се използват приблизително два месеца през летния период за охлаждане на стаи от двата етажа на жилищната сграда.
Всички елементи от отоплителната инсталация са топлинно изолирани.
Отоплителните тела, които се използват работят на принципа на свободна конвекция . Състоянието им е отлично в топлотехнически аспект . Налице е система за автоматично регулиране по температура и налягане на водата в тръбната мр ежа. На всички радиаторни тела има монтирани спирателни вентили и термостатни глави. Циркулационните помпи са две, от които едната е резервна. Те са съвременни с плавно регулиране оборотите на електродвигателите им. Осветлението на сградата е ефективно и достатъчно по норма.

Съставен на 15.12.2009г.

Съставен от „НОВЕЛ" ЕООД гр. Сливен

ЕНЕРГИЕН ПАСПОРТ 4

ЕНЕРГОСПЕСТЯВАЩИ МЕРКИ

Енергоспестяващи мерки	Инвестиции, лв	Годишно спестена енергия, kWh	Спестени емисии CO_2, t/год.	Срок на откупуване, год.
Мерки по огр.елементи В1..... В2.....				
Мерки по системите С1..... С2 -				
Пакети от мерки П1..... П2.....				

ПРЕПОРЪКИ: За надеждната и ефективна работата на отоплителната инсталация се препоръчва годишно да се реализира хидравлично балансиране на топлоносителя по отделните щрангове на сградат а.
За горивната система на отоплителната инсталация се препоръчва проверка рабо тата на вентилатора и дроселната клапа за регулиране на количеството постъпващ за горене въздух. Необходимо в края/началото на отоплителния сезон да се направи проверка на измервателните уреди монтирани в представителни помещения и по тръбната мрежа, както и проверка на горивната камера за образуван нагар по съответните повърхности.
По отношение системата за автоматично регулиране се препоръчва периодична проверка на чувствителните елементи на системата, както и преобразувателят на първичните сигнали.

Съставен на 15.12.2009г.

Съставен от „НОВЕЛ" ЕООД гр. Сливен

Подпис, печат

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
up to
2004

10. Regulation **№** RD-16-1057 dated 10 th December 2009 for conditions and order for observation on energy efficiency, certification of buildings, issuing certificates of energy performance, certificates and categories

Regulation amend:
Regulation № RD-16-294 from 2008 and Regulation № 21 from 2004 for energy efficiency audits;
Regulation № RD-16-295 and № 19 from 2004 for certification of buildings for energy efficiency.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

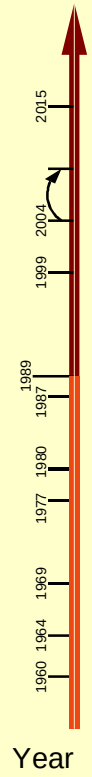
2009

10. Regulation № RD-16- 1057

This regulation specify:
1. arrangements for carrying out energy efficiency audits and certification of buildings;
2. arrangements for issuing energy performance certificates;
3. categories of certificates.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009



10. Regulation № RD-16- 1057

...

The first observation and certification of building is carried out within three years of its practical use

All buildings with unfolded area over 1000 m^2 are due to obligatory certification

....

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

10. Regulation № RD-16- 1057

...

Certification for energy efficiency of buildings is to verify the current status of energy consumption in buildings, energy performance and their compliance with the scale of classes of energy from the Regulation

...

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

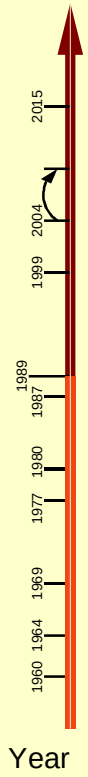
10. Regulation № RD-16- 1057

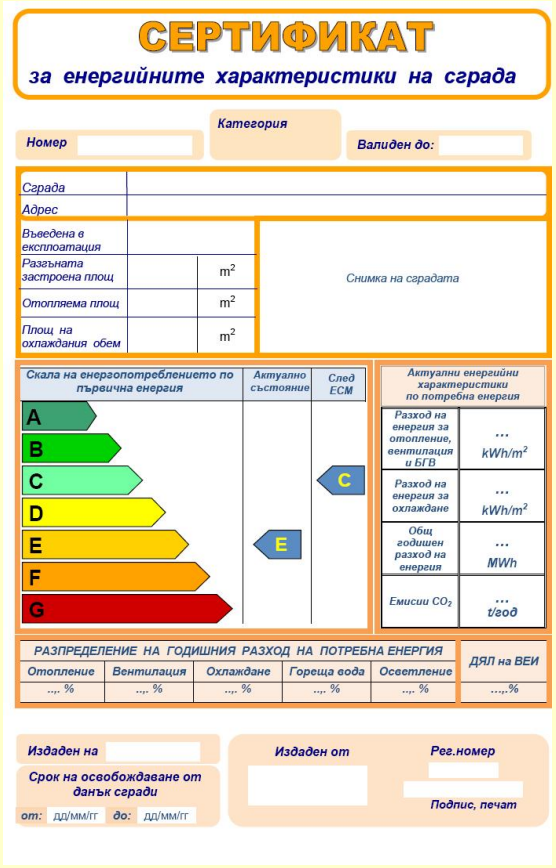
...
Energy performance certificates are issued with category “А” or category “Б”

Obtaining a certificate of building makes the building tax free
for a specific period of time depending on the category.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009





СЕРТИФИКАТ

за енергийните характеристики на сграда

Номер | Категория | Валиден до:

Сграда

Адрес

Въведена в експлоатация

Разгъната застроена площ — m²

Отопляема площ — m²

Площ на охлаждания обем — m²

Снимка на сградата

Скала на енергопотреблението по първична енергия	Актуално състояние	След ЕСМ
A		
B		
C		C
D		
E	E	
F		
G		

Актуални енергийни характеристики по потребна енергия	
Разход на енергия за отопление, вентилация и БГВ	... kWh/m²
Разход на енергия за охлаждане	... kWh/m²
Общ годишен разход на енергия	... MWh
Емисии CO_2	... t/год

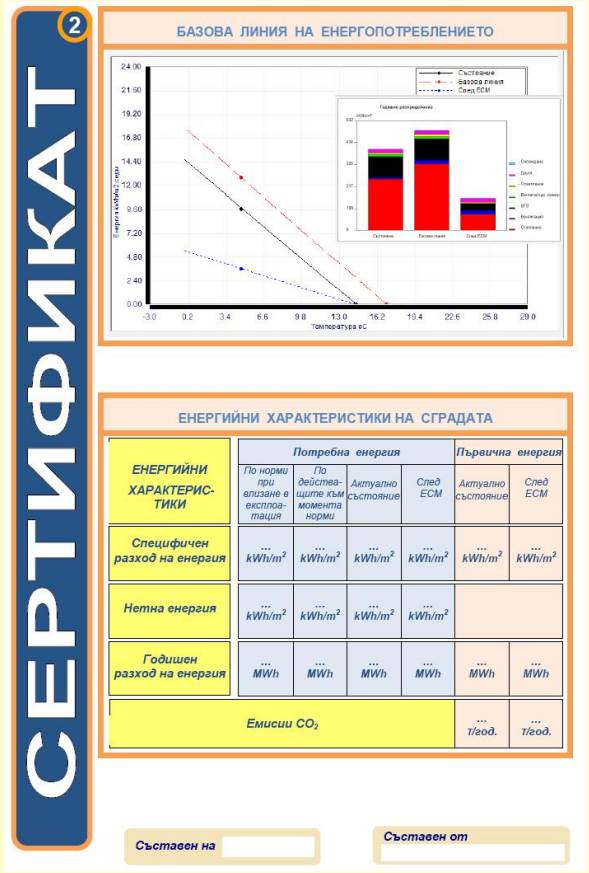
РАЗПРЕДЕЛЕНИЕ НА ГОДИШНИЯ РАЗХОД НА ПОТРЕБНА ЕНЕРГИЯ					ДЯЛ на ВЕИ
Отопление	Вентилация	Охлаждане	Гореща вода	Осветление	
... %	... %	... %	... %	... %	....%

Издаден на | Издаден от | Рег.номер

Срок на освобождаване от данък сгради

от: дд/мм/гг до: дд/мм/гг

Подпис, печат



СЕРТИФИКАТ 2

БАЗОВА ЛИНИЯ НА ЕНЕРГОПОТРЕБЛЕНИЕТО

ЕНЕРГИЙНИ ХАРАКТЕРИСТИКИ НА СГРАДАТА

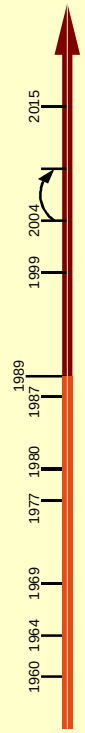
ЕНЕРГИЙНИ ХАРАКТЕРИС-ТИКИ	Потребна енергия				Първична енергия	
	По норми при влизане в експлоа-тация	По действа-щите към момента норми	Актуално състояние	След ЕСМ	Актуално състояние	След ЕСМ
Специфичен разход на енергия	... kWh/m²	... kWh/m²	... kWh/m²	... kWh/m²	... kWh/m²	... kWh/m²
Нетна енергия	... kWh/m²	... kWh/m²	... kWh/m²	... kWh/m²		
Годишен разход на енергия	... MWh	... MWh	... MWh	... MWh	... MWh	... MWh
Емисии CO_2					... т/год.	... т/год.

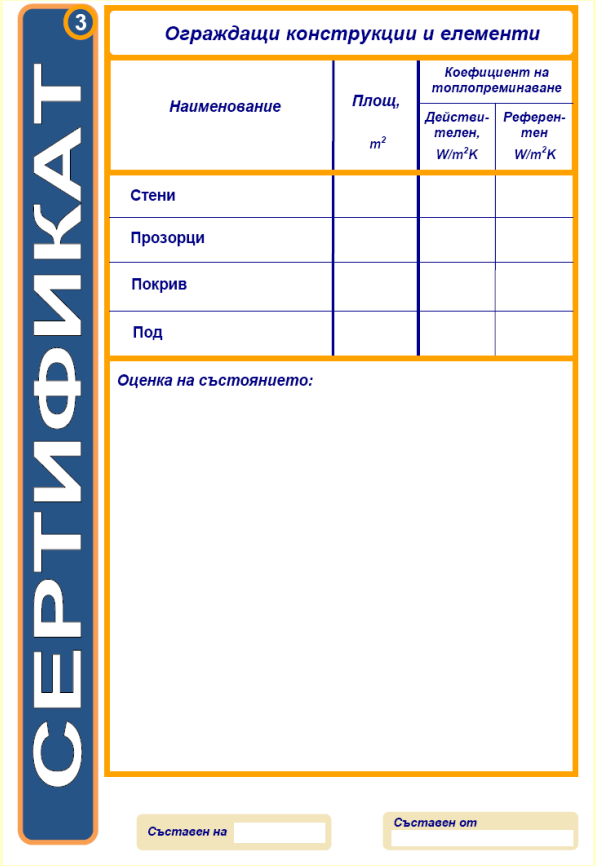
Съставен на | Съставен от

Technical University
SLIVEN Faculty of Engineering and Pedagogic

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009





СЕРТИФИКАТ 3

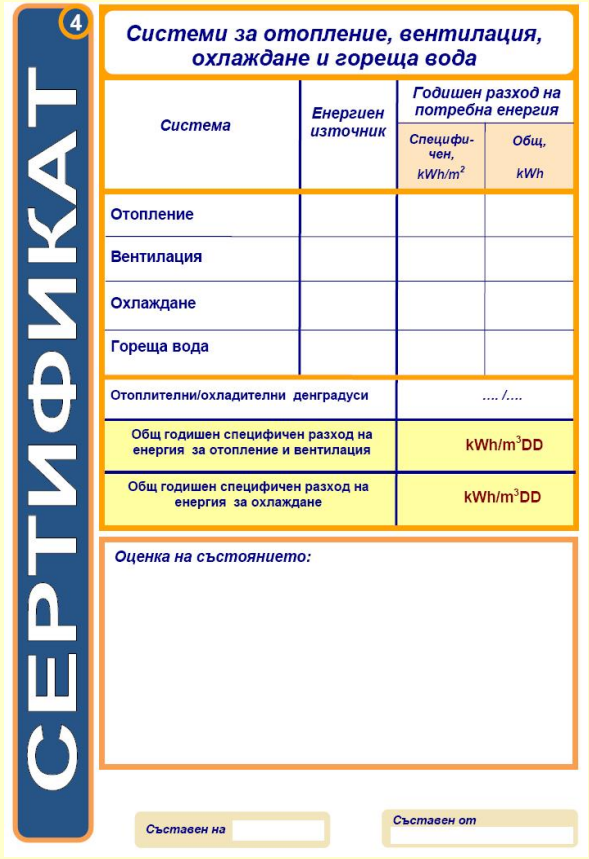
Ограждащи конструкции и елементи

Наименование	Площ, m^2	Коефициент на топлопреминаване: Действителен, W/m^2K	Коефициент на топлопреминаване: Референтен W/m^2K
Стени			
Прозорци			
Покрив			
Под			

Оценка на състоянието:

Съставен на

Съставен от



СЕРТИФИКАТ 4

Системи за отопление, вентилация, охлаждане и гореща вода

Система	Енергиен източник	Годишен разход на потребна енергия: Специфичен, kWh/m^2	Годишен разход на потребна енергия: Общ, kWh
Отопление			
Вентилация			
Охлаждане			
Гореща вода			

Отоплителни/охладителни денградуси	…. /….
Общ годишен специфичен разход на енергия за отопление и вентилация	kWh/m^3DD
Общ годишен специфичен разход на енергия за охлаждане	kWh/m^3DD

Оценка на състоянието:

Съставен на

Съставен от

Technical University
SLIVEN Faculty of Engineering and Pedagogic

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
up to
2004

11. Regulation **№** RD-16-1058 from 10th December 2009 on indicators for energy consumption and energy performance of buildings

Regulation amend consistently:
Regulation № RD-16-296 since 2008 and Regulation № 18 since 2004 on the energy characteristics of objects.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

11. Regulation № RD-16-1058

This Regulation specifies:
1. conditions and procedures for determining indicators of energy consumption and energy performance of buildings;
2. identical methodology for the formation of indicators for energy consumption and energy performance of buildings;
3. rules for making a scale of classes of energy.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

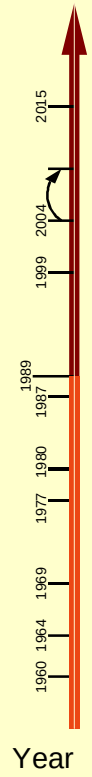
2009

11. Regulation № RD-16-1058

...
The calculation of energy performance aims at:
1. estimating consumption, energy saving and heat preservation in buildings;
2. determining the level of energy efficiency in buildings;
3. assessing each investment project to construct a new building, reconstruction, major upgrade, major repair or reconstruction of an existing building with energy efficiency requirements;
4. making of an energy passport and certificate of buildings
...

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009



11. Regulation № RD-16-1058

Class limits of energy consumption in buildings

Limits (from-to)	Class of energy consumption	Description
$EP < 0,5\ EP_{max,r}$	A	High energy efficiency
$0,5\ EP_{max,r} < EP \leq EP_{max,r}$	B	
$EP_{max,r} < EP \leq 0,5\ (EP_{max,r} + EP_{max,s})$	C	
$0,5\ (EP_{max,r} + EP_{max,r}) < EP \leq EP_{max,s}$	D	
$EP_{max,s} < EP \leq EP_{max,s}$	E	
$1,25\ EP_{max,s} < EP \leq 1,5\ EP_{max,s}$	F	
$1,5\ EP_{max,s} < EP$	G	Large energy consumption

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

11. Ordinance № RD-16-1058

Where:

EP – Energy Performance of Buildings (total specific energy consumption values in the thermal performance of buildings surrounding construction and elements, and the effectiveness of all elements are defined by their current status in the observation of building)

$EP_{max,r}$ - total specific energy consumption values in the thermal performance of buildings surrounding construction and elements, and the effectiveness of all elements are defined by existing regulations at the time of observation

$EP_{max,s}$ - total specific energy consumption values in the thermal performance of buildings surrounding structures and elements, and the effectiveness of all elements are defined by existing regulations at the time of entry into practical use

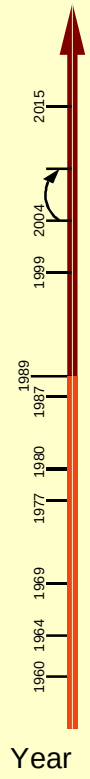
Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

Buildings from this period

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009
to
2004

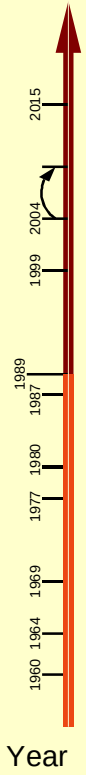


12. Regulation 7 Amendment For Energy Efficiency, Heat Preservation and Energy Saving in Buildings.

Reference values of the coefficient of heat transmission of different types of surrounding constructions.
Compared to 2004, coefficients of heat transmission are recommended, and directed towards energy consumption
...

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009



12. Regulation 7 Amendment For Energy Efficiency, Heat Preservation and Energy Saving in Buildings.

.....Technical indicators for energy efficiency in the design of buildings and assessment of projects in compliance with energy efficiency requirements are defined as:

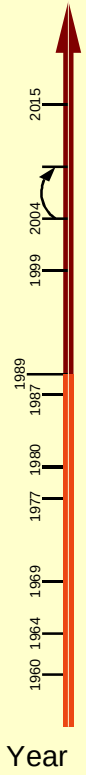
new buildings - total annual energy consumption for heating, cooling, ventilation, hot water and lighting of $1m^2$ of total heated area of the building (A_f) in kWh/m^2;

existing buildings - total annual energy consumption for heating, cooling, ventilation, hot water and lighting of $1m^2$ of total heated area of the building (Af) in kWh/m^2, or one $1m^3$ heated volume (Vs) in kWh/m^3;

Protection of glass facades from sunshine.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009



12. Regulation 7 Amendment For Energy Efficiency, Heat Preservation and Energy Saving in Buildings.

Annual energy consumption (Q) in kWh for heating, cooling, ventilation and hot water is calculated by the following balance equation:

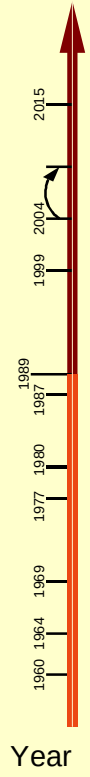
$$Q = Q_H + Q_V + Q_W + Q_C - Q_r$$

Where:

Q_H - annual energy consumption for heating, kWh;
Q_V - annual energy consumption for ventilation, kWh;
Q_W - annual energy consumption for heating water for household needs, kWh;
Q_c - annual energy consumption for cooling, kWh;
Q_r - annual regenerated energy in the building, kWh.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009



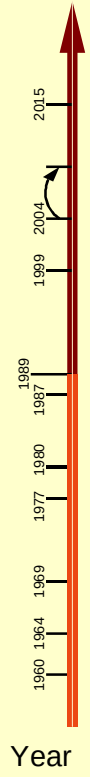
Stages in the audit for energy efficiency in buildings

2. When designing - Prepare part ”Energy Efficiency” the investment project, the total annual energy consumption must comply with the minimum of:

- Class-B - for new buildings;
- Class-C - existing established during the period 1991-2009 incl.;
- Class-D - existing in use until 2009 incl.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

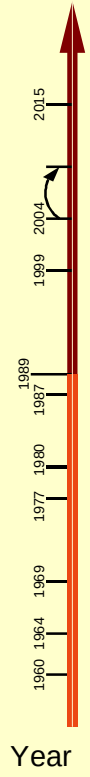


Stages in the audit for energy efficiency in buildings

2. The introduction into service of the building (or already in use building)- prepare yourself ”ENERGY PASSPORT”, giving energy and energy efficiency class and according to current status.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

2009

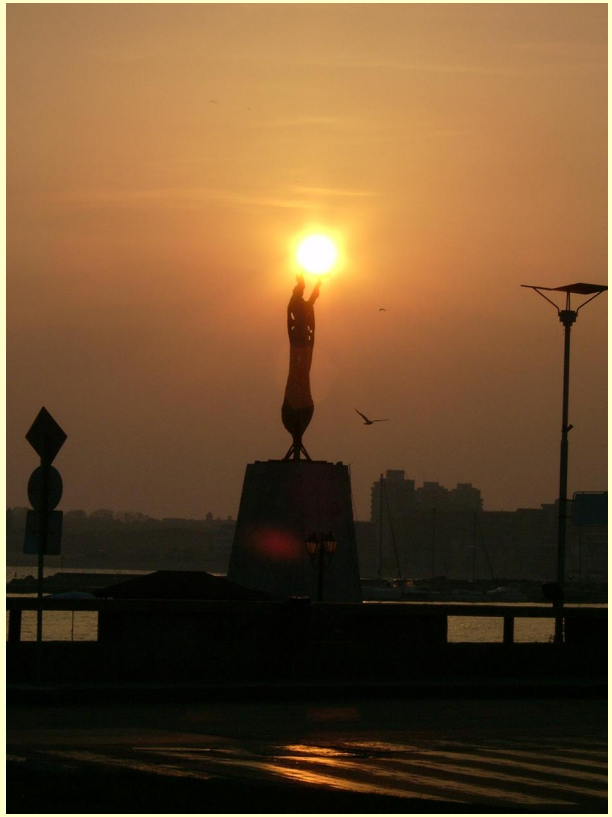


Stages in the audit for energy efficiency in buildings

3. After minimum 3 years of building usage a energy auditing will be made and a "CERTIFICATE" for the energy performance of buildings will be prepared.

Review of the Bulgarian legislation in the field of energy efficiency of buildings

27.04.
2010



"All we need is love" ...

and energy to use sensibly

Thank you
for your attention!

Technical University
SLIVEN Faculty of Engineering and Pedagogic