

Longlife

Sustainable, energy efficient and resource saving, residential buildings in consideration of unified procedures and new and adapted technologies

Project in the Baltic Sea Region Programme 2007-2013



Analysis and comparison

Report on the analysis of state of technology, administrative and legal procedures, financial situation, demographic needs, similarities and differences in the participating countries
Denmark, Germany, Lithuania, Poland and Russia.
Formulation of benchmarks



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2. Contribution

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3. Abstract

Environmental considerations are becoming one of the key features in the design when it comes to constructing modern, sustainable residential buildings. In an effort to streamline procedures and practices, the project Longlife has conducted a comparative review of these among the countries Denmark, Germany, Lithuania, Poland and Russia (associated organizations).

The countries involved have shared knowledge and experiences with each other about how their respective building processes operate. These are collated and analysed. There are differences and commonness's in the state of technology, administrative and legal procedures, financial situation, demographic needs, how a "housing project" functions.

With this exercise Longlife has started to ensure that differences across the Baltic Sea Region will be minimised as regards environmentally-friendly residential constructions.

This initial comparative stage covers planning, building permit and tendering procedures, practices for developing and operating housing and construction technologies. The report reflects the currently most applicable features of the participating countries' processes.

Longlife project partners work in three competence teams to use the special know how and experiences and to cooperate in the public private partnership composition.

The report analyses in the competence team 1 – Engineering and building technology, design standards - the engineering and technology standards in the countries Denmark, Germany, Lithuania, Poland and Russia.

The report shows for the team 2 – Administration procedures, licensing rules, tendering rules, laws - the comparison and investigations of administration procedures, building permit rules, tendering rules and laws in the participating countries.

The report provides for team 3 - Economical and financial basis - a general and a specific overview about economical and financial issues, sustainability and quality aspects in the involved countries.

This report is basis for the next work package: development of standards, criteria and specifications for a sustainable, resource saving residential building.

3.1 Abstract in Danish – Resumé

Miljømæssige hensyn vil i stigende grad udgøre et af hovedtrækkene i udformningen ved opførelse af moderne, bæredygtige beboelsesejendomme. I forsøget på at ensrette procedurer og metoder har Longlife projektet gennemført en sammenlignende gennemgang af disse i landene, Danmark, Tyskland, Litauen, Polen og Rusland (tilknyttede organisationer).

De involverede lande har indbyrdes delt viden og erfaringer om hvordan deres respektive bygningsprocesser fungerer. Disse er sammenlignet og analyseret. Der er forskelle og lighedspunkter i den byggetekniske status, administrative og juridiske procedurer, økonomisk situation, demografiske behov og måden et "bolig projekt" fungerer. Med denne øvelse er Longlife projektet startet på vejen mod at sikre en minimering af de forskelligheder der eksisterer på tværs af Østersøregionen med hensyn til miljøvenlig boligopførelse.

Dette indledende sammenligningstrin dækker planlægning, byggetilladelses- og licitationsprocedurer, samt metoder til udvikling og drift af anvendte bolig-, og konstruktionsteknologier. Rapporten afspejler landenes, for tiden, bedst beskrivende karakteristika.

Partnere i Longlife projektet arbejder i tre kompetence teams med henblik på anvendelse af specifik knowhow og erfaringer, og for at samarbejde i et offentligt – privat partnerskab.

Rapporten analyserer i kompetenceteam 1 – Bygningsudformning- og bygningsteknologistandarder – bygningsudformnings- og teknologistandarderne i landene Danmark, Tyskland, Litauen, Polen og Rusland.

For team 2 viser rapporten – administrative procedurer, regler omkring bevillinger, regler omkring licitationstilbud, lovgivning – sammenligningen og undersøgelser af administrative procedurer, regler for byggetilladelser, love om licitationstilbud i de deltagende lande.

For team 3 tilvejebringer rapporten – økonomisk og finansiell baggrund – en generel og et specifikt overblik over økonomiske og finansielle problemstillinger, bæredygtighed og kvalitetsmæssige aspekter i de involverede lande.

Denne rapport danner basis for den næste arbejdsplan (work package 4): Udvikling af standarder, kriterier og specifikationer for et bæredygtig, ressourcebesparende boligbyggeri.

3.2 Abstracht in German - Kurzfassung

Ökologische Belange sind im Begriff zu einem Hauptaspekt im Entwerfen von modernen, nachhaltigen Wohnungsbau zu werden. In dem Bestreben die Steuerungsabläufe und die Praxis zu rationalisieren, hat das Projekt Longlife eine vergleichende Bewertung unter den Ländern Dänemark, Deutschland, Litauen, Polen und Russland durchgeführt.

Die beteiligten Länder haben ihr Wissen und ihre Erfahrungen über die jeweiligen Bauprozesse ausgetauscht, zusammengetragen und analysiert. Es gibt Unterschiede und Gemeinsamkeiten bezüglich der Stand der Technik, der administrativen und rechtlichen Verfahren, der finanziellen Situation, der demographischen Belange und des Verständnisses wie ein „Bauprojekt“ funktioniert. Mit dieser Aufgabe möchte Longlife sicherstellen, daß Unterschiede in der Ostseeregion auf ein Minimum gebracht werden, um eine Empfehlung für einen umweltfreundlichen Wohnungsbau abzugeben.

Die vergleichende Projektphase befaßt sich mit Belangen des Planungs-, Baugenehmigungs- und Ausschreibungsverfahrens, der Entwicklung und Konstruktionsweisen. Der Bericht reflektiert die derzeit am stärksten anwendbaren Funktionen von Prozessen der teilnehmenden Länder.

Die Longlife Projekt Partner arbeiten in drei Kompetenzteams zusammen um das besondere Know-how und Erfahrungen zu nutzen und kooperativ mit den Public Private Partnerships zusammenzuwirken.

Der Bericht enthält für das Teams 1 zeigt – Gebäudetechnik, Design-Standards, Ingenieur- und Technologie-Standards in den Ländern Dänemark, Deutschland, Litauen, Polen und Russland.

Der Bericht zeigt für das Team 2 - Administrative Verfahren, Regeln für die Lizenzvergabe, die Ausschreibungsregeln, Gesetze - den Vergleich und die Untersuchungen der Verwaltungsverfahren, Baugenehmigung, Vorschriften und Gesetze in den teilnehmenden Ländern.

Der Bericht enthält für das Team 3 - Wirtschaftliche und finanzielle Grundlagen - einen allgemeinen und einen spezifischen Überblick über wirtschaftliche und finanzielle Fragen, Nachhaltigkeit und Qualitätsaspekte in den beteiligten Ländern.

3.3 Abstract in Lithuanian - Santrauka

Aplinkosaugos aspektai tampa vieni svarbiausių ypatybių, kai turima omeny modernių, subalansuotų gyvenamųjų pastatų statyba. Siekiant pagerinti procedūras ir veiklas, projektas „Longlife“ parengė palyginamąją apžvalgą šalių-dalyvių (Danija, Vokietija, Lietuva, Lenkija, Rusija-asocijuotas dalyvis).

Užimtos projekte šalys pasidalino žiniomis ir patirtimi kaip veikia jų statybų procesas. Tai yra apibendrinta ir išanalizuota. Yra panašumų ir skirtumų dėl technologijų būklės, administracinių ir teisinių procedūrų, finansinės situacijos, demografiniuose poreikiuose bei „būsto projektas“ funkcionavime. Tai buvo projekto Longlife pradžios uždavinys, siekiant užtikrinti aplinkai draugiškų gyvenamųjų pastatų statybos skirtumų minimizavimą.

Šis pradinis palyginimo etapas apėmė planavimo, leidimų gavimo, konkursų procedūrų, būsto vystymo ir naudojimo, statybų technologijų veiklas. Ataskaita atspindi šiuo metu labiausiai taikomas šių funkcijų ypatybes šalių procesuose.

Longlife projekto partneriai, veikiant viešos – privačios bendrovės darinyje, dirba trijų kompetencijų grupėse siekiant panaudoti specifinį „know how“ ir patirtį.

Ataskaitoje analizuojama 1-sios kompetencijų grupės – inžinerija ir statybos technologijos, projektavimo, inžinerijos ir technologijų normos partnerių šalyse: Danijos, Vokietijos, Lietuvos, Lenkijos, Rusijos.

2-sios kompetencijų grupės ataskaitoje matyti – administracinės procedūros, licencijavimo taisyklės, konkursų taisyklės, teisė - palyginimas ir tyrinėjimas šalyse dalyvėse administracinių procedūrų, statybos leidimo išdavimo taisyklių, konkursų taisyklių ir teisės.

Ataskaitoje pagal 3-ią kompetencijų grupę – ekonominė ir finansinė bazė – pagrindinį ir specifinį ekonominių ir finansinių rezultatų, darnos ir kokybės aspektų supratimas šalyse dalyvėse.

skaita yra sekančio darbo paketo – norminių reikalavimų vystymo, kriterijų ir aprašymų, subalansuoto, taupančio energetinius resursus gyvenamo namo pagrindas

3.4 Abstract in Polish - Streszczenie

Względy środowiskowe stają się kluczowe podczas projektowania nowoczesnych budynków mieszkalnych zgodnych z ideą zrównoważonego rozwoju. W celu uproszczenia i racjonalizowania procedur, projekt Longlife przeprowadził ich analizę porównawczą w krajach Danii, Niemiec, Litwy, Polski i Rosji (organizacje stowarzyszone).

Zaangażowane kraje podzieliły się wzajemnie wiedzą i doświadczeniem na temat przebiegu procesów budowlanych w poszczególnych regionach. Analizy wskazały różnice i podobieństwa w stanie zaawansowania technologii, procedurach prawnych i administracyjnych, sytuacji finansowej, potrzeb demograficznych oraz sytuacji w budownictwie socjalnym. Powyższe działania wykonane w ramach projektu Longlife są pierwszym krokiem na drodze minimalizacji różnic w Regionie Bałtyckim odnośnie budynków mieszkalnych przyjaznych środowisku.

Ten wstępny etap porównawczy obejmuje planowanie, procedury wydawania pozwolenia na budowę, procedury przetargowe, zwyczaje i praktyki obowiązujące w budownictwie mieszkaniowym oraz technologie budowlane. Raport wskazuje najkorzystniejsze cechy procesów budowlanych w danych krajach.

Partnerzy projektu Longlife pracują w trzech zespołach kompetencyjnych, aby wykorzystać doświadczenie i specjalistyczną wiedzę partnerów oraz umożliwić współpracę w publiczno-prywatnym składzie partnerskim

Raport z analiz przeprowadzonych przez zespół kompetencyjny nr 1 - Technologie budowlano-inżynierskie, normy projektowe - normy inżynierskie i technologiczne w krajach Danii, Niemiec, Litwy, Polski i Rosji.

Raport zespołu nr 2 - Procedury administracyjne, zasady licencjonowania, procedury przetargowe, prawo - porównanie i analiza procedur administracyjnych, zasad wydawania pozwoleń na budowę, zasad procedur przetargowych i prawa w poszczególnych krajach.

Raport zespołu nr 3 - Podstawy ekonomiczne i finansowe - przegląd ogólny i szczegółowy kwestii ekonomicznych i finansowych, zrównoważonego rozwoju i aspektów jakościowych w zaangażowanych krajach.

Niniejszy raport jest podstawą dla następnego etapu projektu, opracowania norm, kryteriów i specyfikacji dla zrównoważonego i oszczędnego budownictwa mieszkalnego.

3.5 Abstract in Russian - Краткое описание

Экологические идеи становятся одним из ключевых элементов в дизайне, когда речь идет о строительстве современных, устойчивых жилых зданий. В целях рационализации методики и практики, в проекте Лонглайф был проведен сравнительный обзор среди стран Германии, Дании, Литве, Польше и России (в качестве ассоциированной организации).

Участвующие страны поделились друг с другом своими знаниями и опытом о том, как в них происходят соответствующие строительные процессы. Они проанализированы и сведены воедино. Существуют различия и общность на этапе технических, административных и правовых процедур, в финансовом положении, демографических потребностях, и в том, как функционирует "Жилищный проект".

В этом рабочем пакете проект Лонглайф приступил к сведению разницы между странами региона Балтийского моря касательно экологически чистого жилого сооружения к минимуму.

Этот первоначальный сравнительный этап охватывает планирование, разрешение на строительство и процедуры проведения торгов, методы разработки и эксплуатации жилищного строительства и строительных технологий. В докладе отражены наиболее применимые в настоящее время особенности строительных процессов внутри стран.

Партнеры проекта Лонглайф работают в трех компетентных группах в целях использования особых навыков и опыта, а также сотрудничества в составе государственно-частного партнерства.

В отчете команды номер 1 анализируются инженерные и строительные технологии, дизайн инженерных и технологических стандартов в странах Германии, Дании, Литве, Польше и России.

В отчете второй команды представлены административные процедуры, правила лицензирования, правила проведения торгов, законы - сравнения и исследования административных процедур, норм о выдачи разрешения на строительства в участвующих странах.

Отчет третьей команды содержит - экономические и финансовые основы - общий и конкретный обзор экономических и финансовых вопросов, устойчивые аспекты и аспекты качества в участвующих странах.

Этот отчет является основой для следующего рабочего пакета: разработка стандартов, критериев и спецификаций для устойчивого, ресурсосберегающего жилого здания.

4. Introduction

Longlife - Sustainable, energy efficient and resource saving residential buildings in consideration of unified procedures and new and adapted technologies - is a Baltic Sea project, part financed by the European Union.

The construction boom of the last decades fuelled the growth of markets in the Baltic Sea Region. High-end technologies are still not widely used in housing construction. Owners and investors don't introduce new energy-efficient technologies as these are more expensive. Building technologies and procedures, like planning, permit and tendering, financing, sustainability standards are different in the countries.

Longlife aims to optimize methods and construction, adapts and implements new technologies for buildings and harmonizes building procedures between the countries. These will lead to a reduction of energy consumption during a building's life cycle.

In a first step Longlife analyzed and compared the state of art for energy efficiency, sustainability, resource saving buildings and low life cycle costs including minimum requirements for sustainable buildings in the participating countries.

It already shows the building process in all five partner countries during the entire life cycle of the building - presented in the detailed information at the end of the book according to national units – and similarities and differences in an easy comparison chart according to the three transnational competence teams.

The produced results are separated in two parts: The first is a comparison chart which compares short information of every country about design and technology, administration and financing instruments. The second part gives detailed information of every country about the same topics and can work as basic information for foreign investors, planners and companies to construct in foreign countries. This report is the result of both parts.

In the second step Longlife will develop common standards, criteria and specifications for a sustainable, resource saving residential building. The aims are unified procedures for energy efficiency, sustainability, resource saving dwellings and low lifecycle costs in order to simplify the work for transnational planners, investors and administration. These will lead to a reduction of energy consumption and operating costs during a building's life cycle.

The third step is the design of a prototype residential building. Complete planning, administrative and tender documents for a prototype residential building will be available based on common standards. Financing and maintenance models for this prototype are developed for planners, housing and construction companies. The prototype residential building will be certificated as a sustainable building. It can be built by interested companies.

The establishment of the "Baltic Sea Housing Development Association- BASHDA" will continue the cooperation after conclusion of the Longlife project. Interested companies or planners are welcome to get more information on our web page at www.longlife-world.eu.

The working method of Longlife bases upon the triple helix: Three transnational competence teams – universities, administrations and housing companies – of which each is composed of five members from Denmark, Germany, Lithuania, Poland and Russia work jointly in the progress of the project thus enabling the transnational work of fifteen different project partners. Berlin University of Technology, Faculty VI, Institute of Architecture, Department Design and Structure is the lead partner. Longlife has started in January 2009 and will finish in January 2012.

5. Summary and benchmarks

Summary:

Architectural, structural and urban design are similar, mainly because of the corresponding climate of the Baltic Sea Region. Thus, the usage of materials, roof structure, load bearing structure, handcraft and material usage doesn't differ very much and is mostly reasoned in tradition, economy, time and technical properties meanwhile ecologys declarations are mostly still voluntary. Internationally there are no common standards for "low energy house", "passive house" or "zero energy building". National energy certification systems are already part of the norming system in three of the participating countries meanwhile a sustainable certification system only exists in one participating country – in Germany. Architectural sustainability for us begins with the site selection and ends with the demolition of the house, green urban development therefore isn't a subject of our project Longlife.

The demographic analysis showed that the population decreased in the last years in Denmark, Lithuania and in Germany as well. This diagnosed trend will proceed within the following years. However, more residential buildings are mainly required as a consequence of increasing sqm living space per person and as a result of changing of household structure (the tendency shows clearly the development to households with reducing household members). Another reason for new construction is founded on the results of the project BEEN that shows that new buildings are financially more efficient than the modernization of existing buildings if we see the cost-benefit factor.

It is an interesting fact that the private ownership rate differs notably in all participating countries and that the administration of buildings - after all multi family buildings – still isn't usual in some of the participating countries – a fact that has to be changed by Longlife.

The involved countries also differ significantly in the level of the household income and the percentile amount of the rental costs.

The energy consumptions differs from (see different numbers in comparison chart 7.3.3.1) with the implemented EU directive 2002/91/EG in each involved country except Russia. Calculation methods and requirements for thermal insulation and energy demand still differ very much. The involved countries as well differ in the mainly used energy source, technical heating, cooling and ventilation and energy prices.

Sustainable norms for functional reusing ability don't exist, even though one pre Euro Norm(preEN) is in progress. Sustainability is included in national and international certification systems and voluntary architectural concepts. Thermal modernization, solar heating systems or low energy houses are different possibilities to support sustainability and energy needs. In law, three of five involved countries have included energy needs as part of the planning laws, building regulations or technical requirements. Only in Germany these possibilities are advanced by financial support, in the other countries there is no such financial conveyance.

A hierarchic planning law is existing in all participating countries as a version of a 2 or 3 stage planning system. Building permit procedure and tendering are similar as well. While the tendering process has to follow strict national and EU laws, the building permit application with distinct

attachments has to be applied by the owner to the authority to issue it. The regional differences can be found in price, time limits and involved persons. All involved countries have a building code or construction code to follow and principally there is an obligatory checking from the authorities.

In Poland and Germany the entitled architect or engineer (foreigner or resident) must be member of the national engineer's or architect's chambers. In the other involved countries there are no restriction for construction management.

The financial structure and instruments, supporting models/programmes differ in all the involved countries.

The level of financial support is differently high. Social housing has been supported in all countries as well as modernization. Energy saving measures and sustainable construction are only supported in Germany (e.g. KfW-program "Energy Efficient Construction"). Kinds of financial supports are: loans with less interests, grants or subsidies. Besides classical equity and debt capital there are other forms (e.g. private public partnership).

Benchmarks:

Longlife will develop standards, criteria and specifications for a sustainable, resource saving residential building in Baltic Sea Region. Therefore, comparable calculations of regionally realized EU Energy Directive (2002/91/EG) with a comparable climatic fundament, equally defined terms and units and compared ecological material standards are needed. The future guideline should show the different national manners of planning, permit, tendering and construction methods in the involved countries in a clearly arranged manner in order to simplify the work for international planners. A unified European definition of operating costs and life cycle costs and other related terms should be made and publicated in the guideline and in a European benchmark database.

A **sustainable European certification system** for residential buildings will be developed and applied to a prototype building with comparable requirements and regional differences. In this residential building the rise of renewable energy consumption and the lowering of energy consumption in general are adapted to develop sustainable architecture and cities. Furthermore, it should define standardized methods for sustainability - in the whole life cycle of a residential building - that complete the national norms - for example in the supervision of the construction or in tendering – to allow a standardized comparison.

EU - Benchmarks like the development of dynamic financial programmes for all countries on national or EU basis with the help of loans and grants are important aims as well. For that we have to define the term energy and develop different levels of energy saving in the residential building as base for the financial support. Existing support programmes for example for social housing should be part of these programmes. The national building permits will be made bilangual and can be replaced by a common European building permit form in all languages with national differences in price and time.

For the **design and the construction of the prototype** - that will be developed to prove the guideline, the certification system and the EU - benchmarks - we have to define parameters like construction costs, target groups, amount of inhabitants per apartment and m² per person. A decision has to be made which kind of ownership should be considered always in relation with general similarities like the proportion of floor space and living space and distinct regional differences like rental cost in % of net household, temperature differences and approximate building costs per m².

6. Methods

Longlife has formed three transnational competence teams and five national units or regional teams.

The cooperation between the three transnational competence teams – science, politics and economy - team 1, team 2 and team 3 – it is enable to work in an integrative style and as triple helix.

Through the public-private partnership (PPP) composition - the cooperation science, politics and economy - team 1, team 2 and team 3 - it is also possible to move the project aims faster and closed.

All participating countries - Denmark, Germany, Lithuania, Poland and Russia - have members in the three transnational competence teams:

science - team 1: technology, energy, planning

politics - team 2: administration procedures

economy - team 3: industry, costs, financing, quality

Team 1 consists of universities, team 2 consists of administration as well as housing and urban Development Agencies and team 3 consists of investors and building societies. In the figure below the triple helix is imaged to show the three competence teams and five national units.

TEAMS			regional team	regional team	regional team	regional team	regional team	
			GERMANY	POLAND	LITHUANIA	RUSSIA	DENMARK	
transnational	University	specialists ↓	TEAM 1 technology, energy, planning	University Berlin	University Gdansk	University Vilnius	University St. Petersburg	Cenergia
	Administration	specialists ↓	TEAM 2 administration procedures	InvestitionsBank des Landes Brandenburg (ILB)	Municipality of Gdansk	Housing and Urban Development Agency	Joint-stock company Hypothecary Agency of Leningrad oblast	Roskilde Kommune
	Investor/ Building Society	specialists ↓	TEAM 3 industry, costs, quality	ProPotsdam GmbH	City Development Company	Building Planning Systematics Centre	North-West-Inter- Regional Center ABOK	Boligselskabet Sjælland

All involved countries work in the three competence teams. All project partners work at the same time in the same workpackage, they are divided in the three competence teams. They share the knowledge in the national units. All three competence teams have a team leader for the whole duration of the project. The workpackage leader is responsible to coordinate the work in the competence team between the partners from the involved countries. As well, each workpackage has a workpackage leader.

The lead partner, the workpackage leaders and the team leaders follow the Longlife project structure

In the work package Analysis and comparison the aim was to develop a comparable base of international information of the five participating countries and to show the building process in Denmark, Germany, Lithuania, Poland and Russia during the entire life cycle of the building, the similarities and differences in an easy comparison chart according to the three transnational competence teams.

For this a questionnaire was jointly developed in the three transnational competence teams - Engineering and building technology standards, administration tools, method of planning, permit and tendering procedures and economical and financial basis, industry and quality.

This questionnaire was filled out by all project partners and later brought together by the Lead Partner, Berlin Institute of Technology, Institute of Architecture, Department Design and Structure, Germany and the work package leader, Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Poland.

Two parts of the output are developed in order to compare the answers. The first part is a chart filled out with short answers to be able to compare easily the contributed informations. The second part is an annex with detailed informations of the three competence teams sorted by participating countries to get an overview of the national processes and standards.

In a last step we formulated in columns summaries and benchmarks, which will be used as the basis for comparison of sustainability for the next work package – Development of standards, criteria and specifications for a sustainable, resource saving residential building – to deepen specific information that we'll need to design a prototype residential building.

We provided with a virtual project room an access to the project's work results, to discuss the steps and news and to have the possibility for up-and download documents for all project partners.

7. Workshops, meetings, events

- Kick – Off Conference and partner meeting, 25-26 March 2009, Berlin, Germany
- Workshop, 14-15 May 2009, Gdańsk, Poland
- Workshop, 23-25 September 2009, Roskilde, Denmark
- Monthly appointments of project partners on a national level
- Participating at 8th International Conference on Sustainable Energy Technologies "SET 2009", Aachen, Germany, 31 August -3 September 2009

8. Results

- Engineering and building technology standards
- Method of planning, permit and tendering procedures
- Economical and financial basis, industry and quality



8.1 Engineering and building technology standards

- Architectural / urban design
- Structural design
- Energy standards
- Buildings materials
- Buildings physics
- Technical facilities (heating and cooling systems, ventilation systems)
- Definition of quality standards “Energy performance building pass”
- Quality of building process and integration of sustainable aspects
- Quality of site

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?	There are totally 2,735,000 houses in Denmark. 40 % are detached houses, 14 % are terraced, linked or semi-detached houses, and 38 % are multi-dwelling houses.	In Germany, there are usually more single family houses in the rural regions (around 60%). In the urban area of Berlin the part of the multi family houses is higher (around 55 %) although the part of single family houses is high as well.	About 32% of the persons live in detached houses and 61% in flats.	In cities mainly blocks of flats and detached houses in the country. A significant amount of existing builds in cities is comprised of concrete panel buildings built in the 70s and the 80s. New blocks are usually built in the improved traditional method of constructing or as a combination of a concrete skeleton with a brick filling. From the early 90s we can observe a great increase in the number of detached houses built in suburban terrains.	In the city the usual typology of the residential building is multistory multiple dwelling building. In the countryside and suburbia – private single family houses. There are also block houses, townhouses, dormitory and other typologies, but they amount insignificant number in comparison to the bulk of residential buildings.	In Germany (60%) is the highest share of detached houses, while in Lithuania only 32% live in detached houses.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.2 What can be generally said about the residential buildings?	63 % of all houses are private owned and 19 % are owned by non-profit building society. Only 2 % are owned by public authorities. Detached houses are 97% private owned meanwhile multi-dwelling houses have only 32% private owners.	Almost 50% of all flats are in detached or semi-detached houses. The other half is inside of residential blocks or town houses of 4 to 6 floors.	32,7% - individual houses, 4,7% - part of the house, 61,2% - separate apartment (flat) in the multi-storey houses.		Construction of new dwellings is represented by new brick-monolithic panel houses with 12-16 floors. The share of other types of dwellings is relatively small.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
a) year of construction	Half of all multi-storey and detached housing units are constructed before year 1955 and 2/3 before the first building energy requirement was introduced in the Danish building regulation. Number of newly constructed dwellings is about 10.000 a year.	The amount of newly constructed residential buildings rose after the Second World War due to the destruction. After this it stays more or less at the same level. In the last fifteen years the amount of new residential units rose after the fall of the wall but then declined to a very low amount of new constructions.	32,7% - before 1919 20,8% - 1919-1945 19% - 1946-1960 15,3% - 1961-1970 17,1% - 1971-1980 14,5% - 1981-1990 7,1% - 1991-2001 Number of newly constructed residential units in the last ten years is around 3600 per year.	Multi-storey buildings, especially those built in the 70s and the 80s, are the typical view of Polish cities. Majority of new buildings (those built after somewhere about 1990) have three or four storeys. From 90s up to the present detached houses have	Buildings most parts of St. Petersburg (with the exception of the central historical areas of the city) are represented mainly by massive series of house-building plant built 60-x (5 storied) and 70-80-ies of the last century. Construction of new dwellings actively began in the second half of the 90-ies.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
b) private or public owner	Detached houses have 97% private owners meanwhile multi-dwelling houses have only 32% of private owners.	In Germany there are more tenants than private owners and almost no subtenants. Owners: 41% Principal tenant: 57% Subtenant: 2%	1991 - 42% private, 58% - public; 2008 - 97,2% private, 2,8% public.	92% private owners, 8% public owners.	There are two types of property status of dwellings in the multistory multiple dwelling building - privatized -property of the State Single family houses are private property of the owners.	There are the majority of private owners in Poland, Lithuania and Denmark (about 92-97 %).
1.1.3 What is the common architectural design of residential buildings? (pictures, drawings, floor plan, view)	Danish homes are architecturally very different. Single family houses are typically detached houses built with brick or concrete. Accommodation is typical in blocks of three storeys with a total of 24 to 36 apartments. In recent years timber structures is used more extensively.	Large prefabricated blocks from the 60s and 70s, town houses with 4 to 6 floors and detached houses are determinant for cityscape and landscape.	The content of Architectural part of building project is described by building requirement STR1.05.06:2005 "Structure Design".	Before the 90s shapes and the look of buildings was relative the same or very similar (panel buildings). From the 90s this situation has been significantly changing. Designers have started to use more glass in their projects (i.e. very popular glass balustrades), more complicated building bodies.	Architecture of the houses in Russia is very different. Low-store houses are typically single-family detached houses or multifamily houses built with brick, wood or concrete. In the recent times there have been developed social buildings, built mostly with wood structures.	Distinct regional financing programmes for private owners, public owners and tenants.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.1.4 What are the common requirements for living spaces (main room, living room, etc. in person per sq.m)?	There is no general requirement for the size of living space.	Requirements are defined in the BauOBl. There are no exact requirements about min. living area per person, but for min. height of rooms.	Flat rate for 1 person - not less than 34 m ² . Bath together with a toilet area – not less than 5m ² . Any apartment, one room must not be less than 16m ² .	Average values:	National code (СНИП (SNiP) Building standards and rules).	The min. living area is defined in Poland and Russia (in Poland per flat for 1 person -34 sq m in Russia min living area per person 18 sq m).	Standardization of living requirements with regional differences.
a) number of rooms	42 % of all housing units including flats have kitchen and 2-3 room and 53 % have kitchen and 4 – 5 rooms.	4,4	5 – 7 rooms	3,70	1 - 3 rooms	The average number of rooms is between 5 and 3,7 rooms per dwelling.	
b) number of persons per household	The average number of persons in dwellings is 2.1.	2,2	3 – 4 persons	2,93	2 - 5 persons	The average number of persons per household is between 2,1-2,9 in all countries.	
c) sq m per person : 1) min effective area per person (requirement); 2) average living area per person	60.0 average sqm per person	41,9m ² , average flat size 61 m ²	24,9 average per person	23,8m ²	min. 18m ² living area per person, Living space per person in multi-storey buildings from social standard -10-12 m ² .	Area per person between 18 and 60 sqm/ person.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
d) height of different rooms?	Typical room height in new dwellings is 2.35 m.	2,40 m - 2,50 m	2,0 - 2,5 m; 14 sq m	2,5m	2,40 m - 2,50 m	Height more than 2,40m; one room bigger than 16 sqm, corridors wider than 1,20m.
e) information about usual living spaces	A typical housing unit consists of a kitchen one or two or bathroom with toilet, a living room and a number of bed rooms.	Bathroom with shower or bathtub and toilet, kitchen, storage rooms.	Bathroom, kitchen, living rooms, storage room for wheelchairs and bicycle, wardrobe and closet.	Average apartment area: 69,8m ² . Consists of: bathroom, kitchen, living rooms, storage room.	Entrance hall, kitchen and bathroom, sleeping rooms, second bathroom in 3- and more room apartment obligatory for new residential buildings, loggia- glazed balcony, terrace (single family houses), The built-in closets and small pantries have to be built in according to the norms. In the big apartments and houses there are also additional rooms: office room, sauna, terrace and pool.	Bathroom (toilet, shower or bathtub), kitchen, storage room (bicycles, wardrobe, closet), entrance hall (only in Russia).

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.5 Are there any building envelope design limitations? (e.g. material, windows etc.)	All new buildings have to comply the Danish building regulation and the requirements in the local planning.	The limitations for min. floor space area are regulated in BauOrdBln.	Outer partitions to be designed according to STR2.05.01: 2005 "Thermal technique of the building envelope" STR2.01.09: 2005 "Energy Performance of Buildings; Certification of Energy Performance of Buildings".	Yes - there is maximal windows surface area limitation.	They determine size and orientation of the windows of residential buildings, thermal conductivity and fire resistance of the wall materials, number of elevators, type of stairs. The rules have a lot of specific requirements and restrictions.	In Germany a minimum window area is required, while in Poland the window area is limited to a maximum.
						Benchmarks

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
a) window surface area	Generally between 20 and 25% of floor area.	Minimum 1/8 of the floor space of the room.	Indoor natural light settings associated with the minimum of window glass surface and room floor area ratio: tambour door, staircase, the house of the general-use corridors - 1:12; living rooms – 1:6; kitchen – 1:8; rooms in an inclined roof – 1:10.	In residential building and collective residence the area A_0 , expressed in m^2 , of windows, glass and transparent barriers, with the thermal transmittance U not smaller than 1,5 W/($m^2 \cdot K$), counted according to their modular dimensions, cannot be greater than the value A_{0max} counted according to the following example: $A_{0max} = 0,15 A_z + 0,03 A_w$ where: A_z - is the sum of areas of horizontal crop of all above ground storeys (in external contour of building) in 5m wide strip along external walls, A_w – is the sum of areas of the rest horizontal crop of all storeys after subtraction of A_z	Generally between 12 and 30% of floor area.	
						Reconsideration of valid window surface area in combination with solar gains.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.6 Are there any specific standards?					Building standards and rules, special features of National codes in each region of the federation.	In Germany, Poland and Russia an elevator is obligatory for houses with 5 or more floors. In Denmark it's required for houses with more than 2 floors.
a) elevator	Elevator when more than 2 floors.	Houses with more than 4 floors or barrier free houses have to have an elevator in a fireproof shaft.	The newly built house, higher than 4 floors (homes for the elderly - 3, at home, for families with disabled persons - 2), shall be installed in elevators.	Elevator – an obligation to install an elevator in the 5-storey (or more) buildings.	Elevators are required in case the building is higher than 4 floors. In the stairs there have to be windows and exit to the street.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
b) cellar	No.	Cellars are common for the residential buildings in Germany. Cellars aren't storeys if their ceiling height is less than 1,40 m above the average ground level.	No.	Cellars are very common both in blocks of flats and detached houses.	Cellar are usually used as a garage or for household needs.	
c) bell/intercom	It is standard in all new buildings.	Almost in all residential buildings.	Almost in all residential buildings.	Intercom – installed in almost every building.	Almost all residential buildings have intercom.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
d) required rooms	Kitchen, bathroom with toilets and living room.	Bathroom with shower or bathtub and toilet, kitchen, storage rooms.	Bathroom, kitchen, living rooms, storage room for wheelchairs and bicycle, wardrobe and closet.	Required rooms – nothing distinctive: kitchen, bathroom, toilet, living room, bedroom, child's rooms.	2 living floors. The first one - for general rooms: entrance hall, main living room, kitchen, bathroom, terrace and sometimes one sleeping room. In the second floor there are sleeping rooms and bathrooms.	Prototype with a standardized selection of required rooms with regional difference.
e) garage/parking space	Parking space req. set by local planning authorities.	Depends of the federal land building law.	Requirements are in the STR 2.02.01:2004 "living Houses".	Garage/parking space – in the new builds one car parking space/garage is a standard.	Depends on the construction age. Today all newly constructed buildings have garage.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
f) concierge service	Unusual.	Unusual.	Concierge service dont be used.	Concierge-service is rather rare.	In the entrance there is commonly room for concierge only in wealthy houses .	
g) flat roof or slanted roof	No requirements.	Wooden pitched roof is used for single family houses. Large multi-family houses often have concrete flat roof.	STR2.05.02: 2008 "Building constructions. Roofs" Roofs must be designed, built and used so as to meet the essential requirements of the 6 Regulations: "Essential requirements of the building" .	Slanted roofs predominate over flat roofs in the low-rise buildings and flat roofs are characteristic for high-rise buildings.	Single family houses have mostly pitched roof, upper floor - as mansard. If hydrological conditions permit. Residential buildings of the 20th century have almost always flat roof, older buildings –pitched roof.	

Results

1.1 Architectural and Urban Design							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
h) bicycle comfort (e.g.cellar room or parking space for bicycles)	There are not any bicycle comfort standards.	For buildings of building class 3 - 5 according to § 2 there has to be a common storage room for bicycles and buggies.	Storage room is needed, also possible is an outside located bike depot.	There are not any bicycle comfort standards.	There are not any bicycle comfort standards. Only in Moscow city exist special parkings for bicycles in big trade centers.	There are not any bicycle comfort standards, there are requirements for a storage room in Germany and Poland.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
1.1.7 What are the definitions or guidelines for roof design?	A number of guidelines do exist.	Flat Roof Guidelines gives hints for the professional planning and realization of layers and connections to other building parts in detail. Flat roofs have slope of 0°- 10° grade. Roof edge connection height has to be (roof with a slope of <5°) about 10 cm or (roof with a slope of >5°) about 5 cm over the surface covering or gravel. Green Roof Guidelines.	STR2.05.02: 2008 "Building constructions. Roofs" Slope up to 7deg. – flat roof; Slope > 7deg. – pitched roof.	Distance measured horizontally from the closest edge of window placed on the roof to border of building parcel cannot be smaller than 4m.	SNIP II-26-76: "Roofs". Slopes of roofs: generally between 1:1 and 1:5 (ratio of length from apex to eaves and height); rolled-strip roofing: slope of 0° - 2,5°; asbestos-cement roofing: 10° - 33°; concrete panel with imbrex: 5° - 10°.	

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.8 Are there any functional guidelines about space efficiency, floor-space index (FSI), site occupancy index (SOI)?	Rules for the maximum percentage of land area that may be built.	Berlin Building Law, Brandenburg Building Law, Building Law of Mecklenburg - Vorpommern.	Comfort ability or space efficiency are expressed as minimal requirements for living spaces and accessibility for disabled people. It is described in STR2.02.01:2004 "Living Houses", STR2.03.01:2001 "Buildings and Territories: Requirements for the Needs of Persons with Disabilities"	Terms FSI and SOI are not defined in Polish Construction Law or any other legislative which is in force in Poland. Although there may be some obligations described in Local Development Plan.	SNIP 31-01-2003: "Multicomapartment residential buildings".	
						New standards for possibility of the space to contain other functions than living or different kinds of living for all kind of people.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?	No general requirement, but can be made a local requirement (declarations) when land is sold.	Negative design limitation (Land Building Law) and positive design limitations (land use plan).	Law of Construction; Regulations.	They don't include it at all.	Existing standards define the height and majority of the building; they don't include art and design. Aesthetic quality of the building in the city determines the governmental official responsible for the architecture in this area or city.	
1.1.10 What kind of requirements are defined for barrier free construction? Name of the code?	No requirements.	DIN 18025-part1: Accessible dwellings, Dwellings for wheel chair users, design principles E DIN 18040-part1: Construction of accessible buildings – Design principles: Publicly accessible buildings.	Law on Construction; STR1.07.01: 2002 "Construction Permit" STR1.09.06: 2007 "Construction Suspension. Liquidation of Consequences of Unauthorised Construction" .	There are many requirements. All of them are defined in "Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes.	No requirements.	Barrier free construction is only included in the German construction laws.
						Barrier free construction should be included in the construction law of all countries.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.11 Which plans control the local urban and architectural design, what are the common criterias and where can they be found?	The local plan sets guidelines for developing a new building area and it is defines by the authorities or the municipality.	The land use plan can contain federal, regional and community laws in text and plan.	There are detailed plans, under which local authorities issue a summary of design conditions with all requirements, including the architecture.	Local development plan ("miejscowy plan zagospodarowania przestrzennego") is a kind of local law which controls urban and architectural design.	Only in the Urban development code of Russian Federation.	
1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept of investor, client and architect?	The social guidelines are described in the local plan for the area.	prEN 15643: Sustainability of construction work Part 3 Social framework.	During the work of preparation of plot plan the solutions and concept of investor and architect are coordinated with community.	Just a part of the concept of investor, client and architect.	Regulation concerns the general concept of urban development of the city. That is taken into account in the provision of building plots. There are some restrictions generally concerned with solving the master plan, the ratio of types of apartments, the balance of the area- at the discretion of the investors.	Sustainability norms don't exist in any country, only one prEN is in progress.

8.1 Engineering and building technology standards

1.1 Architectural and Urban Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.1.13 What criterias should be involved to describe the quality of the urban area and the site?	Distance to public transportation, schools, shops, noise ratio, green spaces, bicycle paths, parking.	Affordable dwellings, air quality, acoustic quality, distance to public traffic, shopping offers, local recreation area, parks, playgrounds, sports abilities,...	Territorial Planning Law provides for the preparation of detailed plans, the management of this binding site and mode of use:1) Territory use and (or) the nature; 2) Allowable height of buildings; 3) Allowable building density of the parcel of land; 4) Allowable building intensity plot; 5) Construction zone, construction of range; 6) The municipal or local engineering networks, the territory (land) supply of engineering techniques and communication corridors; 7) Of the system of organization; 8) Easement.9) Urban and architectural; 10) The natural and cultural heritage protection; 11) The territory (land) greenery (percentage).	Criteria determining the quality of the urban area and the site may be based on the rules of "spatial order", concept being in use in Poland, which is defined as harmonic composition, proportions, attractiveness of spatial organization. However it is very uncertain and wide definition.	Availability of dwelling according to the costs, distance to the metro, convenient transport links, availability of recreation areas, parks, squares.	Site factor should include sustainability of construction and social framework as a part of concept of investor, client and architect.
						Part of the certification process of the new building should be the local environment as a site factor.

8.1 Engineering and building technology standards

1.2 Structural Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.2.1 What are the climatic conditions?	warm temperate climate	moderate		The greatest influence on the climate of Poland, determining its transitional nature, are the polar-sea and polar-continental air masses.		
a) storms, floods	Data not available. approx. 1-2	50 storms per year	no storms	Average number of storms per year is approximately 14-20.	floods	
b) number of hours/days of sun annually	1495	1560 65	1700	75	50-100 days	
c) temperature development p. a.	7,7	10	6	8,3	summer: 18, winter: -8	
d) annual rainfall	712	750	650	600	634	
e) annual snow depth	The design criteria for snow must comply with Eurocode standard: EN 1991-1-3 .	0,65-1,10 kN/m ²	94cm or 154kg/m ²	0,7-1,6 kN/m ²	1,3 kN/m ²	
f) number of heating days	Number of heating degree days is 3112.	240	225	Regulations do not specify the exactly duration of heating season, but average number of heating days is 240-250.	No appointed number. Calculate with formula, which are describe in SNIP 23-01-99* "BUILDING CLIMATOLOGY"	
						Combination and amplification of national information to a new fundament for standardization of energy saving laws.

8.1 Engineering and building technology standards

1.2 Structural Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
g) annual sun radiation in kWh/m ²	1014	1000	1010	1022	between 2,5 kWh/m ² and 5 kWh/m ²	
1.2.2 What types of roof structure are used in residential houses?	Ventilated roof with timber frame, massive roof – tilted and flat roof.	Wooden pitched roof is used for single family houses. Large multi-family houses often use concrete flat roof.	Pitched roofs of steel and wood, flat roofs usually made of reinforced concrete constructions.	Slanted roofs predominate over flat roofs in the low-rise buildings and flat roofs are characteristic for high-rise buildings.	Pitched roof - wooden rafter with a wooden crate, metal rafter with wood and metal crate. Flat roofs - monolithic reinforced concrete and prefabricated coverings.	Similar roof structure for residential buildings, pitched roofs for detached, flat roofs for large multi-family houses.

8.1 Engineering and building technology standards

1.2 Structural Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.2.3 What types of load bearing structure are used in residential houses?	Timber frame, concrete beam, load bearing walls.	The walls are mainly constructed of brick or building stone, sometimes reinforced concrete is used as well.	Load bearing wall constructions: masonry (bricks, blocks, panels); storey partitions, foundations: reinforced concrete Load bearing framework constructions: reinforced concrete.	New blocks are usually built in the improved traditional method of constructing (load-bearing structure are masonry walls) or as a combination of a concrete skeleton (slab column systems) with a brick filling.	In modern multi-residential buildings there is used monolithic reinforced concrete skeleton of the interior walls, pillars and ceilings. Exterior walls –not load bearing, are often from the gas (porous) block with exterior finish of brick. In single family houses the walls are from the gas blocks or bricks, floors - prefabricated reinforced concrete or reinforced concrete, coating - wooden rafter.	The load bearing structures in residential buildings are equal. Walls are made of masonry, frame construction, slabs and foundation of reinforced concrete.

8.1 Engineering and building technology standards

1.2 Structural Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
1.2.4 Is there any national code to calculate load structures?	Eurocodes.	DIN 1055-1: 2002-06 - Action on structures: All possible loads and material information are defined there.	STR2.05.04:2003 "Actions and Loads" STR2.05.05:2005 "Design of Concrete and Reinforced Concrete Structures" STR2.05.06:2005 "Design of Aluminium Structures" STR2.05.07:2005 "Design of Timber Structures" STR2.05.08:2005 "Design of Steel Structures" STR2.05.	Examples: PN-82/B-02001 Building loads – Permanent loads PN-86/B-02015 Building loads – Environmental loads – temperature loads PN-82/B-02003 Building loads – Changeable technological loads – Basic technological loads PN-88/B-02014 Building loads – Soil loads PN-80/B-02010 Loads in static calculations – Snow loads PN-77/B-02011 Loads in static calculations – Wind loads.	Constructions are calculated according to SNIP Building standards and rules: 12-01-2004 SNIP and 52-01-2003 Concrete and reinforced concrete structures, SNIP 2.01.07-85 * Pressures and impacts SNIP 2.02.01-83 * Foundations of buildings and structures, SNIP Pile foundations 2.02.03-85, SNIP II-22-81 Stone and armature stone design, SNIP II-23-81 * - Steel structures, etc.	Would a standardized European norm be useful for sustainability?
1.2.5 How highly-developed are the industrial prefabricated materials?	Quite high.	Prefabricated materials are important for thermal modernization of buildings.	Quite high.	Prefabricates used nowadays are predominantly the very popular filigran floor slabs and canal ceilings.	Construction of multi-storey buildings of reinforced concrete panels are also used, but their share is insignificant.	Reinforced concrete panels and thermal systems for modernization are the most industrialized products. Define the importance of industrialization in financial matters in all countries.

8.1 Engineering and building technology standards

1.2 Structural Design						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.2.6 How is the proportion between handcraft building method and industrialised building?	The industrial part is growing – it is hard to assess the present percentage.	Nowadays prefabricated houses mostly are single family houses. Multi - family housing almost always are handcraft buildings.	Multi-family houses currently being built from monolithic reinforced concrete structures, in the decoration using less manual work.	Industrialized building was popular in the 70's and the 80's. Nowadays a vast majority of new buildings are built by the handcraft building method, but there are widely used prefabricated materials like filigran floor slabs.	The proportion of manual and industrial labor is approximately half to half. Shuttering used to be set manually, accessories have to be knit, concrete have to be brought by cars, gas concrete blocks are used to be placed by hand, etc. Construction companies tend to perform most work on their own, if it does not affect the quality of work. Glazing and finishing facades order to specialized firms.	Handcraft building is still very important in all countries, but the industrialization of construction work is a parallel development in construction business.
1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?	Economy and quality.	The main reasons of choice of certain construction method are technical feasibility, economical reasons and time duration and sometimes ecological criteria play also a role by making the decision.	Minimum construction costs.	Generally there are two main criteria: 1) financial 2) build time	Criteria for the selection of construction: Reliability, durability, efficiency, fire resistance.	Main criteria are economical and technical quality, ecological are not common. Financing tool for ecological construction.

8.1 Engineering and building technology standards

1.3 Energy standards							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.3.1 Is there any national code for Energy efficiency of buildings?	There is a requirement for maximum energy need in new residential building for: space heating, domestic hot water, cooling, pump and fans The energy must not exceed $Q < (70+2200)/A$, kWh/m^2a . Besides two low energy classes are defined: Class 2: $(50+1600)/A$ kWh/m^2a , Class 1: $(35+1100)/A$ kWh/m^2a .	DIN V 4107-10 Energy efficiency of heating and ventilation systems in buildings. DIN V 4108-6 Thermal protection and energy economy in buildings. DIN V 18599- Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting.	STR 2.01.01(6):1999 "Essential requirements of the building. Energy saving and heat retention" STR 2.01.09:2005 „Energy Performance of Buildings: Certification of Energy Performance of Buildings“ STR 2.05.01:2005 "Thermal technique of the building envelope".	"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes.	"Building standards and rules", "Thermal performance of the building". In designing there is also in use "Residential and public buildings. Microclimate parameters for indoor enclosures". In practise two different ways are usually used: - specific heat consumption - required thermal resistance.	The EU Directive 2002/91/EG is implemented in each country except Russia by codes and standards.	Further comparison and examination of the different implementations of the EU Directive to use the same calculation. Comparison of national computer calculating programmes.

8.1 Engineering and building technology standards

1.3 Energy standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.3.2 What is average specific heat consumption of residential buildings in kWh/m ² a? Grouped according to systematic in 1.3.1 (if applicable)	The energy for space heating, domestic hot water, cooling, pump and fans in new buildings must not exceed (70+2200)/A, kWh/m ² år where A = treated floor area.	Energy consumption is differentiated according to typology and year of construction. Modernized buildings have an average heat consumption of about 35 - 90 kWh/m ² a. KfW Efficiency House 70 < 60 kWh/m ² a KfW Efficiency House 55 < 40 kWh/m ² a Passive house < 15 kWh/m ² a.	Regulation STR 2.09.04:2008 "Thermal Output of Building Heating System. Heat Demand in Heating" Total energy consumption in dwellings per month, 2008: > 35 kWh/m ² - 22%; ~ 25 kWh/m ² - 56%; ~ 15 kWh/m ² - 17%; ~ 8 kWh/m ² - 5% (it satisfies the requirements of existing standards for new buildings).	Value of new construction: 95-110KWh/m ² . a Data about heat consumption of residential buildings grouped according to systematic in 1.3.1 is not available.	Specific heat consumption for residential buildings depends on the number of storeys and heating space in a building and it varies between 70-125 kJ/(m ² *K*day).	The average heat consumption differs from 35 - 110 kWh/m ² a.
						Fixation of different energy consumption levels for comparable EU financing models.

8.1 Engineering and building technology standards

1.3 Energy standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.3.3 Is there any national code for thermal insulation of buildings?	The energy requirement in new building must follow 1.3.2. In addition the following heat loss coefficient must not exceed: external wall: 0.40 W/m ² K floor: 0.30 W/m ² K roof: 0.25 W/m ² K windows: 2.00 W/m ² K.	DIN 4108 (Part 1-4; 7) - Thermal insulation and energy economy in buildings.	STR 2.05.01:2005 "Thermal technique of the building envelope" STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“.	"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. Section IX - Energy saving and heat insulation.	"Building standards and rules", "Thermal performance of the buildings".	In each country a code for thermal insulation is implemented, but with different requirements.
						Comparison of the codes, new common standards.

8.1 Engineering and building technology standards

1.3 Energy standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.3.4 What method is implemented to calculate energy demand?	<p>The energy demands must be verified by the calculation tool: Be06</p> <p>Developed by the Danish Building Research Institute.</p> <p>The method complies with „Thermal performance of buildings – Calculations of energy use for heating and cooling (ISO 13790).</p>	<p>Annual primary energy demand for residential buildings can be calculated in connection with DIN V 4108-6 and DIN V 4701-10. Annual heating demand has to be calculated according to the monthly balance method or according to the seasonal balance method and DIN V 18599.</p>	<p>According to STR 2.09.04:2008 "Thermal Output of Building Heating System. Heat Demand in Heating": Method based on prEN 15217:2005 and prEN 15203:2005 requirements.</p>	<p>The method of prime energy demand calculation is described in "Energy profile calculation methodology of buildings and flats", Decree of The Minister Of Infrastructure of 6 November 2008. It is based on seasonal efficiencies of specific technical systems as heating system, ventilation system, cooling system and hot water preparation system.</p>	<p>No certificated method.</p>	<p>Each country use different calculation method for the energy demand.</p>
						<p>Benchmarks</p> <p>Implement a unified calculation method for the energy demand of residential buildings.</p>

8.1 Engineering and building technology standards

1.4 Building Materials						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.4.1 What kind of building materials are used for....?				Percentage statistics are not available.		
a) roof structure	Timber frame construction with tiles, etanit or roofing felt, concrete slap with roofing felt, wooding prefab. elements.	Wood and tiles, reinforced concrete and bitumen.	Multi-story houses - reinforced concrete.	Slanted roofs: ceramic tile, plate tile, cement tile Flat roofs: roofing paper.	Roof Tiles: ceramic tile, plate tile, cement tile; Flat roofs: membrane.	
b) load bearing structure	Timber frame, concrete beam, external brick wall.	Walls of brick and building stone, reinforced concrete.	Reinforced concrete.	Wood, steel, concrete, masonry.	Walls of brick and building stone and reinforced concrete.	The most popular load bearing structure is made of concrete.
c) foundation	Reinforced concrete.	Reinforced concrete.	Reinforced concrete.	Reinforced concrete.	Reinforced concrete.	Reinforced concrete is used for all foundations.
d) external wall	Timber frame, light concrete, bricks.	Normally plaster and colour and building stone or brick wall.	Different types of masonry walls (bricks, blocks, panels).	Ceramic brick, lime-cement bricks, cellular concrete, leca concrete reinforced concrete, wood.	Brick, masonry blocks, reinforced concrete, wood.	Different kind of building stones or bricks are the most common material for external walls.
e) internal wall	Wooden, steel and brick construction.	Light seperation walls of gypsum plaster boards.	Different types of masonry walls (bricks, blocks, panels).	Ceramic brick, lime-cement bricks, cellular concrete, leca concrete reinforced concrete, cardboard-plaster walls	Construction built with wood, steel and brick.	
f) floor	Concrete, wooden prefab elements.	Wood, floor tiles, linoleum, carpet.	Wood, floor tiles, tarcet, carpet, stone plates.	Ceramic floors, floor panel, wooden floors, stone plates.	Wood, floor tiles, carpet, stone plates.	

8.1 Engineering and building technology standards

1.4 Building Materials						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
g) ceiling	Wood.	Wood, prefabricated slabs of reinforced concrete, partially prefabricated slabs of reinforced concrete, prestressed concrete slabs.	Reinforced concrete, suspended ceiling.	Reinforced concrete (monolithic and prefabricated), wood.	Reinforced concrete and suspended ceiling.	
h) facade	Tiles, wood, eternit.	Metal, glass, reinforced concrete.	Plastering, metal, glass, ceramic.	Various types of plaster, brick, stone, wood, ceramic plates	Brick, various types of stone, ceramic plates, wooden and saiding panels.	
i) windows	2-layer low energy. 3-layer low energy.	Aluminium with insulation material, wood, plastic.	Plastic or wooden windows.	Wooden, PVC	Wooden and plastic windows.	
j) thermal insulation	Mineral or glass wool.	Mineral wool insulation, expanded polystyrene hard foam (EPS), polyurethane (PUR), polystyrene extruded foam, insulating lightweight building board.	Mineral or glass wool.	Styrofoam, styrodur, mineral wool, leca	Mineral and glass wool, polystyrene extruded foam and styrofoam.	Mineral wool insulation is the most common.

8.1 Engineering and building technology standards

1.4 Building Materials							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.4.2 What are the reasons of the material usage?	Economy, architecture, tradition and regulation.	Technical, economical, ecological, habits, tradition, regulations, aesthetical.	Usually – according to laws of market economy.	1) assurance of appropriate technical properties at minimal price 2) social habit (cellular concrete, ceramic brick) 3) tradition (eg. Traditional highlander log house, shingles, thatched roofs).	Technical, economical, ecological, regulations.	The reasons for material usage are tradition, economy and technical properties.	Strengthen ecology reasons financially or in the certification.
1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?	New products are developed constantly: windows, building elements, HVAC equipment. The energy standards are strengthened every 5th year currently.	Three Heat saving regulations (WSchVO) from 1977 to 1995 and four Energy savings regulations (EnEV) from 2001 to 2009.	First tightening of requirements for outer partitions was made in year 1993. Later – in 1996, 1999, 2005 and 2008, also appeared new regulations for integrated energy saving. Building envelope (walls, roof) design solutions and U – value for it: In 1993 - ~ 0,35 W/(m2K); 1999 – ~ 0,25 W/(m2K); 2008 – 0,16 – 0,2 W/(m2K).	Implementation of union directive 2002/91, the effects of which we will see in the future. Up until this point: continuous technological development.	New composite materials are being actively introduced, frame house constructions are being developed, foreign technologies in the construction of low-rise buildings are being tested. "Energy-saving housing construction in Moscow for the 2010-2014. And with the perspective up to 2020" law has been adopted and passes a final reading.	Almost all countries have a development in building materials and energy standards, only that Germany has more experience as it started in 1977 and Poland for example started in 2002.	

8.1 Engineering and building technology standards

1.4 Building Materials						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.4.4 Is there any ecological declaration of building materials?	Yes, ecoflower and swan.	In Germany there are various ecological declarations of building materials with different criteria. Some building materials are also declared according to the international standard ISO 14040 but it is not obligatory. There are following ecological declaration labels: natureplus, GEV-EMICODE EC 1, FCS-Siegel, Euro-Blume, Der Blaue Engel.	HN 36:2002 "Banned and restricted substances" HN 35:2002 "Maximum permissible concentration of chemicals polluting air in residential areas" Minister for the Environment 2006 12 29 Order No. DI-637 "About confirmation of rules for cleaning-up of building waste" For ecological building materials special codes we do not have.	Yes, but their use is not obligatory. In Poland ecological declarations of building materials are consistent with ISO 14020 series norms, but they are a novelty in our country.	All building materials being used in Russia have ecological declarations.	Ecological declarations do exist but they aren't obligatory, only voluntary.
						New obligatory ecological standards for materials by involving for example the primary energy demand.

8.1 Engineering and building technology standards

1.4 Building Materials						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.4.5 What criteria are involved in this declaration?- Health risks, Potentials to accumulate or to abolish the ozone layer, Potentials for greenhouse effect, Potentials for acidification and overfertilization, Risks for the local and global environment.	Health risk, green house effect.	Green house potential, ozone depletion potential, photochemical ozone creation potential, acid potential, eutrofication potential, emissions, health risks, risks for local and global environment, lifecycle, sustainability	Health risks, potentials to accumulate or to abolish the ozone layer, Potentials for acidification and over fertilization, Risks for the local and global environment	In dependence from the type of the declaration. For specific information look at ISO 14020, ISO 14021, ISO 14024, ISO 14025.	Health risks, fire risks.	Summary
						Benchmarks
						Obligatory ecological criteria for materials.

8.1 Engineering and building technology standards

1.4 Building Materials						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.4.6 Are there any declarations or codes for waste materials?- Ability for recycling, Ability for deconstruction, Ability for removal	Yes, it is part of the declaration 1.4.4.	European Waste Catalogue shows all possible waste materials. ISO 14025 shows all waste materials during production and construction process.	Management, VZ, 1998, no. 61-1726; Government of the Republic of Lithuania 2002 04 12 Resolution No. 519 "On the state of strategic waste management plan" VZ, 2002, no. 40 * 499; Minister for the Environment 2006 12 29 Order No. DI-637 "About confirmation of rules for cleaning-up of building waste" VZ, 2007, no. 10-403; Construction waste management regulations set of construction waste generation and management of planning, accounting, and management of the construction site, building the mobile crushing equipment on site, construction of untreated waste consumption, construction waste recovery and disposal.	The Act dated 27 April 2001 on refuse Official no. 62 position 628 with later changes. The Act defines the rules of conduct concerning refuse in a way ensuring the safety of the lives and health of people and environmental protection in accordance with the rule of balanced development, and in particular with the rule of preventing the creation of waste or limitation of the amount of waste and it's negative influence on the environment, as well as recycling or neutralizing waste.	There are not such kind declarations or codes in Russia.	Waste material declaration aren't that popular in the participating countries.
						Material lifecycle.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?	Thermal conductivity λ -value $[W/(m \cdot K)]$, U-value $[W/(K \cdot m^2)]$.	λ -value $[W/(m \cdot K)]$ - thermal conductivity, U-value $[W/(K \cdot m^2)]$ - thermal transfer coefficient, μ -value - water vapor proof, ρ -value- bulk density $[kg \cdot m^{-3}]$.	STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“ There are used parameters from EN15217:2005 and EN15203:2005 in this code.STR 2.01.03:2003 “Declared and Project Values of Units of Thermal Technical Construction Materials and Products”. They meet the LST EN ISO 10456 provisions. Regulation 3, 4 and 5 annexes of the thermal values correspond with LST EN 12524 .	For a complete construction: ☐ Heat transmittance U $[W/K \cdot m^2]$ ☐ Temperature coefficient α_{fsi} [-], (the risk of fungus emergence on the interior surface of barriers and the risk of condensation of water vapour on the inside of the barrier) For a non-built-in material: ☐ Specific heat c $[J/kg \cdot K]$, ☐ Humidity w [%] ☐ Material density ρ $[kg/m^3]$ ☐ Thermal conductivity λ $[W/m \cdot K]$ ☐ Vapour permeability coefficient δ $[g/m \cdot h \cdot Pa]$.	Thermal conductivity λ $[W/(m^2 \cdot K)]$, vapor penetration μ $[mg/(m \cdot h \cdot Pa)]$.	The u- value is used in almost all countries meanwhile other characteristics may differ in standardization.
						Using the same terms and units.

8.1 Engineering and technology standards

1.5 Building physics							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?	Danish Building Regulation "Kapitel 6 Indeklima" includes: - thermal indoor air quality - indoor air quality (ventilation, emission from materials, others) - acoustic indoor quality - lighting (daylight and electric lighting)	DIN 4108-2 Thermal protection and energy economy in buildings - Part 2: Minimum requirements to thermal insulation, DIN EN 15251 Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics	HN 42:2004 "Microclimate in dwelling and public buildings" HN 69:2003 "Thermal comfort and sufficient thermal environment in work rooms. Requirements for parameters of normal values and measuring"	A norm exists, but it is not compulsory: PN-85/N-08013 – Ergonomics. Moderate thermal environment. Definition of the PMV, PPD index and the requirements concerning thermal comfort.	"Residential and public buildings. Microclimate parameters for indoor enclosures". In winter indoor air temperature have to equal 18 or 20°C. In summer indoor air temperature is standardized only for public buildings.	Common requirements for thermal comfort (mainly in winter) are indoor quality, acoustic qualities, lighting, thermal environment and microclimate.	Some requirements like thermal comfort, acoustic comfort, building envelope design, moisture prevention and fire prevention are already part of the norms of all countries meanwhile others like soil sealing and visual comfort still are not part of national norms. Therefore all requirements should be included in the European certification or norm system.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.3 What requirements are defined for acoustic comfort? Name of the code?	see 1.5.2	DIN 4109 Sound insulation in buildings – Part 1: Requirements Sound insulation in buildings; construction examples and calculation methods.	STR 2.01.01(5):1999 Essential requirements of the building. Protection against noise STR 2.01.07:2003 „Protection of the Internal and External Environment of Buildings from Noise“ STR 2.01.08:2003 “Control of noise sent to surroundings by open-air equipment”.	Only maximum values of noise are given. Res. facilities in a res. building: - 40dB during the day - 30dB at night Kitchen and sanitary areas: - 45dB during the day - 40dB at night "Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. PN-87/B-02151.02 Construction acoustics. Protection from noise in building facilities. PN-B-02151-3:1999 Construction acoustics. Protection from noise in building facilities. Acoustic insulation of building barriers and acoustic insulation of construction elements.	Projection of sound insulation of separating constructions in domestic and public building, Building standards and rules: "Sound Protection". These codes define: indoor and outdoor sound (pressure) level (dB, dBA), sound insulation of windows, balcony doors, indoor construction.	The acoustic requirements are sound insulation form internal and external environment according to rooms and functions, mostly with the aid of maximum noise values.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?	see 1.5.2	DIN 5034-4 Daylight in interiors - Part 4: Simplified determination of minimum window sizes for dwellings, DIN 5034-6 Daylight in interiors - Part 6: Simplified determination of suitable dimensions for rooflights	STR2.02.01:2004 "Living Houses" STR 2.02.01:2004 p.192 - residential buildings should be located so, that comply with the building facilities and children's playground for visual comfort requirements do not impede the natural indoor lighting, meet the requirements of natural indoor lighting (see also the reply to 1.1.5a)	No requirements.	No requirements.	
1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?	In residential buildings a satisfactory indoor climate must be achieved by ventilation, with a minimum requirement for air change rate in different type of room.	DIN 4108-3 Thermal protection and energy economy in buildings - Part 3: Protection against moisture subject to climate conditions; Requirements and directions for design and construction	STR2.02.01:2004 "Living Houses" STR 2.01.01(3):1999 "Essential requirements of the building. Hygiene, health, protection of environment"	"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: Section VIII - Health and hygiene.	"Residential and public buildings: Microclimate parameters for indoor enclosures": - indoor air temperature - air humidity - concentration air contamination	Protection against moisture is part of the norms of all countries.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.6 What requirements are defined for the building envelope? Name of the code?	The air leakage must not exceed 1.5 l/sm ² at 50 Pa pressure test.	Structural stability (DIN 1053,DIN 1054,DIN1045), Thermal insulation(DIN 4108-6), Moisture proofing (DIN 4108-3), Air-tightness (DIN 4108-7), Natural lighting (DIN 5034), Sound insulation (DIN 4109), Fire prevention (DIN 4102).	STR 2.09.02:2005 "Heating, ventilation and air conditioning", STR 2.09.04:2008 "Thermal Output of Building Heating System. Heat Demand in Heating", STR 2.05.02:2008. "Structures of Buildings. Roofs" STR 2.01.01(3):1999 "Essential requirements of the building. Hygiene, health, protection of environment".	"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 with later changes: Annex no. 2 - Air-tightness - Energy efficiency - Moisture resistance There is also a "blower door" testing method being performed according to ISO 9972.	Air-tightness, moisture proofing, sound insulation of windows and balcony doors, heat transmission.	For the building envelope there are defined different conditions like air tightness, energy efficiency, moisture resistance, lighting, thermal and acoustic insulation, fire prevention. Blower door test is known in all countries.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.7 What requirements are defined for fire prevention? Name of the code?	The Danish Building Regulation "kapitel 5 Brandforhold".	DIN 4102-1 Fire behaviour of building materials and building components - Part 1: Building materials; concepts, requirements and tests DIN 4102-4 Fire behaviour of building materials and building components; synopsis and application of classified building materials, components and special components.	STR 2.01.01(2):1999 „Essential requirements of the building. Fire safety“ STR 2.01.04:2004 „Fire safety. Main requirements“ STR 2.01.06:2003 “Lightning safety of structures. Active safety against lightning”.	“Technical Conditions, which buildings and their location should meet”, Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: Annex no. 2 Section VI – Fire Prevention Fire resistance class of parts of a residential building.	All requirements are in SNIP СНиП 2.01.02-85* "Fireproof norms", SNIP 21-01-97* "Fire safety of buildings and works".	There are requirements for fire prevention in all countries with the aid of fire resistance classes of building parts.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?	Ventilation for buildings – Design criteria for the indoor environment. Below ground, there should be particular attention to the floor sealing against the soil to minimise risks of radon penetration.	The zoning map of the distinctive site gives information about footprint area of each site respectively about the area not to seal. Normally it is called the site occupancy index SOI (Grundflächenzahl GRZ) which shows the proportion of Gross External Area to land area.	STR 2.01.01(1):2005 „Essential requirements of the building. Mechanical endurance and stability“ STR 1.04.02: 2004 „Engineering Geological (Geotechnical) Investigations“	There are no requirements defined.	Rules and rates EniP (ЕНiP): Collection Е8 Issue 1,2,3;EniP (ЕНiP) Collection Е11.	Soil sealing is not very common although it is a sustainable factor in the fight against flooding.
						Soil sealing should be involved in the certificate in order to develop a green environment with the aid of the building.

8.1 Engineering and technology standards

1.5 Building physics						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.5.9 What criteria are involved to determine Energy Efficiency of building?	Energy demand for space heating, U-value; The construction must be protected against moisture condensation (vapour barrier) to secure good indoor air quality.	1.3.1	Final energy demand, U -- value, R-value, risk of moisture condensation, heat loss through outer walls, outer storey partitions, roofs, heat loss through partitions contacting soil, heat loss through windows, entrance doors, through thermal bridges and through ventilation system, heat loss because of over-normal outer air infiltration inside, heat inflow from outside, inner emission of heat, annual consumption of electricity energy, annual consumption of energy for hot water production.	EP (coefficient explained in the question 1.5.6) U-value.	All criterions and requirements written in SNIP 23-02-2003 "Thermal performance of the buildings"	Requirements for energy efficiency are for example final, net and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting, but as well the U - and R- value.

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.6.1 What kind of heating energy sources are used in residential houses?	62 % of all residential units are heat supplied by district heating, 14 % with central heating with oil, 15 % by central heating with natural gas, and 5 % are heated by electricity.	48,6% natural gas; 30,2% oil; 13,2% district heating; 4% electricity; 3% renewable energy; 1% coal (year 2006).	The heating energy sources used in 1997 and 2008 are: natural gas 68,5% - 77%; fuel oil 27,3% - 4,1%; wood, bio fuels, geothermal resources 1,2% - 17,7%; other fuels 3% - 1,2%.	Coal, natural gas, biogas, bio fuels, biomass, solar energy, geothermal energy, electricity.	Coal, wood (firewood), electricity and natural gas	In Denmark and Lithuania district heating is the main energy source. In Germany natural gas and oil make almost 80% of all energy sources, while Poland use mostly coal and natural gas.
1.6.2. 1 What kind of heating system is used in residential houses? Central heating, district heating etc.?	Central heating, radiators, floor heating, air.	71,6 % central heating; 13,2% district heating; 7,5% local heating system (covering one floor or zone), 7,7% others (year 2006).	In residential houses the kind of used heating energy sources: district heating – 78,5%; different heating – 21,3%; no heating – 0,2%	Central heating, heating furnace, others.	Predominately central heating (district heating plant). Also dwellers of village detached houses use local heating systems.	
1.6.2. 2 What kind of heating generators are used?	Gas and oil boilers.	Condensing boiler, low temperature boiler, wood pellet boiler, electric heat pump, solar heating system.	Closed solid fuel stove; gas-fired heat generators.	Condensing boiler, low temperature boiler, wood pellet boiler, electric heat pump, solar heating system.	Gas and oil boilers, electric heat pump.	

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
1.6.3 What kind of cooling system is used in residential houses?	There is no cooling in residential buildings.	Conventional cooling system, passive cooling system.	STR 2.09.02:2005. Usually not used at residential houses.	Air conditioning, cooling system.	Air conditioning, cooling system.	
1.6.4 What type of ventilation system is used in residential houses?	Natural ventilation Mechanical exhaust air ventilation. Mechanical ventilation with heat recovery.	Window ventilation, mechanical exhaust air-plant without and with heat recovery.	Mechanical, natural, with heat recovery.	Gravity ventilation mechanical ventilation with single ventilators or in- and out-leading air elements and a function of heat recovery air conditioning.	Mechanical, automatic and combined extract and input ventilation.	Mechanical ventilation systems with heat recovery are already used in Denmark, Germany and Poland, in Lithuania it is used without heat recovery.

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)	No requirements for maintenance and cleaning in residential buildings.	DIN 1946-6 Ventilation and air conditioning - Part 6: Ventilation for residential buildings - General requirements, requirements for measuring, performance and labeling, delivery/acceptance (certification) and maintenance DIN EN 13141-6 Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 6: Exhaust ventilation system packages used in a single dwelling.	STR 2.09.02:2005 "Heating, ventilation and air conditioning". Regulation STR 1.12.05:2002 "The use and maintenance of mandatory requirements and implementation arrangements for residential hoses"	The frequency of inspections of boilers, heating and air conditioning systems has been defined in: The Act of 19th September 2007 on amending the act – Construction law (J. O. No. 191, item 1373). The requirements of maintenance and cleaning of systems are also defined in: The Ordinance of the Ministry of Infrastructure of 12th March 2009 on amending the ordinance - technical conditions for buildings and their location.	All requirements are in SNIP 2.08.01-89* "Living houses" and reference guide for it's.	Regular maintenance to guarantee low operation costs.
					Only in Denmark there is no regulation of maintenance and cleaning for residential buildings in the other countries are existing norms for regulation. There is regulation of maintenance and cleaning for residential building in almost all countries (except Denmark)	

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.6.6 What requirements are defined for water supply and domestic sewage?	Specifications for installations inside buildings conveying water for human consumption - DS/EN 806-1.	Drinking Water Regulation DIN EN 806-1 Specifications for installations inside buildings conveying water for human consumption - Part 1: General; German version EN 806-1:2001 + A1:2001 Domestic sewage Regulation DIN 4045.	STR 2.02.04:2004 "Water charge, preparation of water. Main provisions" STR 2.02.04:2004 "Sewer cleaners. Main provisions" STR 2.07.01:2003, "Water-Supply and Waste Water Treatment. Building Services. Outdoor Engineering Networks".	The requirements for water supply and domestic sewage are expressed in: The Act of 7th June 2001 on collective water supply and domestic sewage.	GOST R 51232-98 "Drinking water. General requirements for organization and quality control methods"; Sanitary-hygienic rules and norms SanPiN 2.1.4.1074-01 "Drinking water. Hygienic requirements to quality of water of the centralised systems of drinking water supply. Quality control".	
1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.	Target in household: 100 l/day per person.	From 1995 to 2004 the water consumption per person and day reduced from 132l to 126l (5%).	Lithuanian building code (RSN 26-90) depending on the category of cities and towns in the residential houses with water supply, waste remover and bathroom, with a local hot-water species 1 capita water consumption rate of the day for the 160 to 230 liters	From 1990 to 2006 the water consumption per person and day reduced from 184l to 112l (39%)	There is no data available.	

8.1 Engineering and building technology standards

1.6 Technical facilities and services							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.6.8 What requirements are defined for security? Bulger security in doors, in windows	There is no data available to define the requirements for security.	DIN V ENV 1627 Windows, doors, shutters - Burglar resistance - Requirements and classification	STR 2.01.01(4):1999 Essential requirements of the building. Usage safety	There is no data available to define the requirements for security.	There is no data available to define the requirements for security.		
1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels to heat, cool or ventilate buildings? (percentages of total energy demand)	Renewable energy in the form of biomass are used in even greater extend in district heating - Production of renewable energy, etc. represents in 2004 14.2% of gross energy consumption in Denmark. In 1990, the proportion of renewable energy in the district heating production were 31.6% (including biomass 10.3 % and waste 20.0%).	Portion of renewable energy of primary energy demand increased from 1,6% in 1990 to 6,9% in 2006.	Yes, and the comparative weight increases:1997 – 1,2%, 1998 – 2,0%, 2001 – 4%, 2003 – 7,2%, 2005 – 12%, 2008 – 17,7% (in the number of solar and wind energy is ~3.3%).	The percentage contribution of renewable energy to total energy demand is estimated to be 6,9%.	The use of renewable energy isn't spread in Russia. There are cheap technologies for use solar, wind and bio mass energy, but they have not found their consumer among the population.		Rising the percentage of renewable energy and lowering the consumption of energy in dwellings.

8.1 Engineering and building technology standards

1.6 Technical facilities and services							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?	Biomass in district heating.	There are used distinctive renewable heating sources.	Renewable heat sources are not used in energy supply systems of residential buildings.	Energy supplying systems of residential buildings use such renewable heat sources as: biogas, bio fuels, biomass, waste combustion, solar energy, geothermal energy.	Renewable heat sources are not used in energy supply systems of residential buildings.	In Poland and Germany renewable heat sources are used in different types while in Lithuania and Russia it is unusual yet.	
1.6.11 How popular is the usage of renewable heat sources in residential houses?	Solar heating for domestic hot water. Solar energy for electricity. Heat pump mainly by utilise energy from soil.	About 350000 heat pumps are installed. About 1/3 in 2007 and 2008. The total produced PV-power increased from 76 GWh (2001) to 2220 GWh (2006). The number of installed solar heating system increased from 1999 to 2004 about 260% to total 700000.	No data for residential buildings.	biomass 96,1% ,biofuels 2,3%, biogas 1,4%, geothermal energy 0,2%, solar energy 0,018%, waste combustion 0,007%	No data for residential building.	The use of renewable energy sources in Germany increased in the last years. In Poland biomass is with 96% the most important renewable energy source.	Financial help for renewable heat sources by EU .

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.	Energy consumption for space heating has fallen 13% from 1980 to 2004. The decline occurred even though the heated area in the same period grew 23.8%.	In the last 10 years energy demand for space heating decreased about 28% from 199,3 kWh/m ² to 142,7 kWh/m ² . But in the same time electric power consumption per person increased about 16%.	No data. Increase in the number of heat users from 2001 to 2009 amounted to 31.5%.	In the last 15 years the energy consumption fell from 35 to 21 kgoe/m ² .	It is defined by the standards for consumption of electrical energy within the living quarters on the basis of differentiation depending on the number of rooms and number of people, that are established by the Office of Housing and Communal Services and other authorized institutions.	The energy consumption for space heating felt in the last years. In Germany about 28% to 143kWh/m ² a in Poland about 40% to 244kWh/m ² .
						Financial help for lowering energy consumption.

8.1 Engineering and building technology standards

1.6 Technical facilities and services						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?	Pumps and fans are included in the calculation of the energy consumption of residential building to meet the energy requirement in the Danish building regulation.	There are not special energy efficient requirements on fans, pumps and temperature efficiency of heat recovery, according to the Norm DIN EN 15459:2007, DIN EN, EnEV 2009 and numbers of the interrelated Norms the designer calculate the energy consumption under the actual situation, they choose the optimal fans, pumps and the heat recovery.	STR 2.09.02:2005 Regulation, Chapter VIII of the "Energy Saving", where there is guidance on: · The use of disposal of air, if it is economically appropriate; · Equipments, ducts and pipe insulation; · Fans power categories; · Systems management and automation, etc.	There are no energy efficient requirements on fans, pumps and temperature efficiency of heat recovery.	There are not such kind of energy efficient requirements.	

8.1 Definition of quality standards

1.7 Definition of quality standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.7.1 If there exist "Energy Performing Certificates" for houses in your country which standards signifies these certificates? Show example.	There is one compulsory labelling system in Denmark for houses - "Energimærke".	"Energy Performing Certificates" according to EnEV follow the standards of DIN EN 15217 Energy performance of buildings - Methods for expressing energy performance and for energy certification of buildings,	STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“ - p.15 - Building (building in part) the energy performance assessment and / or certification made building (part of the building) total energy calculation method. Calculation methods (in total 25 pages) basis is prEN 15217:2005 „Energy performance of buildings. Methods for expressing energy performance and for energy certification of buildings“	<ul style="list-style-type: none"> • The Act of 19th September 2007 on amending the act – Construction law (J. O. No. 191, item 1373). • The Ordinance of the Ministry of Infrastructure of 21st January 2008 on training and examination for licence to prepare the energy performance certificates for buildings and residential unit. 	Doesn't exist	Almost in all countries, energy certification systems are already part of the norming system. (accept Russia)

Results

1.7 Definition of quality standards							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?	0-energy houses, plus-energy houses, Svanemærket	German sustainable building certificate. Six subjects affect the evaluation: ecology, economy, social-cultural and functional topics, techniques, processes, and location. The certificate is based on the concept of integral planning that defines, at an early stage, the aims of sustainable construction.	No standards	There are no regulations referred to Green Building Certificates.	No standards	Only in Germany exist a certificate for sustainable/green building.	

8.1 Definition of quality standards

1.7 Definition of quality standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.7.3 Which standards signify a "low energy house", "passive house", "zero energy building"?	Passiv House certificate according to the German Passivehaus Institute.	Low energy house with energy demand of min. 25% under the current energy saving ordinance (EnEV). Passive house with annual heating demand Q _h less than 15 kWh/m ² a of living space. The primary energy demand including hot water and electricity is allowed to be max. 120kWh/m ² a. Zero energy building (ZEB) or net zero energy building is a building with zero net energy consumption and zero carbon emissions annually.	No standards	There are no specified regulations referred to these terms.	No standards	No common standards for "low energy house", "passive house" or "zero energy building"

8.1 Definition of quality standards

1.7 Definition of quality standards						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.7.4 Following up procedure of the performance of the building energy system.	There isn't any following up procedure of the performance of the building energy system.	0	No, because the method is based on the Regulation tables values sizes, not the actual values sizes needed for the calculations. Overall, this is not a certification it is calculations of energy efficiency of design solutions	There isn't any following up procedure of the performance of the building energy system.	There isn't any following up procedure of the performance of the building energy system.	
						Benchmarks

8.1 Engineering and building technology standards

1.8 Quality of process and integration of sustainable aspects						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?	Usually the target on sustainability is described in the local district plan.	DIN EN 15643 (Draft) Sustainability of construction work- Sustainability assessment of buildings Part1: General Framework Part2: Frame for environmental quality Part3: Frame for social quality Part4: Frame for economical quality ISO 15686 part 1-10 Criteria for the German Sustainable Building Certificate* Quality of the project's preparation.	There is no project part like that in building project documentation.	There is no unified system of legal rules which defines sustainability as part of preparation and planning of the project. It is partly regulated by: • The Act of 19th September 2007 on amending the act – construction law (J. O. No. 191, item 1373). • The Act of 27th April 2001 on environmental protection law (J. O. No. 62, item 627 as amended).	Urban development code and local urban development regulations.	Sustainability codes or norms don't exist in a national level. In Germany one norm about sustainability of construction work is still in progress in Poland it is partly regulated by the law.
						Benchmarks Guideline for sustainability in Europe.

8.1 Engineering and building technology standards

1.8 Quality of process and integration of sustainable aspects						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?	Local plans include guidelines for sustainable urban development.	DIN EN 15643 (Draft) Part2, Part4 prEN 15804 environmental product declaration.	There are not any codes.	All the new and modernized buildings, or complex of buildings or systems cannot be used if they do not comply with requirements mentioned in section 2. Art. 76. 2. The requirements of environmental protection for new and modernized buildings: 1) The implementation of technical means required by the law to protect the environment; 2) The usage of proper technical solutions resulted from the acts and regulations; 3) The obtaining of required regulations about the scope and conditions of using the environment;...	There are not any codes.	Only Denmark, Germany and Poland have standards which describe partly the role of sustainability in construction, tendering and placing.

8.1 Engineering and building technology standards

1.8 Quality of process and integration of sustainable aspects						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?	Local plans include guidelines for sustainable urban development.	Criteria of DGNB - certification: 1. low-waste construction site 2. Low-noise construction site 3. Low-dust construction site 4. Environmental protection at the construction site and DIN EN 15643 (Draft) Part2, Part4 prEN 15804 : environmental product declaration.	No codes defining sustainability for building process. Quality assurance of execution is regulated by Construction Law and under code STR 1.09.05:2002 "Engineering Supervision of Construction of a Structure".	The Ordinance of the Ministry of Infrastructure of 6th November 2008 on amending the ordinance - technical conditions for buildings and their location. The quality assurance of the execution is expressed in the form of the energy performance certificate for buildings and residential unit which is carried out on the basis of: • The Ordinance of the Ministry of Infrastructure of 6th November 2008 on methodology of calculation of the energy performance of buildings and residential unit as well as way of preparing and patterns of their energy performance certificates.	Only in recent times some of local plans include guidelines for sustainable urban development.	Certificates, Construction law or ordinances define sustainability as part of the construction process although not in all countries and sometimes only for energy demand.



8.2 Method of planning, permit and tendering procedures

- Building permit rules
- Tendering rules and laws
- Currently applied planning method
- Conditions and habits of investigation/ funding
- Conditions and habits of operating/ facility management
- Commercial parameters, housing industry key data, urban infrastructure and housing situation
- Demographic analysis of housing needs and the target group of population

2.1 Currently applied planning methods						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.1.1 Describe the currently applied planning methods in your country in short words.	<p>The "Country planning department" - "Landsplanafdelingen" of the Danish Ministry for Environment is responsible for the administration of the Planning Law and develops guidelines and strategies for planning.</p>	<p>Three-phase system of the building land planning right</p> <ol style="list-style-type: none"> 1. Federal law (construction code of law) 2. extent: Federal state law (building code) 3. extent: municipal law (statutes or zoning maps) 	<p>Ministry of the Environment of the Republic of Lithuania is currently responsible for the legal acts and norms related to the territorial and urban planning processes as well as construction works within the country. On a more local level – municipalities are responsible for the development to be in accordance to the laws and norms set by the government, municipalities set some more specific regulations for their areas. The third level would be inhabitants, developers, investors, architects and etc., to comply and conform to the regulations set by the State government and municipalities.</p>	<p>Urban planning in the cities and municipalities is based essentially on two stages of planning: the preparatory land-use plan and the various legally binding land-use plans .</p>	<p>Committee of urban development planning and architecture approves urban development plans. District architects oversee the observance of the regulations and produce urban plans for the separate plots and define the boundaries of the design planning in accordance to the future development of the site. They control the observance of sanitary zones. The third level are inhabitants, developers, investors, architects and etc., to comply and conform to the regulations set by the State government and municipalities.</p>	<p>In all countries a version of a 2 or 3 stage planning system is in place: country, region and local planning, and for the local planning again two stages: Overall and specific plans are developed.</p>

8.2 Method of planning, permit and tendering procedures

2.1 Currently applied planning methods						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.1.2 What local or national planning laws do exist?	Hierarchy in 4 levels: Country level, regional level, municipality level and local (area specific) level.	Construction code of law of the federal republic, the building codes of the federal countries and statutes and orders of the local authority districts.	1. Comprehensive Plan of the Territory of the Republic of Lithuania 2. Republic of Lithuania Law on Territorial planning. 3. Republic of Lithuania Law on Construction 4. 91 Normative Technical Construction Documents (NTCD)	Building Code and Local planning laws. The legally binding land-use plan, as a local law, contains the legally binding designations to control orderly urban development within a specific area.	Urban development code of Russian Federation and norms of the subjects of Russian Federation.	A planning law seems to be covering the systems mentioned in 2.1.1
						Benchmarks

8.2 Method of planning, permit and tendering procedures

2.1 Currently applied planning methods						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.1.3 What kind of energy and sustainable needs are required according to the planning law?	Energy: No requirements, but a possibility to strengthen the BR in local planning.	The energy saving order (EnEV) is a share of the German building law. Standards are prescribed for efficient energy consumption of building or construction projects like residential building, office building and certain factories.	Minimum energy performance requirements : 1. 1) for new buildings; 2) existing buildings that are subject to reconstruction or major renovation and a total useful floor area of which is over 1000 square meters and the price of works done during reconstruction or major renovation in order to upgrade their energy performance makes up to 25 per cent of the value of the building, excluding the value of the plot of land on which the building is situated. Energy performance certification of buildings are mandatory: when constructing, selling or renting out buildings...	Required are electricity, water and sanitary fittings. Fittings of drainage, heating and hot water preparing could be determine.	There are no energy and sustainable requirements according to the planning law.	No regulations in planning laws but in the building codes in most countries.
						Comparison of regionally adapted EU energy directive.

8.2 Method of planning, permit and tendering procedures

2.1 Currently applied planning methods						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)	The employees in the different institutions responsible for each level of the hierarchy mentioned under 2.1.2.	Required documentations for the establishment and change of buildings must be created by a property planner who is required documentation-entitled.	1. Participants of the Territorial planning (licenced specialists) 2. Participants of the construction works Builder, investigator, designer of a construction works, contractor of construction of a construction works, technical supervisor of a construction works supplier...	Entitled to the planning is everyone, who have suitable building power and is a member of the polish engineer's , urban's or architect's chamber.	Only legal entities licensed to perform the respective types of works with subsequent examination of the documents by the State Architectural and Construction Supervision.	Different levels of strictness: From just being employed to be certified by a license. The responsibility is with the authorities.
						Description and simplification of the "how to plan in ..." the different countries.

8.2 Method of planning, permit and tendering procedures

2.1 Currently applied planning methods						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)	<p>This is generally an architectural discipline, but recently also a new university degree: Environmental Planner is producing candidates that take the planner positions.</p>	<p>For the development of the required documentations ordered property planners must be suitable after knowledge and experience for the preparation and monitoring of the respective building project and are responsible for the completeness and usefulness of the planning.</p>	<p>See 2.1.4</p>	<p>In planning process take part architects, structural engineers and sanitary fittings engineers. Architect plan the building and coordinate all trade. He is (after authorization) a representative of investor in bureau.</p>	<p>The lead architect of the project, the lead engineer of the project.</p>	<p>Summary: Specialists: architects, environmental planners or engineers.</p>
						<p>Benchmarks Description and simplification of the "who plans in ..." the different countries.</p>

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.2.1 Describe the building permit procedure in short words. How long is it valid?	The owner or the construction company on his behalf sends in a description of the house to be build including a thermal calculation that shows the building will comply with the energy frame requirement in the BR. With this s/he applies for the building permit. The municipality checks the documentation and if in order issues the permit. Sometimes the permit is issued with some conditions and sometimes specific missing information is requested.	The applicant sends a satisfactory and signed application form to the responsible authority. The authority checks the application for completeness and for accordance with the juridical requirements. In addition, the authority can include external professional experts. Then the authority can approve or not approve. It can also require additional information, calculations or proofs. The building permit is valid for three years.	A permit for construction of a construction works is a mandatory document issued by the county's administration or by the director of the administration of a municipality. In order to obtain a permit to construct, the developer must submit the application of an established form. The construction permit contains the technical data and the purpose of each construction work established by technical construction documents. The construction permit is valid for 10 years.	The investor submits an application for building permit to the bureau of the county. With the application he has to attach the project with agreements. After max. 65 days bureau gives building permit.	Building permits are issued by municipality of the first level in the presence of the project documentation, which passed the state examination. It is valid during the time established in the project documentation. Passage of the state expertise: all project documentation have to be passed in GASN, as well as the land lease contract, charter documents of customer and designer, license of the designer and technical conditions for the connection to the utilities, with the agreement of the network holders of the relevant sections of the project. The official date of the examination - 1 month.	Building permit procedure is a similar procedure in all countries: An application has to be send in to the authority which issues the permit. Validity from 1 to 10 years. In Russia it depends on the project.
						Benchmarks Show comparison of building permit procedure in the guideline.

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)	The drawings and technical information relating to the building regulations.	With the local building application form according to case (exemption, simplified procedure, normal procedure,...) following documents have to be filed: plans descriptions, reasons, specifications, proofs,...	A construction permit contains the data on the structure, as specified in the Annex 2. To obtain the construction permit, the Builder must submit to the Municipality Administration entity the documents as follows: a standard application form (Annex 1 here)	With application must be attached object's of the project with agreements and energy performance.	Land lease contract, expert opinion.	The application has to be followed by documentation showing in sufficient detail the planned project: plan descriptions, specifications, proofs.	Show comparison of all regional necessary documents and application forms in the guideline; english - national application forms.

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.2.3 What kind of national or local building permit rules do exist?	There are different rules according to the complexity of the buildings: 1. Single-family, double-family and summerhouses, 2. Row houses with 3 or more dwellings, 3. Industry or storage buildings or similar, 4. garages and similar buildings not to be used as dwellings. For 2 and 3 types - the fire technical aspects need to be evaluated by the municipality. Except for that all responsibility for the fulfilling of requirements lie on the builder.	See 2.2.1 For the building permit the lower construction supervising body or the local authority district is always responsible.	Normative Technical Construction Document: STR 1.07.01:2002 Statybos leidimas (Construction permit)	The Building Code establishes planning principles and procedural rules. Urban planning in the cities and municipalities is based essentially on two stages of planning: the preparatory land-use plan and the various legally binding land-use plans. Each municipality is responsible for preparing the urban land-use plans for the territory under its control. If the urban land-use plan does not exist, municipality has to publish a decision of development's conditions.	Urban development code and local urban development regulations.	The answers refer to documents that states various regulations, but do not refer any rules for permit as such.

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?	All, who can supply the required information. No.	Applicant is the Proprietor or his representative or a developer. If the Proprietor is not an owner of the building plot, he needs the approval of the plot of land owner. The same laws are also valid for a foreign developer. It is important that the developer has a property planner who is entitled to the template of the building application.	See 2.2.2 In Lithuania the right to be a builder (client or developer) in the Republic of Lithuania shall be enjoyed by natural and legal persons of Lithuania and foreign countries when the developer owns or holds and uses a plot of land; has a prepared, in a prescribed manner and approved construction package of documents for construction operations as well as pertaining maintenance of a construction works; the builder has the construction permit issued in the prescribed manner.	Entitled owner, co-owner, leaseholder (with owner's permit), perpetual user (with owner's permit).	Only customer of the building (legal or private person)	Only the owner of the construction site (or a representative, or a renter) is entitled to apply for a building permit.

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)	Architects and engineers in the different department of the municipality that are involved with the permit.	Proprietor, property planner (if necessary under use of other professional planners and engineers), responsible authority (if necessary under use of certificated test engineers, fire department, neighbours of the building)	See 2.2.7	In the building permit procedure take part investor, owner, co-owner, perpetual users and developer's manager in influence territory.	Administration takes a statement and a set of documents from the land lease contract to the conclusion of the State Architectural and Construction Supervision (GASN).	Show comparison of related laws and persons to building permit procedure.
2.2.6 How does the inspection system work and who checks the documents?	The documents are checked by the responsible persons taken care of each application for a permit – at the municipality level.	The authority is to be carried out entitled special appraisal measures / controls independently (paragraph 3, §§73-78 BbgBauO). See 2.4.2	See 2.2.7	Inspection can check building site accord permission of construction.	State Architectural and Construction Supervision (GASN).	Show comparison of included proofs and - if necessary - related departments for different proofs.

8.2 Method of planning, permit and tendering procedures

2.2 Building permit rules						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.2.7 How much time has the administration to finish the procedure and is there any law to force this?	This varies a lot - from 1 to 3 months - sometimes longer. No law forces a particular length of time.	Simplified proceeding: 4 weeks if all default was kept. Process after Construction notification: 5 weeks (confirmation of entrance of Construction notification: 1 week; execution of construction: one month after entrance of the Construction notification)	Where a construction permit is issued by the County Governor Administration, within 10 days from receipt of the Builder's application the Municipality Administration entity shall turn over to the County Governor Administration the report of the Standing C	The administration has 65 days to finish procedure, according to the Building Code.	Application processing time 10 days.	The time varies from 10 days in Lithuania to 3 and more months in Denmark.
2.2.8 What does a building permit cost?	The municipality can decide whether to charge a cost or not. If it chooses to charge it can be based on a price per m ² , per m ³ or a pct. of the construction costs. However the charge has to be in balance with the actual costs of the municipality to handle the permits.	The expenses of a building permit are directed after the respective tariff systems of the countries / local authority districts. In the tariff systems the expenses are performed for every administrative act. The authorisation expenses for a normal single-family-house amount to approx. 1,800 EURO net.	Free of charge.	Treasury fee amount to 47 PLN (10 Euro). Houses are released.	Building permit is issued free of charge. The cost of the state examination has to be calculated by a special technique.	The building permit can be free of charge, can cost a distinct amount of money or it can have a price per m ² .
						Free of charge, 10 Euro - or higher

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.1 Describe the tendering procedure in short words.	Tender material - documents, etc. are prepared and sent out. The offers are received as closed offers which are opened at a public event where the prices, etc. will be told to everyone. There is a subdivision -individual tender and -combined tender.	According to the EU regulation in the standard form introduced in 2005 for the publication of allocation announcements are valid without other implementation directly in the member states of the EU. - announcement > 200.000€ - bid of tendering < 200.000€	Tendering process, where the finances from municipality, state, EU structural funds are used, have to comply with the Republic of Lithuania Law on Public Procurement (2005 12 22 Nr. X-471, Vilnius). If the private and legal persons are not using the mentioned before funds the tendering of construction works may be done on a direct agreement with a contractor.	Investor submits an application for building permit to the bureau of the county. With the application he has to attach the project with agreements. After 30 days, if bureau have nothing against, construction can begin. Investor must tender the beginning of building's construction in inspection's bureau.	In accordance with the urban planning code. The main procedures are open tendering or auction. Announcement of tender are published in the media 30 days before the tendering takes place.	Tendering has to follow strict national and EU laws: the EU directive is applied for the money amounts, the process is regulated by national law. Minimum 10 days.

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.2 What kind of national or local tendering rules and laws do exist?	Tenders for more than DKK 38,5 mio. Excl. VAT, will have to follow the EU Directive for tendering. For tenders below this value the Danish tendering law will govern. Individual and combined tenders are possible.	For public tenders of public clients are valid special regulations on account of the public procurement law. The procedure is regulated in Germany in: the allocation and contract order for construction works (VOB), the allocation and contract order for performances (VOL) and the allocation and contract order for freelance performances (VOF).	Republic of Lithuania Law on Public Procurement (2005 12 22 Nr. X-471, Vilnius)	Tendering procedure is conducting according to the Building Code. Buildings must allow for land-use plan or decision of development's conditions.	see 2.3.1	Local tendering rules and laws are procurement laws and EU public tendering law. Usually there are stronger rules for public tendering than for private.

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.3 What types of tendering procedure are there? (public building, private building,...)	see above	1. below the EU-guideline (threshold values): public invitation of tenders, limited invitation of tenders after public participation competition, limited invitations of tenders, freehand allocation and 2. above the EU-guideline (threshold values): open procedure, Non-open procedure, Competitive dialog, hearing procedures	According to Republic of Lithuania Law on Public Procurement: public institutions (for public building construction works) organise the tendering procedure. There are several types of tendering procedure, such as: open, limited, competitive dialog, to be announced negotiation or not to be announced negotiation.	To tendering procedure belongs to the object, for example: farming building to 35 m ² and construction span 4,80m; domestic open swimming pool to 30 m ² .	see 2.3.1	Depends on the sum the tender procedure can be: open, limited or direct invitations. See above.
						Benchmarks

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.4 What are the limits for the national tendering process? (in relation to EU)	DKK 38,5 mio> X > DKK 500.000	Building orders: € 5.150.000 delivery order and service orders: € 206.000 delivery order and service orders in the sector sphere: € 412.000 To delivery order and service orders of the uppermost or upper authorities of the federal republic: € 133.00	In 2004 the Law on Construction was amended and equalised the conditions for Lithuanian and EU member states natural (architects and construction engineers) and legal persons, intending to engage in the business of the construction. Normative Technical Construction Documentation is a shifting process which depends upon EU appropriate organisations acting, science and construction progress and changes, as well as the other range of activities involved in this field, such as environmental protection, immovable cultural heritage, protected areas, hygiene, fire protection, energy performance safety, etc.		Only joint ventures with Russia's capital can acquire land in private ownership. Foreign companies can only obtain land on lease.	There are two different limiting amounts of national tender - one for the services (architects and engineers) and one for the building project. Generally lower thresholds in the national rules and sometimes even at a city level (Germany).
						For DK an DE, Services: 66.666 Euro - 206.000. Building orders: EU - tender sum: 5.15 mio Euro.

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.5 Are there any time limits for the tendering procedure?	Each tender is valid for 1 year.	Sufficient deadline also with urgency: not less than 10 calendar dates. Open procedure deadline: 52 calendar dates, at least 22 days. Not open procedure: deadline for delivery of application amounts: 37 calendar days, offer deadline: 40 calendar days. Announcements in the Internet portal of the European Community: deadline can be shortened about 7 calendar days, at least 15 calendar days.	Time limits of construction works are determined by the tendering procedure and signing the contractor agreement.	Bureau has 30 days to publish objections.	Thirty days before tendering, the result is on the day of tendering and in accordance with protocol.	Depending on the the tendering process. Minimum 10 days.
						Show comparison of all national time limits.

8.2 Method of planning, permit and tendering procedures

2.3 Tendering rules and laws						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?	In special situations.	Environmental compatibility audit must be carried out for building project in the proceeding relating to permission. With a flat new building must be kept the EnEV. The client can formulate criteria of the sustainability. The surcharge for an offer should follow taking into account all criteria, as for example quality, price, aesthetics, environmental properties, operating and facility costs, execution deadlines, date observance etc... Not only the lowest offer price can be chosen if there are reasons.	There are no separate codes or requirements. When preparing the documentation for the tendering procedure, it is obligatory to conform with Normative Technical Construction Documents.	No.	Defined by terms of tendering in accordance with urban planning code and local regulations.	Criteria for sustainability can voluntarily implement in tendering and placing.
						Voluntary Implementation of sustainability in tendering and placing in all countries.

8.2 Method of planning, permit and tendering procedures

2.4 Construction process						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.4.1 Are there any rules to comply during the construction?	All construction works in Denmark are governed by "Byggesloven" - The construction law.	The rules are determined in the respective building codes of the countries, fee order for architects and engineers for every phase of the planning and the construction, DIN (German Institute for Standardization) rules.	Essential Requirements for a Construction Works (a part thereof) must be designed and built from such construction products the characteristics of which would satisfy the essential requirements for a construction works for an economically reasonable working life. Essential Architectural Requirements for a Construction Works , Protection of the Environment, Landscape, Immoveable Cultural Heritage Properties and other Types of Protection (Safety), Protection of Interests of the Third Parties.	The construction must be lead according to the Building Code and safety regulations (BHP).	Building codes and regulations, technical regulations adopted at the federal level.	All countries have a building code or construction code to follow.

8.2 Method of planning, permit and tendering procedures

2.4 Construction process						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.4.2 Is there an obligatory checking from the authorities?	Very limited. Arbejdssynet – the official institute that check general working conditions may also check the construction site.	The building control authority is entitled to carry out special building control sanctions on their own, e.g. stop of the construction work.	According to the Republic of Lithuania Law on construction, the State regulation and supervision of the construction is exercised by the public administration entities, such as: 1) on the county level – county's administration, 2) on the national level – the State Territorial Planning and Construction Inspectorate under the institution authorised by the Government.	No.	Yes. Current control inspection by the State Architectural and Construction Supervision in the process of production works.	In principle, there is an obligatory checking from the authorities. Often it is the responsibility of the builder.

8.2 Method of planning, permit and tendering procedures

2.4 Construction process						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?	No restrictions.	Required documentations for the establishment and change of buildings must be created by a planner who is entitled for the required building documentation. The same laws are also valid for a foreign architect and engineers with comparable qualifications and an entry in the chamber or arrangements between the national architect's chambers and engineer's chambers consist.	Manager of construction of a construction works is a natural or legal person any other foreign organisation acting as the agent of the principal – the builder (client). Who manages construction of a construction works, organises construction operations and works related to other main fields of technical construction activities which are carried out by natural person, a legal person, any other foreign organisation hired by him and enjoying such a right.	Building construction can manage a person, who has suitable building power and is a member of the polish engineer's chamber. Foreigners have to be member of the polish engineer's chamber, too.	Construction management is carried out in a general manner by the Service Chief Engineer and Technical Supervision Service, a licensed building organisation. The license is federal. From the first January 2010 the licenses will be cancelled. Qualifying of the organisations will be confirmed by the Regional self-regulatory organisations of the building complex.	In Poland and Germany the entitled architect or engineer (foreigner or resident) must be member of the national engineer's or architect's chambers in the other countries there are no restriction for construction management.
						Show the possibilities to enter the chambers.

8.2 Method of planning, permit and tendering procedures

2.4 Construction process							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
2.4.4 Is there an obligatory construction supervision?	No .	The construction supervising body can carry out entitled special appraisal measures independently.	Technical supervision of construction is mandatory for all construction works (except simple construction works). Such requirement does not apply when carrying out simple repairs of a construction works. And the procedure of carrying out technical supervision of construction shall be established by an institution authorised by the Government. See also 2.4.2	No.	State Architectural and Construction Supervision (GASN).	There are different ways of carrying out the construction supervision. Construction supervision is normal and obligatory in some countries.	Make Supervision part of certificate to ensure correct construction according to plans.
2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?	No restrictions.	The construction supervision is carried out by the construction supervising body or by her authorised audit engineers. No information of second part of questions.	See 2.4.2	Foreigners must have a suitable building power and be a member of the polish engineer's chamber.	There are no special laws for foreign experts. Construction management is engaged by the Service Chief Engineer- general contractor.	From 2010 according to EU Directive 2006/123/EG inspection engineers from EU countries are entitled to do the construction supervision in other EU countries.	Check application of EU directive to national law.

8.2 Method of planning, permit and tendering procedures

2.4 Construction process						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?	For apartment blocks the municipality must issue a "ibrugstagnings-tilladelse" permit that allows starting to use the buildings. Nothing is required for single family houses.	The Proprietor has to advertise the completion of the building measure of the construction the supervising body and to present all necessary documents. There is an obligation to documentation of the building measure	The construction works which have been built are accepted as fit for use by the commission authorised by the Government (annex 3). Therefore cadastral measurements for the construction work (which has been accepted as fit for use) have to be carried out in accordance with the procedure laid down by the Law of the Cadastre of Immovable Property and other legal acts. After the establishment of the cadastral measurements a construction works which has been accepted as fit for use shall be registered in the Republic of Lithuania Register of Immovable Property in accordance with the Law on the Register of Immovable Property.	Before the building can be inhabited, permission for use is required. Energy-Pass, Announcement construction's site manager about according construction to project (Announcement about the end of the works), other permissions (fire department, sanitary departments) are required at the end of the construction works.	Building permit, statements of commissioning of engineering systems and the statement of the commissioning of the facility of the completed construction.	Permission for use is required.

8.2 Method of planning, permit and tendering procedures

2.5 Conditions and habits of operating/ facility management							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?	There are no such kind of rules.	There are no such kind of rules.	Normative Technical Construction Document : STR 1.12.05 :2002 Working life varies, depending upon materials and purpose of construction works. The table in the attachment shows working life of a multifamily building depending upon construction materials.	There are no such kind of rules.	Yes, there is the Law of Russian Federation "The law about associations of the homeowners ", "Housing Code of the RF ", Rules of providing facility services, Rules and standards of for maintenance of housing resources and others.	There are no rules for operating or facility management in the countries.	
2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).	Construction costs vary from 8000 DKK to 18000 DKK per m2.	Operation costs: See detailed information. Construction costs: The costs for a typical single-family-house (without cost of fees, supply and land and planning) amount to approximately 850 -1.500 €/ m².	At the moment multi-family buildings in Lithuania are being built in major cities, such as Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys and resort towns as Palanga, Druskininkai, Birštonas, Šventoji. The prices per sq. meter vary between 720 up to 1740 Euros.	Average cost of constructions amounts 3.895 PLN per m² (866 euro per m²).	Prices for construction depend on many factors - from the market value of the land till the climatic conditions of the area of the construction. Average figures are incorrect.	Construction costs are the highest in Denmark (1.750€) - then comes Germany (1.500€), Lithuania (1.200€) and Poland (850€).	Construction costs: 720 - 2400 Euro/m²

8.2 Method of planning, permit and tendering procedures

2.6 Commercial parameters, housing industry key data, urban infrastructure and housing situation						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?	No - there has been support to solar heating systems - some years ago. Currently a "Bolligforberedningspuljen" has been launched – supporting renovation projects in general – not energy renovation in particular.	Within the scope of laws there are the regulations of the EnEV. The implementation of these standards are supported by support programmes of the federal and of the federal states.	There are no rules to support a decisive (ecological) construction process economically.	No. It's only subsidized thermo modernization.	There are no rules to support a decisive (ecological) construction process economically.	Thermal modernization, solar heating systems or low energy houses are different possibilities to support sustainable energy saving dwellings. Some support in Germany does exist, but not in the other countries.
						EU - wide financial support for sustainable construction.



8.3 Economical and financial basis, industry and quality

- Economical and financial issues
- Sustainability aspects
- Economical energy supply
- Evaluation of current maintenance and operating costs
- Housing development programs of the participating countries
- Management models, owner's structures
- Conditions of real estate management
- Benefit analysis for owners and investors
- Financing and funding instruments and mechanism

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.1.1 How is the private-home ownership rate?	63 % of all houses are private owned and 19 % are owned by non-profit building society. Only 2 % are owned by public authorities. Detached houses are 97% private owned meanwhile multi-dwelling houses have only 32% private owners.	The private property ownership rate in Germany is about 41,6%	Private ownershiprate: 97,2 %; Public ownershiprate: 2,8 %.	Private ownership rate is approximately 48,6%.	Private ownershiprate about 70 %;	Lithuania with 97,2% has the highest private ownership rate. In Denmark the private ownership rate is also remarkable high (97%), but only for detached houses. Germany shows the lowest ownership rate with about 41,6 %.
						Although the private ownership rate is quite high in all countries, it is a need to figure out, if it is a downward or an upward tendency to private ownership to decide which kind of ownership should be considered in the next work packages.

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
3.1.2 What can be generally said about the residential buildings, e.g. - multi-storey buildings vs. detached houses, year of construction, private or public owner respectively hybrid forms such as associations?	<p>Dwellings with 2 -3 rooms are normally for tenants, meanwhile dwellings 4 or more rooms are for private owners.</p> <p>Due to financial upturn in the 60-ties there was a boom in building of detached houses for private owners. In the late 60-ties to approx 1980 when the upturn has cooled down there was a boom in building multi storey buildings for tenants.</p> <p>Private owned or other dwellings make 2.548.240 in 2009. Non-profit dwellings make 526.202 in 2009 which makes 20.65% of the housing market.</p>	<p>The majority of all housing units (approx. 46.3%) was constructed in the years between 1949 and 1978. Approx. 38.3% of the residential units belong to property stock, approx. 53.7% are rented.</p>	<p>About 66% of buildings in Lithuania built in the period from 1961-1990. The administration for common partial property of homeowners: a multi-apartment homeowners' association (17 %); contract on joint activities among homeowners (3 %); an administrator of common property appointed by the municipality (80 %).</p>	<p>The total number of residential buildings in cities is approximately 1780000. 16,8% of them were built after 1988. An average number of flats in a building is 4,6.</p>	<p>Multistorey buildings. About 60% of buildings was constructed between 1960 and 1985.</p>	<p>Denmark differentiates between the amount of rooms of a dwellings: smaller dwellings are normally rented, while dwellings with 4 or more rooms are mostly private. This does not apply to Germany and Lithuania.</p>	<p>Multistorey buildings are represented in all participating countries. In WP 4 it should be concentrated on multistorey buildings of 3-5 levels.</p>

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
3.1.3 What statements can be done about the residential structure, e.g. habitant per sq. km., living space per person, anticipated requirement of residential buildings in the next 5 years, predicted demographic trends for the country or the region?	<p>The population density in Denmark is about 120 persons per km². Living space per person in multi-storey buildings and detached houses: 60 m². The table (see detailed information) shows the completed number of m² in the past 3 years and is such an indication of the anticipated development over the next years.</p>	<p>Habitant per km²: 231. Average floor space of residential units: 89.9 m². Living space per person: 42.9 m². Living space per person will increase to nearly 46 m². The new building of housing units in multi-storey buildings until 2020 proceeds with a quite stable level from approx. 1,5 units per 1.000 inhabitants and is only easily declining until 2020. Until 2050 the total population in Germany will decrease to 69 million inhabitants, at its maximum maybe to 74 million inhabitants.</p>	<p>51,6 habitant per km². Useful floor space per capita, m²: 1996 – 20.4 m²; 2008 – 24.9 m²; useful floor space per capita, m² will increase about 28–29 m² until 2020.</p>	<p>122 habitants per km². Present living space per person: 23,8m². Present space per person will increase to 26m². It is estimated that the Polish population will decrease by 12% till 2050.</p>	<p>7300 habitant per km² in St.Petersburg, 1 level-420 habitant per km², 2 level-35 habitant per km² Living space per person in multi-storey buildings from social standard -10-12 m².</p>	<p>In comparison to the other countries, Germany is most densely populated (twice as Denmark and four times as Lithuania). Denmark's habitants demand the biggest living space per person. Although the population decreases in all countries, they strive to construct new buildings.</p>	<p>The discrepancy between population decrease and enhanced new building activities need to be considered in WP 4.</p>

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.1.4 What can be said about the structure of the households, e.g. age distribution, distribution of income, amount in % for rental costs of net household income, development of the living standard, gross domestic product?	Around 16% (average rent for average size apartment – app. 540 €/mth) , total earnings (excluding nuisance bonus): app. 27 € per worked hour.	The people between 40 and 60 years make the biggest amount of the population. The average net income per household in Germany in 2006 was approx. 2.100 € per month. The average rental costs in 2006 amounted to approx. 22.8 % of net household income.	The working age persons in 2008 were 63,6 % of population. Average income of households per person in largest cities in 2008 was 347,8 €. Monthly rent of 3 rooms flat in Vilnius in 2008 cost from 231,7€ to 637,2€. Gross value added in Lithuanian statistics for households in 2007 was 3473,4 € million	Age: 0÷17 -21,9%; 18÷64 (working age) - 62,9%; older than 60 (women)/ 65 (men): 15,2%. The average net income per household: ~1040€. The average rental cost is 9€ per square meter. (450€ for 50m ² apartment). However the average housing cost for private owners is app. 88€ for one apartment.	No data available.	The level of income is significant different in the participating countries. The lowest approx. net income per month shows Lithuania, but compared with the other countries, the amount for rental costs of the net household income is the highest rate.
						The amount in % for rental costs of the net household income should not exceed a certain level that has to be defined yet (e.g. 25%). To achieve this certain level it is necessary to consider on building costs, financing and promotion.

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.1.5 Are there any regional distinctions or similarities concerning the climate?	In Denmark we generally think the climate is the same all over – but there are areas with a little more sunshine than others and less rain. But the impact on the energy consumption of houses cannot be seen.	There are no significant differences within the German Federal States of the Baltic Sea Region in general.	There are some regional distinctions for the snow and wind effects: under the snow-load values in Lithuania are two districts – in snow load I-st district characteristic values of ground snow load is equal to 1.2 kN/m ² , II district - 1.6 kN/m ² ; according to the wind load values in Lithuania are 3 of wind speed areas - in the I-st area of wind-speed the basic reference value is 24 m / s, II-the district - 28 m / s, the III-- 32 m / s.	All Polish regions have similar climatic conditions. Considerable differences are only in mountain regions at the south (wind and snow loads, average temperatures). The average sun radiation is almost the same in every region.	There are some regional distinctions for temperature 2-5 degrees, windspeed.	There are no significant differences in Denmark and Germany. In Lithuania there are regional distinctions for snow and wind effects.
						Further consideration in WP 4 should have regards for the different climatic conditions in the participating countries.

8.3 Economical and financial basis, industry and quality

3.1 Demographic analysis of housing needs and the target group of population						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.1.6 Construction, maintenance and operation costs per m ² , m ³ ?	<p>Construction cost indices of dwellings – app. 122 for Q4, 2008; The first quarter (Q1) of 2003 the index was 100.</p> <p>Maintenance costs: see 3.4.5</p> <p>operating costs: see 3.4.1</p>	<p>Construction costs for single-family houses ranged from 1,000 €/m² to 1,500 €/m² in 2005. For dwellings in multi-family houses you had to estimate costs of 1,197 €/m² on average in 2005.</p> <p>In 2006 maintenance costs amounted up to 1,000 € per house or flat in more than 60% of the stock. Converted into €/m² it may range from 8 €/m² to 12 €/m². (see also 3.4.5)</p> <p>for operation costs see 3.4.1</p>	<p>Price of living area per m² for 3 rooms dwelling of new construction (about 64 m²)* in 2008 was from 1100,6 € to 1911,5€.</p> <p>Average net monthly earning per person, € in 2008 was 513,5 €.</p> <p>Dynamics of expenses of average family for building maintenance (Furnishings, household equipment and routine maintenance of the house): in 2004 -7,7 €; in 2008-11,8 €.</p>	<p>Construction cost for single family house: 630€/m².</p> <p>Maintenance costs: see 3.4.5</p> <p>operating costs: see 3.4.1</p>	<p>Price of living area 1300-1800 €/m². Maintenance price-12 €/m².</p>	<p>Construction costs are tendentially increasing in all participating countries.</p>
						<p>It should be define an approx. building cost per m² for the pilot project, which for example can differ in each country for certain reasons. In addition to that new building technics should be considered or even developed within the project to work against this trend.</p>

8.3 Economical and financial basis, industry and quality

3.2 Sustainability aspects						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
3.2.1 How is the energy saving/sustainable construction of residential buildings connected with any financial support?	Currently, there is no connection.	The German financial institute (KfW) supports with the program "Energy-Efficient-Construction" the construction of so called "KfW Efficiency Houses". According to KfW the funds are provided up to 100% of the building costs but not more than 50.000 € per housing unit.	For new construction in Lithuania there are no financial supports. Only for modernization (maintenance) of the buildings and for wind power (as an alternative source of energy).	Construction cost for single family house: 630€/m ² . Maintenance costs: see 3.4.5 operating costs: see 3.4.1	There are no financial supports.	Existing financial support models in Germany could be source material to develop promotional programs for all countries. It is figure out whether these programs can be nationally integrated or on EU-basis.
3.2.2 Are there any existing capital allowances regarding sustainability building practice?	There are not any existing capital allowances.	In Germany you can get a variety of tax deductions according to the German Income Tax Act.	Lithuania has developed only the Sustainable Development Strategy. It is added to the general nature of some of the regulations.	There are no capital allowances regarding sustainability building practice.	There are no any existing capital allowances.	Germany offers tax deductions. The other countries have no capital allowances. We have to check if German regulations are applicable to the partner countries respectively to the EU.

8.3 Economical and financial basis, industry and quality

3.3 Economical energy supply						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
3.3.1 What is (how high) the energy consumption per m ² and what is the needed expense per m ² ?	The heating requirements vary a lot. Average 120-150 kWh/m ² /year. Price varies also - depending on source: 0,06 - 0,11 €/kWh. Electricity use is 1.500 - 2.000 KWh/person. Price is 0,29 €/kWh.	The consumption of the private households for living is increased by 3.5 per cent from 1995 to 2005, the monthly expense for energy per household is increased from 86 € in 2000 to 126 € in the year 2008. The average energy consumption per household amounts to 17.530 kWh per year (in 2007). With an average floor space of 89.9 m ² it results in 195 kWh/m ² .	There are 4 categories of houses : 1. New construction, high quality buildings (4,6% of total dwelling stock) - 96 kWh/m ² per year. Average heating price 6,96 €/m ² per year. 2. Dwellings (17,3 % of total dwelling stock) which consumption of energy is 180 kWh/m ² per year. Average heating price 13,08 €/m ² per year. 3. Dwellings (before modernization) with high consumption of heating (55,7 % of total dwelling stock) - 300 kWh/m ² per year. Average heating price 21,72 €/m ² per year. 4. Old construction, dwelling with poor heating insulation (22,4 % of total dwelling stock) - 429 kWh/m ² per year. Average heating price 30,36 €/m ² per year.	In the last 10 years the energy consumption fell from 162 to 146 kWh/m ² . Average heating price equals to 8.70€/m ²	The heating requirements demand from building storage. Average 110-100 kWh/m ² . Price 0,05 - 0,037 €/kWh.	The energy consumption is differently high: Denmark has an annual average consumption of 120-150 kWh/m ² , Lithuania has a consumption of 96 to 429 kWh/m ² and Germany on average 195 kWh/m ² . The term "energy" has to be clearly defined (only heating?). Within the project a maximum requirement/m ² and country has to be specified as an aim which should be achieved.

8.3 Economical and financial basis, industry and quality

3.3 Economical energy supply						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
3.3.2 How was the development of energy costs for private household (incl. TAX) within the last few years?	The energy consumption for heating has fallen 28,6% from 1980 to 2007. Prices per energy unit have been quite stable the last couple of years.	The energy prices rose in the last years. If in 1998 a kWh of electricity costs 15.48 Cent, then in 2008 the amount was on average 21.43 Cent.	Average heating cost in 2008 y. was 51,47 €/MWh, but heating net cost 60,65 €/MWh. Average cost of central heating in 2000-0,03 €/kWh, in 2008-0,05 €/kWh.	The energy prices increased in the last years. Average cost of heating in 1998 - 0,04€/kWh , in 2007 - 0,07€/kWh	Average heating cost in 2007 y. was 0.27 €/ m ² . Average cost of central heating in 2009-0,31€/ m ² .	While the development of energy prices was quite stable in Denmark, prices rose remarkably in Germany (40% in 10 years) and in Lithuania (66% in 8 years). Because of the rising prices it is necessary to save energy: on one hand by changing our consumer attitude and on the other hand by building houses with less energy requirement.

8.3 Economical and financial basis, industry and quality

3.3 Economical energy supply						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.3.3 What is the rate of CO ₂ –emission of the used energy resources of buildings? Dynamics of demand of energy resources per 1 sq. m. of living area (depending on fuel, materials, constructions; during building period and lifetime)	District heating: 36 kg. pr. GJ Natural gas: 0,2 kg/kWh Oil: 0,27 kg/kWh Electricity: 0,55 kg/kWh	brown coal: 0.4 kg/kWh hard coal: 0.33 Kg/kWh heavy heating oil: 0.28 kg/kWh light heating oil: 0.26 kg/kWh natural gas: 0.2 kg/kWh	General structure of emission of used energy resources: - CO ₂ – 56,7 % - SO ₂ – 19% - NO _x – 20 % - Particulate – 3,5% - Other – 0,8 %.	District heating: 0,38kg/kWh, Oil: 0,29kg/kWh, Natural gas: 0,2kg/kWh	Emissions of the most widespread pollutants from stationary sources (2006): Total: 20, 4 million tons; solids - 2,8 million tons, gases and liquids : CO - 6,5 million tons; SO ₂ - 4,7 million tons; NO ₂ - 1,7 million tons, altogether: 17,6 million tons. There are no emissions of carbon dioxide (CO ₂ in multi-family housing (urban housing) , because of the usage of central heating (gas or electricity). In suburban houses (cottages, apartment, etc.) emission level is not counted, because there is no relevant expertise to integrate data.	For the prototype building only energy resources with least CO ₂ -emission should be used. The highest aim of course should be to reduce energy consumption in general, in the best case by using renewable energy.

8.3 Economical and financial basis, industry and quality

3.4 Evaluation of current maintenance and operating costs						
Question	Denmark	Germany	Lithuania	Poland	Russia	Benchmarks
3.4.1 What can be said about the operating costs?	Operating costs: 14 €/m ² covering sanitation, common maintenance and planned and periodic replacement.	The Operating Cost Ordinance forms the legal basis for listing and accounting of operating cost. According to this ordinance operating cost are the cost, which emerge to the owner by the ownership of the estate or by the appropriate use of the building, the auxiliary buildings, assets, mechanisms and of the estate.	The list of operating costs depends on the condition of the building and depends on the building and equipment inside. Average Exploitation expenses 0,09 €/m ² ; administration costs - maximum rate 0,04 €/m ² ; cleaning expenses of common areas in dwellings (depends how many times per week, 1 time about 0,04 €/m ² ; supervision of heating and hot water supply system (depends on conditions of the building, in the buildings of 3 type (see 3.3.1 - Dwellings with high consumption of heating (55,7 % of total dwelling stock)) the cost about 0,07 €/m ² ; ...	Operating costs include: common maintenance, sanitation, planned and periodic replacement.	Operating costs: 1.3 €/m ² including sanitation, common maintenance and renovation	There seems to be no uniform definition of operating costs for the participating countries. The amount of operating costs mostly depends on consumer behaviour. see. 3.4.3

8.3 Economical and financial basis, industry and quality

3.4 Evaluation of current maintenance and operating costs						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.4.2 What kind of performing benchmarks are available?	Benchmarking has been started. First data exists on administration costs.	The internet portal ImmoBench offers analysis tools to compare operating costs in Germany (benchmarks for operating costs, for maintenance costs, for energy consumption).	In Lithuania the specific benchmarks do not exist.	There are no performance benchmarks.	There are standards of different levels. Level Fed.Law № 41 " The State regulation of tariffs for electricity and heat in the RF", Fed.Law № 210" The basis of tariff regulation of municipal utilities" and the level of ministries Gosstroy 170 "Rules and regulations of the technical operation of the housing Fund "	Benchmark data are suited very well for comparison in general. Due to the fact that in DK an LT no dataform for this discussed benchmarks exist by now, it might be considered to initiate/ to trigger an EU-Benchmark database for that, starting with Longlife participating countries.

8.3 Economical and financial basis, industry and quality

3.4 Evaluation of current maintenance and operating costs						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.4.3 Which costs can be listed in the bill of operating costs and which not?	<p>Operating costs:</p> <ul style="list-style-type: none"> 1- taxes, property official 2- water use, plumbing installations 3- 4- 5- 6- 7- cleaning 8- 9- electrical installations 10- 11- insurances 12- renovation, energy use, contribution to LBF, Administration, maintenance, savings for renewal, losses (missing rent), improvement, depreciation, damages on buildings, refurbishment 	<p>Operation costs:</p> <ul style="list-style-type: none"> 1- real estate tax 2- water supply 3- sewage 4- operating, cleaning and maintenance of machines to the supply of heat and warm water or connected installation of heat and warm water supply 5- operating of elevators 6- street cleaning and waste disposal 7- house cleaning 8- garden maintenance 9- lighting 10- chimney cleaning 11- property insurance and liability insurance 12- caretaker. <p>Among the operating costs the administrative and maintenance cost are not ranked.</p>	<p>The costs of operating on the bills are following:</p> <ul style="list-style-type: none"> 1. Water supply 2. Exploitation expenses (operating, cleaning and maintenance of machines to the supply of heat and warm water) 3. Operating of elevators (if such exist in building) 4. Street cleaning and waste disposal 5. Administration costs 6. Cleaning expenses of common areas in dwellings (house cleaning) 7. Lighting 8. The rent of containers for rubbish 9. Electricity expenses of common areas in dwellings <p>Maintenance costs are not ranked.</p>	<p>Operating costs include:</p> <ul style="list-style-type: none"> 1. taxes, 2. water supply, 3. sewage, 4. operating, cleaning, maintenance of facilities to water and heating supply. 5. operating of elevators 6. street cleaning and waste disposal, 7. house cleaning, 8. garden maintenance, 9. lighting 	<p>Operation costs:</p> <ul style="list-style-type: none"> 1- heating 2- water supply 3- sewage 4- operating of elevators 5- street cleaning and waste disposal 6- house cleaning 7- radio 8 - TV 9- caretaker. 	<p>The definition of operating costs is different in the participating countries. Special cost groups (e. g. maintenance and administration costs) are partly included and partly excluded.</p>
						<p>In connection with 3.4.1 it can be seen that the term "operating costs" is used very differently. In WP 4 it is imperative to find a general, transnational definition (possibly referring to the German Operating Cost Ordinance), especially with regard to profitability calculations that have to be made in the next working steps.</p>

8.3 Economical and financial basis, industry and quality

3.4 Evaluation of current maintenance and operating costs						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.4.4 How was the development of maintenance and operating costs in the last few years?	Quite stable, but 2 to 3% per year.	Construction price index for conventionally constructed new residential buildings in Germany was up 2.0% compared with February 2008. In November 2008, the price index increased 2.7% on a year earlier. Compared with November 2008, the price index for residential buildings rose up 0.3% in February 2009.	No data.	There is no data available.	Maintenance and operating costs rose from 2006 in 1.5 time.	Actually, there is no real data available. In Denmark, the development seems to be stable, Germany is only able to supply data according to the construction price index.
3.4.5 What are the costs of maintenance and administration costs?	Maintenance: 17.50 €/m ² . Administration: 401 €/m ² per year.	Costs of maintenance and administration costs are listed in the Second Computation Ordinance. Actual costs of the housing company can differ considerably.	Maintenance costs depends on the year the building was built, the administration costs the same (see 3.4.1).	The cost of maintenance depends on the age of the building and the structure type.	For the owner or tenant of apartment direct operating costs depend on the occupied space, and maintenance costs of public spaces make economic sense of the overheads.	Actual costs may differ from possibly existent standardized values.
						A general statement is not possible by now. It is a need to figure out in WP 4 if that can be unified with fixing certain standards.

8.3 Economical and financial basis, industry and quality

3.4 Evaluation of current maintenance and operating costs						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.4.6 What can be said about stability of value and life cycle costs? (development)	<p>The general picture is: → Value decreases → maintenance and repair → value increases a little → this is repeated a few times → Then a mayor refurbishment is made and value increases to start value or higher → and the pattern is repeated.</p>		No data available.	No data available.	<p>There are not such kind of statistical researches in Russia.</p>	
						<p>Life cycle costs and stability of value are criterias to evaluate the sustainability of buildings. How should "Life cycle costs" equally listed in the participating countries? That should be worked on in WP 4.</p>

8.3 Economical and financial basis, industry and quality

3.5 Housing development programs of the participating countries							
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary	Benchmarks
3.5.1 What kind of financial support does exist for owners and lodgers/renters, respectively for construction of residential buildings?	For social housing: Special loans and a percentage support of 7% to be covered by the local authority For other types: None.	For owners and for the construction of residential buildings there are federal means and funds but also state means and funds as well as subsidies from local authorities. For lodgers and renters there are rent subsidies or income-oriented support.	Not for new construction (only for some social groups). According to modernization program the State support for residents is up to 15 % (for implementation of energy saving means).	There is a federal financial support for modernisation (energy saving) of residential buildings. The State covers part of loan for implementation of energy saving solutions.	For certain groups of citizens identified social benefits to pay for housing and communal services, which, of course, protects them, but does not contribute to energy saving. On the other hand there is a public-private partnership, providing solidarity funding energy-saving measures.	There is financial support for social housing in every country. Modernisation is supported in Lithuania and in Germany. In addition to that, new building is also promoted in Germany.	It is necessary to check whether the existing kinds of support are applicable to the other countries or to the EU. Additionally, the supporting programs must be analysed if they need to be adapted to actual conditions, needs and trends.
3.5.2 Who is the target group for these supporting programs?	The tenants.	The target groups are owners, tenants and constructors.	Social supported groups, as pensioners, low income persons and etc. The Law on Cash Social Assistance for Low-income families (single residents) exists in Lithuania.	The target group are owners.	Social supported groups, like pensioners, low income persons.	Tenants are supported in all countries. Additionally, there are other target groups (owners, constructors) in Germany.	Different supporting programmes for different target groups are to be found out.

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3.6 Management models, owner's structures						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.6.1 How can the structure of ownership, i.e. the proportion of "classic" real estate manager and yield-oriented investors be described?	The majority of apartments for renting are owned by social associations.	About 10 million units of accommodation are managed by professional-commercial offerers. About 80 % of it belong to the stock of cooperatives, municipal enterprises as well as private-economical housing enterprises. The remaining part is allotted to public housing enterprises or churches.	Private ownership 97,2 %; Public ownership 2,8 %. The Civil Code (2005) stipulates three forms of administration for common partial property of homeowners (see 3.1.2).	The majority of residential buildings are managed by homeowners' associations, which can hire a professional manager / administrator.	According to some expert estimates 50% of the new constructed houses in Moscow and St. Petersburg is used as a yield-oriented houses for the rent.	Since the private ownership rate is very high in Lithuania, it only can be considered the dwelling stock in Denmark and Germany: Most of the apartments in Denmark are rented by social associations. In Germany, nearly 50% of the dwelling stock belong to enterprises in the form of capital companies and others (banks, funds,...) that are yield-orientated.
						It might be necessary to discuss how important the owner structure and therefore the management model are for the development of sustainability property.

8.3 Economical and financial basis, industry and quality

3.6 Management models, owner's structures						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.6.2 What are the procedures to make a decision within owners' associations?	Democratic – election of board members – holding of general assembly.	In Germany we have different management models according to housing industry. So the procedures to make a decision depend on the form of the corporation.	To accept the decision in the meeting of tenants there have to participate more than 50 %+1, and the decision is accepted if half of the participants are voting positively. The same procedure is valid for other forms of ownership, not only for associations. "The Law On Multi-family Apartment Home Owners' Associations"	The decision is made by the majority of votes. Votes are distributed between members either proportionally to their share in the property or according to the principle 1 member = 1 vote.	In Russia there are 2 types of owners' associations: housing owners partnership and management companies. Housing owners partnership is a non-commercial voluntary association of owners of residential and non-residential rooms in the multi family house. Making of the decision, as well as different types of activities (e.g. works and services for maintaining and repairing buildings) in the partnership provides the elected administration of the partnership. The management company - is a legal organization, that provides administration by prior agreement with the tenants.	Procedures to make decisions are quite uniform in Lithuania (democratic majority decisions) because of the high private ownership rate. In Germany there are different forms of cooperations with different decision makers. In Denmark decisions are made democratically by the organs of the association which seems to be quite similar to Germany.
						Benchmarks see 3.6.1.

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3.7 Condition of real estate management						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.7.1 What are national distinctions in the tenancy law?	The tenancy law in Denmark is: "Lejeloven".	In Germany there are no national distinctions in the tenancy law. The legal basis is the German Civil Code ("Bürgerliches Gesetzbuch, BGB")	The Land Tenancy Law is not valid in Lithuania since 2001. The tenancy law for foreign consulars regulates, that it is possible to rent the state land for foreign consulars or diplomacy offices for not more than 99 years. Private plots of land lease contract is a determined agreement between the lessor and lessee. Also in Lithuania the tax system for land exists.	The tenancy in Poland is regulated by Civil Code.	Foreign citizens, persons without russian citizenship can own land located within the territory of Russia on the right of land lease, except as provided in this Code (Land Code, Art. 22, p.1)	In Denmark and Germany exist a defined tenancy law for the entire country. The tenancy law in Lithuania is not valid anymore. There are existing regulations for special groups (e.g. foreign consulars). Tenancy law should not have national distinctions. We have to find out, which are the similarities between the law in the partner countries e.g. according to the structure of the rent and possibilities for rent increase.

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3.7 Condition of real estate management						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.7.2 How was the development of the rental prices in the last few years?	The prices increased between 0,5% to 2,7% from 2005 to 2006 depending on the type of dwelling.	From 1990 till 2006 the rental prices have increased. In Westgermany the rate of increase represents more than 60 %. Initiated by the revolution (1989/90) in Eastgermany the rental prices have increased more than 1,000 %.	Average values of monthly rental costs in Vilnius (but not in the centre of town) in 2004 was ~350 € (3 rooms (about 64 m ²), in 2008 was from 231,70 € to 637,20 €.	The prices increased by 20% from 2006 to 2008 depending on the type of dwelling.	Data on Russia's capital Moscow. Every year during the season in Moscow rental rates increase. Minimum was \$ 50. During the season in 2006 prices increased immediately at \$ 100. In February, 2007 the price of apartment in Moscow region - 800\$	Rental prices increased varyingly strong.
						These significant differences in rental prices must be considered in the formulation of standards for the prototype.

8.3 Economical and financial basis, industry and quality

3.8 Benefit analyses for owners and investors						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.8.1 What are the models of calculation of profitability? Examples.	Generally cost and expenses are calculated but loans are included with an amortization calculation, in some cases using a net present value method.	There are two general methods, the static (e.g. profit/cost comparison, profitability comparison and static amortization calculation) and the dynamic methods (discounted cash flow method, annuity method, internal rate of return method and the complete financial plan).	Static methods: profit comparison calculation respectively cost comparison calculation; profitability comparison calculation; static amortization calculation dynamic methods: net present value method/discounted cash flow method; annuity method; internal rate of return method; complete financial plan.	Static and dynamic methods of calculations: Accounting Rate of Return, Net Present Value, Modified Rate of Return, Internal Rate of Return, Profitability Index.	There are several methods of calculation of profitability. In the construction the calculation is based on estimates, which are based on the collections of uniform pricing (EHIP, FER) for production and work, etc. The main methods of calculation are as follows: 1. The method of direct calculation 2. Analytical method; 3. The method of combined calculation.	Static and dynamic calculation methods are known in all countries.
						In newer days calculation must follow a dynamic way to take developments (increase and decrease) and variations during the period under review into consideration. This could be price changes, interest changes or rent increase.

8.3 Economical and financial basis, industry and quality

3.9 Financing and funding instruments and mechanism on local/regional/national/ EU level for housing development /such as public privat partnership (PPP)						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.9.1 What are the financing instruments respectively financial supports? Supporting instruments for house owner and renter/lodgers (see above).	Special loans are available. Support for social housing from the municipalities by law. For private homes 80% can be financed through "realkredit"-loans.	Financing instruments can be classified in equity capital financing (self- or stake-financing), debt capital financing (bank loans/credits, funding loans/credits, subsidies, building society saving loans) and others (PPP, property developer, private assembly).	Before April 2009 , it was a high financial state support for the modernization of the buildings, up to 50% (depend of implemented means, which helps to save energy in the building). After new regulations, it is only up to 15%.	Bank loans/credits, subsidies, grants, PPP.	Internal sources - a refinancing or contributions. External sources: state support through energy saving programs, bank loans, funds from international cooperation programs and others.	In Denmark special loans and support for social housing are provided. Lithuania offers grants for modernization. Germany has different supporting instruments (loans, grants etc.).
						Typical financing instruments are loans and grants. They are known in all countries and easy to handle so that they should be a major part of the financing for the prototype building.

8.3 Economical and financial basis, industry and quality

3.9 Financing and funding instruments and mechanism on local/regional/national/ EU level for housing development /such as public privat partnership (PPP)						
Question	Denmark	Germany	Lithuania	Poland	Russia	Summary
3.9.2 How to make investment decisions and for which time period these decisions are planed and are validly?	<p>A total economy calculation is made where the investments are compared to the savings over the coming years - for which the economical value is calculated to its present value.</p>	<p>PRO POTSDAM created a calculation based on the discounted cash flow method and the complete financial plan. The observation period comes to 15 years. If the result is positive the investment can be done. If the investment is planned to be put into action in the future it is necessary to calculate again because circumstances can change (e.g. interest rates, buildings costs, ...).</p>	<p>To make an investment decision in construction it is needed to make a calculations and business plan. To prepare all documents it takes about 2 years (starting from detailed plans+2 years). In Construction Law of Lithuania mentioned, that the permit for construction (from the date of receiving the permit) valid 10 years.</p>	<p>Investment decisions are preceded by the profitability calculations. The chosen calculation method and analyzed time period depends on the type of investment.</p>	<p>Necessary conditions for investment are contained in the "Methodological recommendations for evaluation of the effectiveness of investment projects and take them to finance", M.: 2000. The paper examines indicators such as net present profit, internal rate of return, profitability index, discounted payback period, etc. The validity is the performance of the obligations to achieve the financial result, defined in the relevant contract.</p>	<p>Due to the fact that it is so important for the profitability of a property project how investments decisions are made, in WP 4 should be discussed an implementation on a standard "investment decision model" for all participating countries.</p>

9. Authors, corresponding authors

The work was done by three transnational competence teams which consist of the appropriate specialists of each involved country (see Figure 1). All partner countries are represented in every competence team.

The team 1 deals generally with engineering standards, building technology and planning and consists of universities.

The team 2 deals generally with administration procedures, permit rules, tendering and laws and consists of administration and state structures.

The team 3 three deals generally with the economical basis, as well as with project development, project management and project financing and consist of investors and building societies.

TEAMS			regional team	regional team	regional team	regional team	regional team
			GERMANY	POLAND	LITHUANIA	RUSSIA	DENMARK
transnational	University	specialists ↑ TEAM 1 technology, energy, planning	University Berlin	University Gdansk	University Vilnius	University St. Petersburg	Cenergia
	Administration	specialists ↑ TEAM 2 administration procedures	InvestitionsBank des Landes Brandenburg (ILB)	Municipality of Gdansk	Housing and Urban Development Agency	Joint-stock company ,Hypothecary Agency of Leningrad oblast	Roskilde Kommune
	Investor/ Building Society	specialists ↑ TEAM 3 industry, costs, quality	ProPotsdam GmbH	City Development Company	Building Planning Systematics Centre	North-West-Inter- Regional Center ABOK	Boligselskabet Sjælland

Figur

Berlin Institute of Technology, Institute of Architecture, Department design and structure, Germany, represented by Professor Dr.-Ing. Klaus Rueckert is the Lead Partner of the project Longlife and responsible for the project and the financial management. The lead partner is engaged in the fields of the realization of sustainable, resource saving, energy saving projects and a specialist in planning and construction of buildings.

The leader of Work Package 3 Analysis and Comparison is Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Poland represented by Professor Dr. Jacek Tejchman-Konarzewski.

The structure of the three competence teams is the following:

Team 1	Universities - present the science Engineering and building technology standards
Team leader	Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Professor Dr. Jacek Tejchman-Konarzewski
Team members	
Denmark	represented by Cenergia, Dr. Ove Christen Mørck
Germany	Berlin Institute of Technology, Institute of Architecture, Department design and structure, Professor Dr.-Ing. Klaus Rueckert and the Tutors Anna Potapova, Sophie Michel, Gang Liu and Ingo Nolte
Lithuania	Vilnius Gediminas Technical University, Department on Engineering Architecture, Professor Dr. Josifas Parasonis, Dr. Natalija Lepkova
Poland	Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Professor Dr. Jacek Tejchman-Konarzewski, Dr. Marek Kraczek
Russia	Saint Petersburg State University of Architecture and Civil Engineering, Professor Vasiliy Goryunov, Professor Tamara Datsuk, Dr. Elena P. Selezneva

Team 2	Administrations - present the politics Procedures and methods of planning, permit and tendering procedures
Team leader	Roskilde Municipality, Technical and Environmental Department, Planning Division, Denmark, Peter Krarup
Team members	
Denmark	Roskilde Municipality, Technical and Environmental Department, Planning Division, Denmark, Peter Krarup and external service, Cenergia, Ove Morck
Germany	Centre of Competence for Major Housing Estates, Ralf Protz
Lithuania	Housing and Urban Development Agency, Housing department, Specialist of urban planning, Valius Serbenta, Simona Irzikeviciute
Poland	Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Professor Dr. Jacek Tejchman-Konarzewski, Dr. Marek Kraczek
Russia	Hypothecary Agency of Leningrad oblast, Saint Petersburg, Alexey A.Polyakov, Witali Smirnov

Team 3	Investors and housing associations - present the economy Economical and financial basis, industry and quality
Team leader	Pro Potsdam GmbH, Germany, represented by the chairman, Horst Mueller-Zinsius
Team members	
Denmark	Housing association of Zealand, Søren Peter Nielsen

Germany	Berlin Institute of Technology, Institute of Architecture, Department design and structure, Professor Dr.-Ing. Klaus Rueckert
Lithuania	Building Planning Systematics Centre, Josifas Parasonis
Poland	Gdansk University of Technology, Department of Fundamentals of Building and Material Engineering, Professor Dr. Jacek Teichman-Konarzewski, Dr. Marek Kraczek
Russia	North-West Inter-Regional Center, AVOK, Professor Alexander M. Grititlin, Marina Grititlina

The country coordinators of the national units are responsible for the coordination of the work in the unit. They are also members in the steering committee. Please, see the structure:

Denmark	Coordinator of the national unit
	Roskilde Municipality, Technical and Environmental Department, Planning Division, Peter Krarup
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Lithuania	Coordinator of the national unit
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Poland	Coordinator of the national unit
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Russia	Coordinator of the national unit
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- Part 6: Final energy demand of ventilation systems and air heating systems for residential buildings
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11. Glossary






Annual Primary Energy Demand

The annual primary energy demand is energy which is needed to cover the annual demand of primary energy used for running the whole building system like heating, ventilating, heating water and the external process chain of the building.

	DE	Jahresprimärenergiebedarf
	DK	Årligt primær energiforbrug
	LT	Metinis pirminės energijos poreikis
	PL	Roczne zapotrzebowanie na energię pierwotną
	RU	Удельный расход тепловой энергии на отопление здания за отопительный период






Anthropogenic Greenhouse Effect

CO₂ is the number one human-produced heat-trapping gas that contributes most to the increasing temperature on Earth. It is produced by fossil fuel burning, cement production and tropical deforestation.

	DE	Anthropogener Treibhauseffekt
	DK	Anthropogener Treibhauseffekt
	LT	Antropogeninis šiltnamio efektas
	PL	Antropogeniczny efekt cieplarniany
	RU	Парниковый Эффект





Atmospheric Greenhouse Effect

Certain gases (e.g. carbon dioxide, methane, water vapor, nitrous oxide) in the atmosphere cause a rise in temperature on earth. Without these gases the heat/energy of the sun would be emitted into space and the average temperature on earth would be colder.

	DE	Atmosphärischer Treibhauseffekt
	DK	Atmosfærisk drivhuseffekt
	LT	Atmosferinis šiltnamio efektas
	PL	Atmosferyczny efekt cieplarniany
	RU	Парниковый Эффект

Building Application

Request for a building permission in order to implement a building project.

	DE	Bauantrag
	DK	Byggeansøgning
	LT	Statybos leidimo prašymas
	PL	Pozwolenie na budowę



RU

Разрешение на строительство

Building Control Authority

An office with the authority to control the approval of building plans. It ensures that these plans match the regulations and targets of the City and building regulations.



DE

Bauaufsichtsbehörde



DK

Byggesagsafdeling



LT

Statybų kontrolės tarnyba



PL

Nadzór Budowlany



RU

Комитет по Градостроительству и Архитектуре

Climate Change

Climate change is a statistical change of weather patterns over a certain period of time. Climate Change can occur regionally or around the world and can appear as warmer or colder temperatures or as a change in the amount of the annual rainfall.



DE

Klimawandel



DK

Klimaændring



LT

Klimato kaita



PL

Zmiany klimatyczne



RU

Изменение климата

Climate Responsive Building

Considering the local resources during the planning process and adjusting the building design to the local climate. The aim is an optimum of indoor temperature and to prevent damage caused by climatic circumstances.



DE

Klimagerechtes Bauen



DK

Klimarigtigt byggeri



LT

Palankus klimatui pastatas



PL

Zrównoważone budownictwo



RU

Застройка, отвечающая требованиям климатических характеристикам

Comfort Zone

The state at which man can spend the minimum energy adjusting to his environment.



DE

Komfortzone



DK

Komfortzone



LT

Komforto sritis/zona



PL

Strefa komfortu








RU

Комфортные условия






Construction Area (CA)

The Construction Area (CA) is the total amount of floor space of the rising building elements. The dimensions of the construction components at the height of the floor, like external walls, internal walls, pillars, including plaster but no elements like skirting boards.

	DE	Konstruktionsgrundfläche (KGF)
	DK	-
	LT	Užstatytas plotas
	PL	Plac budowy
	RU	Площадь застройки






Conversion (Redevelopment) Potential

The potential of a building to alternate from its previous use, respectively the possibility to modulate easily its original floor-plans in order to suit the requirements of the occupant. E.g. variable floor plans in case of children moving out or grandparents moving in.

	DE	Umnutzungspotential
	DK	Renoveringspotentiale
	LT	Konversijos potencialas
	PL	Możliwość przebudowy
	RU	Реновационный (Реконструкционный) Потенциал Здания






Cost Effective Architecture

Is a term that refers to the economical approach to design techniques in the field of architecture. It seeks to minimize construction and operation costs by enhancing efficiency and moderation in the use of material, energy and development space, yet it ensures high quality architecture.

	DE	Kostengünstiges Bauen
	DK	Totaløkonomisk projektering
	LT	Ekonomiška architektūra
	PL	Architektura opłacalna ekonomicznie
	RU	Экономически Эффективная Застройка (Архитектура)






Cubic Index

Cubic Index = Gross volume (m³) ÷ plot area (m²)

	DE	Baumassenzahl
	DK	Rumfang/volumen per m ²
	LT	Kubinis indeksas
	PL	Współczynnik kubatury
	RU	Отношение общего объема зданий к его общей площади (K2)






Downcycling

Downcycling is converting used materials into products of lower value, or the re-use of a product for alternative purposes. E.g. plastic recycling or the use of crippled masonry as flint in a concrete aggregate.

	DE	Downcycling
	DK	Nedbrydning / genanvendelighed
	LT	Perdirbimas
	PL	Downcycling
	RU	Переработка отходов






Ecological Building

The attempt to assign principles of nature like circular flow and energy efficiency to the building industry.

	DE	Ökologisches Bauen
	DK	Økologisk Byggeri
	LT	Ekologiškas pastatas
	PL	Budownictwo ekologiczne
	RU	Экологическое здание






Ecology

Ecology is the interdisciplinary scientific study of the interactions between organisms.

	DE	Ökologie
	DK	Økologi
	LT	Ekologija
	PL	Ekologia
	RU	Экология






Effective Area (EA)

The effective area (m²) is the area of the house which the occupant may actually use, in other words it is the area that serves buildings because of its purpose.

	DE	Nutzfläche (NF)
	DK	Anvendeligt boligareal
	LT	Naudingasis plotas
	PL	Powierzchnia użytkowa
	RU	Полезная площадь (Sp)






Energy Efficiency

Energy efficiency is the optimal benefit of using energy, considering adequacy and ecological compatibility.

	DE	Energieeffizienz
	DK	Energieeffektivitet
	LT	Energinis efektyvumas
	PL	Wydajność energetyczna
	RU	Энергоэффективность






Energy Performance Certificate (EPC)

Energy Performance Certificates (EPCs) give information on how to reduce carbon dioxide emissions and improve the energy efficiency of a building. All houses bought, sold or rented should require an EPC.

	DE	Energieausweis
	DK	Energimærke
	LT	Energinio naudingumo sertifikatas
	PL	Świadectwo Charakterystyki Energetycznej
	RU	Энергетический паспорт здания






Energy-Plus Building

A term applied to a house that produces a surplus of energy during a certain time of the year with zero net energy consumption.

	DE	Plusenergiehaus
	DK	Energi Plus bygning
	LT	Energiją gaminantis pastatas
	PL	Budynki Energy-Plus
	RU	Экономически эффективная застройка






Energy Standard

The energy standard of a building defines the annual energy demand in relation to m² of living space of the evaluated house.

	DE	Energiestandard
	DK	Energistandard
	LT	Energijos/Energetinis standartas
	PL	Standard energetyczny
	RU	Энергетический стандарт






Final Energy

Final energy is the actual portion of primary energy which reaches the consumer considering the loss of transmitting and converting energy. E.g. gas or electricity.

	DE	Endenergie
	DK	Bruttoenergi
	LT	Galutinė energija
	PL	Energia końcowa
	RU	Топливо (Конечная Энергия)






Final Energy Demand

Energy consumption of the entire building system in the house, including heating, ventilation, water heating and energy loss of the building systems. Climatic conditions and vacancy are considered.

	DE	Endenergiebedarf
	DK	Bruttoenergiforbrug
	LT	Galutinės energijos poreikis
	PL	Zapotrzebowanie na energię końcową
	RU	Энергетическая потребность здания






Floor-Space Index (FSI)

Floor-space index = Floor space area (m²) ÷ plot area (m²)

	DE	Geschoßflächenzahl (GFZ)
	DK	Bebyggelsesprocent
	LT	Patalpų ploto indeksas
	PL	Współczynnik powierzchni kondygnacji
	RU	






Functional Area (FA)

The functional area (m²) serves the placing of the technical installations in a building

	DE	Funktionsfläche
	DK	Funktionsområdeareal (FA)
	LT	Funkcinis plotas
	PL	Powierzchnia usługowa
	RU	Площадь обслуживающих (технических) помещений






Global Warming

A term which relates to the increase in the average temperature of the near earth atmosphere and oceans, primarily caused by emitting heat-trapping gases, like CO₂, methane etc.

	DE	Globale Erwärmung
	DK	Global opvarmning
	LT	Pasaulinis atšilimas
	PL	Globalne ocieplenie
	RU	Глобальное потепление






Gross External Area (GEA)

Gross External Area (GEA) describes the total amount of sqm of all floor plans of one building. The Gross External Area is to be calculated floor by floor.

	DE	Brutto-Grundfläche (BGF)
	DK	Bruttoetageareal
	LT	Bendrasis išorės plotas
	PL	Kubatura brutto
	RU	Общая площадь (Собщ)






Gross Value

The total value of goods, products and services reduced by the amount of advanced input in the manufacturing process of an economic area.

	DE	Bruttowertschöpfung
	DK	Bruttoværdi
	LT	Bendroji vertė
	PL	Produkt krajowy brutto
	RU	Общая стоимость застройки

Internal Heat Source






Internal heat sources in a building can be humans, light bulbs, computers etc.

	DE	Interne Wärmequelle
	DK	Intern varmekilde
	LT	Vidinis šilumos šaltinis
	PL	Wewnętrzne źródło ciepła
	RU	Внутренние источники энергии

.






Land Development Plan

A map that defines the modalities and general land-use types of the planned building project. It can show lots, the building height etc.

	DE	Bebauungsplan
	DK	Strukturplan for byudviklingsområde
	LT	Teritorijos plėtros planas/ Detalusis planas
	PL	Plan zagospodarowania przestrzeni
	RU	Генеральный план; проект развития территории






Life Cycle Of A Building

Is the life span of a building, which involves the construction process, the utilization phase, the tearing down and the recycling of the building.

	DE	Gebäude-Lebenszyklus
	DK	Bygningslivscyklus
	LT	Pastato gyvavimo trukmė
	PL	Okres użytkowania budynku
	RU	Жизненный цикл здания






Local Public Infrastructure

To make the site (building) accessible to the occupant, e.g. access to the road system, access to Electricity or water delivery system.

	DE	Erschließung
	DK	Byggemodning
	LT	Vetinis viešasis transportas
	PL	Infrastruktura transportowa
	RU	Региональная (местная) инфраструктура






Low-Energy House

A house with a low energy consumption which still requires some form of outside energy.

	DE	Niedrigenergiehaus
	DK	Lavenergi hus
	LT	Mažai energijos vartojantis pastatas
	PL	Budynek niskoenergetyczny
	RU	Дом с низким энергопотреблением






Microclimate

A microclimate is a local atmospheric zone where the climate differs from the surrounding area. Microclimates can exist in urban areas where brick, concrete, and asphalt absorb the sun's energy, heat up, and radiate the heat to the surrounding air.

	DE	Mikroklima
	DK	Mikroklima
	LT	Mikroklimas
	PL	Mikroklimat
	RU	Микроклимат






Net Internal Area

The net internal area (m²) is the effective area beset with the construction components.

	DE	Netto-Grundfläche (NGF)
	DK	Nettoetageareal
	LT	Vidaus plotas
	PL	Powierzchnia wewnętrzna netto
	RU	Внутренняя площадь здания (Свн)






Net Floor Space Area (NFSA)

The net floor space area is a part of floor space area between surrounding and internal construction components. Net floor space area = Effective area + Functional area + and traffic area ; (NFSA=EA+FA+TA)

	DE	Nettogeschossfläche (NGF)
	DK	-
	LT	Patalpų bendrasis plotas
	PL	Powierzchnia kondygnacji netto
	RU	-






Non-Profit Building Society

Is a term used for an association that has the aim to provide its members with low-priced living space.

	DE	Wohnungsbaugesellschaft
	DK	Boligselskaber
	LT	Ne-pelno siekianti statybų organizacija/bendrija
	PL	Wspólnota mieszkaniowa
	RU	Некоммерческое строительное общество, общество с ограниченной ответственностью (ООО)






Passive House

Passive houses produce all the energy they consume (heat exchange: body heat, light-bulb heat, appliance heat). In addition, they are well insulated and ventilated.

	DE	Passivhaus
	DK	Passivhus
	LT	Pasyvus energijos vartojimui pastatas
	PL	Budynek pasywny
	RU	Пассивный дом






Primary Energy

Primary energy is energy found in nature, like coal, gas or wind. It has not been subjected to other transformation processes.

	DE	Primärenergie
	DK	Primærenergi
	LT	Pirminė energija
	PL	Energia pierwotna
	RU	Природная (первичная) энергия






Preparatory Land-Use Plan

A plan which shows the future urban planning targets of a township.

	DE	Flächennutzungsplan
	DK	Kommuneplan/lokalplan
	LT	Paruošiamasis žemės panaudos planas
	PL	Plan zagospodarowania przestrzeni
	RU	Общая концепция планировки территории

Recycling

Processing used materials into new products to prevent waste.

	DE	Recycling
	DK	Recycling - genanvende
	LT	Perdirbimas
	PL	Recykling / recykliczacja
	RU	Переработка






Resource

A resource can be any physical, energetic or virtual entity. For the most part the term refers to financial resources, land, raw material, and energy, labour or labour time.

	DE	Ressource
	DK	Ressource
	LT	Ištekliai
	PL	Zasób
	RU	Ресурсы






Secondary Energy

Energy that has been subjected to other transformation processes (which causes an energy loss).
E.g. Electricity

	DE	Sekundärenergie
	DK	Sekundær energi
	LT	Antrinė energija
	PL	Energia wtórna
	RU	Вторичная энергия






Site Occupancy Index (SOI)

Index which defines the maximum-area on site that can be build on. Site occupancy index = building area (m²) ÷ plot area (m²)

	DE	Grundflächenzahl (GRZ)
	DK	Bebyggelsesprocent
	LT	Užstatyto ploto indeksas
	PL	Stopień zabudowy działki
	RU	Плотность застройки






Social housing (Low Cost Housing)

Social housing is a general term referring to rental housing which may be owned and managed by the state, by non-profit organizations, usually with the aim of providing affordable / rent-controlled housing.

	DE	Sozialer Wohnungsbau
	DK	Alment boligbyggeri
	LT	Socialinis būstas
	PL	Budownictwo socjalne
	RU	Социальное жилье






Solar Gain

A term which refers to the increase in temperature in a space, object or structure that results from solar radiation. The solar gain increases with the strength of the sun, and with the ability of any material to transmit or resist the radiation.

	DE	Solarer Gewinn
	DK	Passiv solvarme
	LT	Saulės energijos išgavimas
	PL	Solarer Gewinn
	RU	Солнечный нагрев






Solar House

A solar house uses solar technologies to convert sunlight into usable heat with little use of other energy sources.

	DE	Solarhaus
	DK	Solhuse
	LT	Saulės energiją vartojantis namas
	PL	Budynek solarny
	RU	Солнечный дом





Summer Heat Protection

Good insulation prevents the building from heat-overload, caused by solar radiation. As far as possible the improvement shall be made without air conditioning.

	DE	Sommerlicher Wärmeschutz
	DK	Undgåelse af overtemperaturer/overophedning
	LT	Apsauga nuo vasaros karščio
	PL	Ochrona przed przegrzaniem budynku
	RU	Защита от солнца

Sustainability






In a broad sense sustainability is the capacity to endure. For man it is the potential for long-term maintenance of wellbeing, which in turn depends on the responsible use of natural resources. There is a wide range of measures for sustainability like cultural acceptance, feasible technologies, generationally awareness, environmentally consciousness, viable financing etc.

	DE	Nachhaltigkeit
	DK	Bæredygtighed
	LT	Tvarumas
	PL	Rozwój zrównoważony

 RU Устойчивость






Thermal Comfort

Thermal Comfort is a state of mind that expresses satisfaction with the surrounding environment. Temperature, air moisture, airflow, air quality, clothes and building materials are important aspects of thermal comfort.

	DE	Thermische Behaglichkeit
	DK	Termisk komfort
	LT	Šiluminis komfortas
	PL	Komfort cieplny
	RU	Тепловой комфорт






Thermal Resistance

Also known as coefficient of thermal insulation is the reciprocal of conductance. ($\text{m}^2 \cdot \text{K} / \text{W}$)

	DE	Wärmedurchlaßwiderstand (d)
	DK	Termisk modstand
	LT	Terminis/karščio atsparumas
	PL	Opór cieplny
	RU	Сопротивление теплопередаче (R_0)






Traffic Area (TA)

The traffic area (m^2) provides access to the rooms, and can be used as an emergency exit.

	DE	Verkehrsfläche (VF)
	DK	Gangområder
	LT	Judėjimo plotas
	PL	Powierzchnia ruchu
	RU	-






Transmission coefficient / Overall Heat Transfer / U-Value

Measure of the amount of heat flow that will occur across a unit area of an enclosure system or other assembly for a unit temperature difference, i.e. a system conductance that includes both surface films. $\text{W} / (\text{m}^2 \cdot \text{K})$

	DE	Wärmedurchgangskoeffizient (U-Wert)
	DK	Transmissionskoefficient - samlet varmetabstal
	LT	Perdavimo koeficientas
	PL	Współczynnik przenikania ciepła
	RU	Коэффициент теплоотдачи (α_{int})






Upcycling

Upcycling is converting used materials into high quality products, or the re-use of a product with similar value. E.g. glass can usually be upcycled into the same quality as the original product.

	DE	Upcycling
	DK	Upcycling
	LT	Perdirbimas
	PL	Upcykling
	RU	Переработка отходов

Zero-Energy Building

Zero energy buildings are autonomous from the energy grid supply. Energy is produced on-site. Not considered is the energy which has been used to build the house.

	DE	Null-Energiehaus
	DK	0-energi bygning
	LT	Nulinės energijos pastatas
	PL	Budynek zero-energetyczny
	RU	Здание с нулевым энергопотреблением

12. Abbreviation

Terms and Definitions:

symbol	unit	English
f	-	factor
η	-	performance ratio, efficiency, utilisation factor
B	m	width
L	m	length
A	m ²	area
V	m ³	volume
m	kg	mass
Q	kWh	energy
a	a	year
t	h, h/a	time, time period, hours
d	d, d/a	time, time period, days
Q	J	Heat is a form of energy associated with the movement of molecules. Units are as for energy.
Φ	W	Heat flow is heat transferred by time
q	W/m ² or J/(s·m ²)	Heat flux or density of the heat flow rate is the heat flow per unit area. The area is perpendicular to the direction of heat flow.
λ	W/m·K	Thermal conductivity is a material property that indicates the quantity of heat flow across a unit area, through a unit thickness for a temperature gradient of 1K.
Λ	W/(m ² ·K)	Thermal conductance is the time rate of heat flow through a unit area of a body induced by a unit temperature difference, or the conductivity of a material for given thickness.
R	(m ² ·K)/W	Thermal resistance (also coefficient of thermal insulation) is the reciprocal of conductance.
U	W/(m ² ·K)	Transmission coefficient (also overall heat transfer or U-Value) is a system of measure of the amount of heat flow that will occur across a unit area of an enclosure system or other assembly for a unit temperature difference, i.e.; a system conductance that includes both surface films.
C	J/K	Heat capacity
c	kJ/(kg·K) or J/(g·K)	Specific heat capacity is a measure of the amount of heat that a unit mass of dry material can store. It is defined as the heat energy required to raise the temperature of 1 g of material by 1 Kelvin.
μ	-	μ -value - water vapor proof is the resistance of the material used for the water vapor transfer.
ρ	(kg·m ⁻³)	ρ -value- bulk density is defined as the mass of many particles of the material divided by the total volume they occupy.
ϑ	°C	Celsius temperature
e	-	expenditure of energy
α	-	coverage part

Indexes:

symbol	unit	English
V		ventilation
T		transmission
S		solar
I		internal
DHW		domestic hot water
H		heating
HE		heat energy demand
TE		thermal energy
AE		auxiliary energy
ce		control and emission
d		distribution
s		storage
g		generation
HR		heat recovery
reg		regenerative energy
aux		auxiliary
tech		technical

Examples:

Q		annual heat energy demand
Q_p	kWh/a	annual primary energy (P) demand
Q_H	kWh/a	annual heat energy demand
Q_{DHW}	kWh/a	annual domestic hot water energy demand

Areas:

shortcut	definition	English
FSI	floor space area (m ²)/plot area (m ²)	floor-space index
SOI	building area (m ²)/plot area (m ²)	site occupancy index
GV	m ³	Gross Volume
CI	gross volume (m ³)/plot area(m ²)	Cubic index
GEA	m ²	Gross External Area
CA	ground-plan area (m ²) of construction components inside of floor space area (like external walls, internal walls, pillars)	- construction area
NIA	net internal area (m ²) is the effective area inside of the construction components	= net internal area
FA	functional area (m ²) serves for placing of technical installations	- functional area
TA	traffic area (m ²) serves as access to the rooms, traffic inside of the building and as a emergency exit	- traffic area
EA	effective area (m ²) serves for the use of the building because of its purpose	= effective area
NFSA	net floor space area is a part of floor space area between surrounding and internal construction components . It is the sum of effective area, functional area and traffic area (NFSA=EA+FA+TA)	net floor space area

other abbreviations:

LP	Leadpartner
WP	Work Package
PP	Project Partner
preEN	preliminary Euro Norm
KfW	Kreditanstalt für Wiederaufbau

13. Annexes

13.1 Details Denmark

- Engineering and buildings technology standards in Denmark
- Method of planning, permit and tendering procedures in Denmark
- Economical and financial basis, industry and quality in Denmark

1.1 Architectural and Urban Design – Denmark PP11

1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?

There are totally 2,735,000 houses in Denmark. 40 % are detached houses, 14 % are terraced, linked or semi-detached houses, and 38 % are multi-dwelling houses.

Dwellings by region, type of dwelling and time

Number of units	
All Denmark	
Farm houses	127 795
Detached houses	1 060 880
Terraced, linked or semi-detached houses	359 812
Multi-dwelling houses	1 019 893
Student hostels	35 966
Residential buildings for communities	13 189
Other residential building	24 674
Unknown	347
Occupied weekend cabins (2005-)	15 273

1.1.2 What can be generally said about the residential buildings (e.g. year of construction, private or public owner respectively hybrid forms such as associations)?

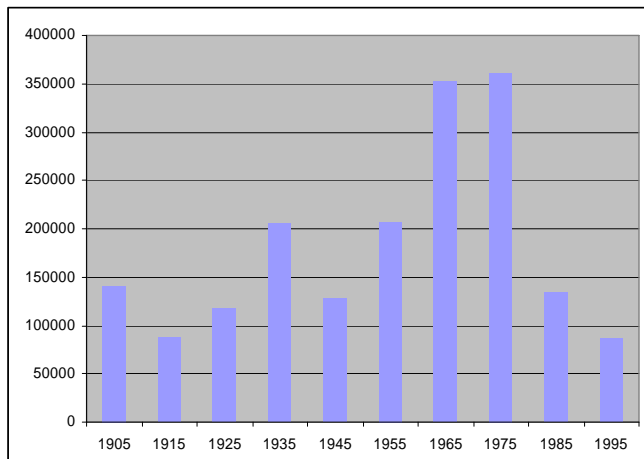
63 % of all houses are private owned and 19 % are owned by non-profit building society. Only 2 % are owned by public authorities.

Half of all multi-storey and detached housing units are constructed before year 1955 and 2/3 before the first building energy requirement was introduced in the Danish building regulation. Number of newly constructed dwellings is about 10.000 a year.

Detached houses have 97% private owners meanwhile multi-dwelling houses have only 32% of private owners.

Multi-storey buildings and detached houses constitute 80% of the total housing stock in Denmark with equal parts of each.

The year of construction is shown in the following diagram:



Ownership by housing type

	Detached houses	Multi-dwelling houses
Individuals inclusive partnerships	1022909	140760
Non-profit building society	9464	362425
Limited liability company, etc.	11546	97790
Housing societies	7654	140527
Public authorities	3697	25210
Owner-occupied flats	1165	210064
Other or unknown	4445	43117

1.1.3 What is the common architectural design of residential buildings (pictures, drawings, floor plan, view)?

Danish homes are architecturally very different. Single family houses are typically detached houses built with brick or concrete. Accommodation is typical in blocks of three storeys with a total of 24 to 36 apartments. In recent years timber structures is used more extensively.

drawings and floor plan, 4 types will be supplied:

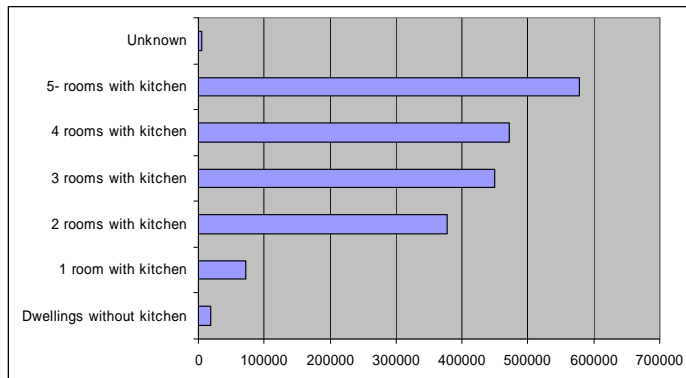
For rent there are dwellings for elderly people, dwellings for young people and dwellings for families, for ownership exists the typical single family house.

1.1.4 What are the common requirements for living spaces? (number of rooms, number of persons per household, sq m per person, height of different rooms, min area of the living room, information about usual living spaces)

There is no general requirement for the size of living space.

- 42 % of all housing units including flats have kitchen and 2-3 room and 53 % have kitchen and 4 – 5 rooms.
- The average number of persons in dwellings is 2.1.
- 60.0 average sqm per person
- Typical room height in new dwellings is 2.35 m.
- A typical housing unit consists of a kitchen one or two or bathroom with toilet, a living room and a number of bed rooms.

Number of rooms per dwellings (Multi-storey buildings and detached houses)



Number of units in multi-storey buildings and detached houses: 2,080,773

Number of sq.m. of multi-storey buildings and detached houses: 217,523,000

Number persons in multi-storey buildings and detached houses: 4,266,000

Sq.m. per persons in multi-storey buildings and detached houses: 60 sq.m.

1.1.5 Are there any building envelope design limitations (e.g material, windows, etc.)?

Not in general, but it can be made by local planning.

All new buildings have to comply the Danish building regulation and the requirements in the local planning.

Window surface area generally lies between 20 and 25% of floor area.

1.1.6 Are there any specific standards (e.g. elevator, cellar, entrance, etc.)?

Some can be made by local planning and some rules exist:

Elevator: when more than 2 floors.

Cellar: No information.

Bell/ intercom: It is standard in all new buildings.

Required rooms: Kitchen, bathroom with toilets and living room.

Garage/ parking space: req. set by local planning authorities.

Concierge servis: No information.

Flat or slanted roof: No requirements.

Bicycle cofort: No information.

1.1.7 What are the definitions or guidelines for roof design?

A number of guidelines do exist.

1.1.8 What are the functional guidelines (space efficiency, reusing ability, accessibility, and bicycle comfort)?

Rules for the maximum percentage of land area that may be built.

1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?

No general requirement, but can be made a local requirement (declarations) when land is sold.

1.1.10 What kind of requirements is defined for barrier free construction? Name of the code?

No requirements.

1.1.11 Which plans control the local urban and architectural design, what are the common criteria and where can they be found?

No general requirement, but it can be made a local requirement (declarations) when land is sold.

1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept?

The social guidelines are described in the local plan for the area.

1.1.13 What criteria should be involved to describe the quality of the urban area of the site?

Distance to public transportation, schools, shops, noise ratio, green spaces, bicycle paths, parking.

1.2 Structural Design – Denmark PP11

1.2.1 What are the climatic conditions?

storms, floods: approx. 1-2

number hours of sun annually: 1495

temperature development p. a.: 7,7 oC

annual rainfall: 712 mm

annual snow depth: The design criteria for snow must comply with Eurocode standard: EN 1991-1-3

number of heating degree days: 3112.

annual sun radiation in kWh/m²: 1014kWh/m²

The design external temperature: -12 oC

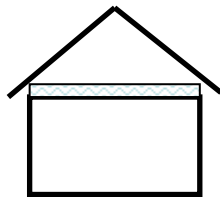
average day temperature: 10.9 oC

average night temperature: 4.3 oC

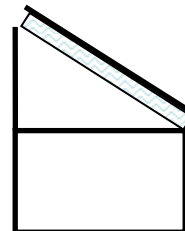
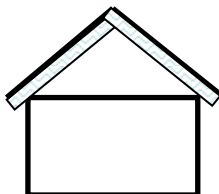
Days with rainfall: 121 days

1.2.2 What types of roof structure are used in residential houses?

Ventilated roof with timber frame.



Massive roof – tilted and flat roof.



1.2.3 What types of load bearing structure are used in residential houses?

Timber frame

Concrete beam

Load bearing walls

1.2.4 Is there any national code to calculate load structures?

Yes. Eurocodes.

1.2.5 How highly-developed are the industrial prefabricated materials?

Quite high.

1.2.6 How is the proportion between handcraft building method and industrialised building?

The industrial part is growing – had to assess the present percentage.

1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?

Economy and quality

1.3 Energy standards – Denmark PP11

1.3.1 Is there any national code for Energy efficiency of buildings?

There is a requirement for maximum energy need in new residential building for space heating, domestic hot water, cooling, pump and fans.

The energy must not exceed $Q < (70+2200)/A$, kWh/m²a where A = treated floor area.

Besides two low energy classes are defined:

Class 2: $(50+1600)/A$, kWh/m²a

Class 1: $(35+1100)/A$, kWh/m²a.

1.3.2 What is average specific heat consumption of residential buildings in kWh/m²a?

The energy for space heating, domestic hot water, cooling, pump and fans in new buildings must not exceed $(70+2200)/A$, kWh/m²a where A = treated floor area.

1.3.3 Is there any national code for thermal insulation of buildings?

The energy requirement in new building must follow 1.3.2. In addition the following heat loss coefficient must not exceed:

external wall: 0.40 W/m²K

floor: 0.30 W/m²K

roof: 0.25 W/m²K

windows: 2.00 W/m²K

1.3.4 What method is implemented to calculate energy demand?

The energy demands must be verified by the calculation tool: Be06 Developed by the Danish Building Research Institute. The method complies with „Thermal performance of buildings – Calculations of energy use for heating and cooling (ISO 13790). [1]

1.4 Building materials – Denmark PP11

1.4.1 What kind of building materials are used for: roof structure, load bearing structure, foundation, external wall, internal wall, floor, ceiling, façade, windows, thermal insulation?

All external surfaces are insulated by either mineral or glass wool.

The roof structure is made of timber frame construction with tiles, etanit or roofing felt, concrete slab with roofing felt or wooding prefab elements. Load bearing structure can be timber frame or concrete beam. Foundation always is made of concrete. External walls are made of timber frame, light concrete or bricks. Floors are constructed of concrete or wooden prefab elements. Windows can be 2-layer low energy or 3-layer low energy.

1.4.2 What are the reasons of the material usage?

Economy, architecture, tradition and regulation

1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?

New products are developed constantly: windows, building elements, HVAC equipment. The energy standards are strengthened every 5th year currently.

1.4.4 Is there any ecological declaration of building materials

Yes, ecoflower and swan.

1.4.5 What criteria are involved in this declaration? ? (health risks, potentials to accumulate or to abolish the ozone layer, potentials for greenhouse effect, potentials for acidification and overfertilization, risks for the local and global environment)

Health risk, green house effect.

1.4.6 Are there any declarations or codes for waste materials?

Yes, it is part of the declaration 1.4.4.

1.5 Building physics – Denmark PP11

1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?

U-values, Thermal conductivity λ -value $[W/(m \cdot K)]$, U-value $[W/(K \cdot m^2)]$

1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?

Danish Building Regulation “kapitel 6 Indeklima” includes thermal indoor air quality, indoor air quality (ventilation, emission from materials, others), acoustic indoor quality and lighting (daylight and electric lighting):

SBI-anvisning 182: “Indeklimahåndbogen” (Handbook - Indoor air quality) [2]

1.5.3 What requirements are defined for acoustic comfort? Name of the code?

See 1.5.2

1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?

See 1.5.2

1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?

In residential buildings a satisfactory indoor climate must be achieved by ventilation, with a minimum requirement for air change rate in different type of room.

1.5.6 What requirements are defined for the building envelope? Name of the code?

The air leakage must not exceed 1.5 l/sm² at 50 Pa pressure test.

1.5.7 What requirements are defined for fire prevention? Name of the code?

The Danish Building Regulation “kapitel 5 Brandforhold”. [3]

1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?

Ventilation for buildings – Design criteria for the indoor environment. Below ground, there should be particular attention to the floor sealing against the soil to minimise risks of radon penetration.

1.5.9 What criteria are involved to determine Energy Efficiency of building?

Energy demand for space heating, U-value;

The construction must be protected against moisture condensation (vapor barrier) to secure good indoor air quality.

1.6 Technical facilities and services – Denmark PP11

1.6.1 What kind of heating energy sources are used in residential houses?

62 % of all residential units are heat supplied by district heating, 14 % with central heating with oil, 15 % by central heating with natural gas, and 5 % are heated by electricity.

1.6.2 What kind of heating system is used in residential houses? Central heating, district heating etc.? What kind of heating generators are used?

In residential houses the kind of used heating energy sources:

district heating – 78,5%;

different heating – 21,3%;

no heating – 0,2%

heating generators

gas boilers

oil boilers

1.6.3 What kind of cooling system is used in residential houses?

There is no cooling in residential buildings.

1.6.4 What type of ventilation system is used in residential houses?

Natural ventilation, mechanical exhaust air ventilation, mechanical ventilation with heat recovery.

1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)

No requirements for maintenance and cleaning in residential buildings.

1.6.6 What requirements are defined for water supply and domestic sewage?

Specifications for installations inside buildings conveying water for human consumption - DS/EN 806-1

1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.

Target in household: 100 l/day per person.

1.6.8 What requirements are defined for security? Bulger security in doors, in windows?

There is no data available to define the requirements for security.

1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels to heat, cool or ventilate buildings? (percentages of total energy demand)

Renewable energy in the form of biomass are used in even greater extend in district heating - Production of renewable energy, etc. represents in 2004 14.2% of gross energy consumption in Denmark. In 1990, the proportion of renewable energy in the district heating production were 31.6% (including biomass 10.3 % and waste 20.0%).

1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?

Biomass in district heating.

1.6.11 How popular is the usage of renewable heat sources in residential houses?

There are no renewable heat sources used in energy supply systems of residential buildings.

1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.

Energy consumption for space heating has fallen 13% from 1980 to 2004. The decline occurred even though the heated area in the same period grew 23.8%.

1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?

Pumps and fans are included in the calculation of the energy consumption of residential building to meet the energy requirement in the Danish building regulation.

1.7 Quality of process and integration of sustainable aspects – Denmark PP11

1.7.1 If there exist “Energy Performing Certificates” for houses in your country which standards signifies these certificates? Show example.

There is one compulsory labelling system in Denmark for houses - "Energimærke".

1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?

0-energy houses

plus-energy houses

Svanemærket

1.7.3 Which standards signify a “low energy house”, “passive house”, “zero energy building”?

Passiv House certificate accordingly to the German Passivehaus Institute.

1.7.4 Following up procedure of the performance of the building energy system

There isn't any following up procedure of the performance of the building energy system.

1.8 Definition of quality standards – Denmark PP11

1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?

Usually the target on sustainability is described in the local district plan.

1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

Local plans include guidelines for sustainable urban development.

1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?

Local plans include guidelines for sustainable urban development.

References – Denmark PP11

- [1] ISO 13790. Thermal performance of buildings – Calculations of energy use for heating and cooling
- [2] Danish Building Regulation “kapitel 6 Indeklima” SBI-anvisning 182: “Indeklimahåndbogen” (Handbook - Indoor air quality)
- [3] Danish Building Regulation “kapitel 5 Brandforhold”

2.1 Currently applied planning methods – Denmark PP11

2.1.1 Describe the currently applied planning methods in your country in short words.

The "Country planning department" - "Landsplanafdelingen" [1] of the Danish Ministry for Environment is responsible for the administration of the Planning Law and develops guidelines and strategies for planning, see:

<http://www.lpa.dk/Venstremenuen/Plantyper/kommune-planlaegning/Informationstyper/Vejledninger/Vejledninger.htm>

2.1.2 What local or national planning laws do exist?

Hierarchy in 4 levels: Country level, regional level, municipality level and local (area specific) level

2.1.3 What kind of energy and sustainable needs are required according to the planning law?

Energy: No requirements, but a possibility to strengthen the BR in local planning

2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)

The employees in the different institutions responsible for each level of the hierarchy mentioned under 2.1.2

2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)

This is generally an architectural discipline, but recently also a new university degree: Environmental Planner is producing candidates that take the planner positions.

2.2 Building permit rules – Denmark PP11

2.2.1 Describe the building permit procedure in short words. How long is it valid?

The owner or the construction company on his behalf sends in a description of the house to be build including a thermal calculation that shows the building wil comply with the energyframe requirement in the BR. With this s/he applys for the building permit.

The municipality checks the documentation and if in order issues the permit. Sometimes the permit is issued with some conditions and sometimes specific missing information is requested.

2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)

The drawings and technical information relating to the building regulations.

2.2.3 What kind of national or local building permit rules do exist?

There are different rules accoring to the complexity of the buildings: 1. Single-family, double-family and summerhouses, 2. Row houses with 3 or more dwellings, 3. Industry or storage buildings or similar, 4. garages and similar buildings not to be used as dwellings. For 2 and 3 types - the fire technical aspects need to be evaluated by the municipality. Except for that all responsibility for the fullfilling of requirents lie on the builder.

2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?

All, who can supply the required information. No.

2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)

Architects and engineers in the different department of the municipality that are involved with the permit.

2.2.6 How does the inspection system work and who checks the documents?

The documents are checked by the responsible persons taken care of each application for a permit – at the municipality level.

2.2.7 How much time has the administration to finish the procedure and is there any law to force this?

This varies a lot - from 1 to 3 months - sometimes longer. No law forces a particular length of time.

2.2.8 What does a building permit cost?

The municipality can decide whether to charge a cost or not. If it chooses to charge it can be based on a price per m2, per m3 or a pct. of the construction costs. However the charge has to be in balance with the actual costs of the municipality to handle the permits.

2.3 Tendering rules and laws – Denmark PP11

2.3.1 Describe the tendering procedure in short words.

The rules can be downloaded here: <http://www.ebst.dk/byggeregler> [2]

There is a subdivision

- individual tender and
- combined tender (samlet udbud)

Tender materials - documents, etc. are prepared and sent out. The offers are received as closed offers which are opened at a public event where the prices, etc. will be told to everyone.

2.3.2 What kind of national or local tendering rules and laws do exist?

Tenders for more than € 5,2 mio (DKK 38,5 mio. Excl. VAT), will have to follow the EU Directive for tendering. For tenders below this value the Danish tendering law will govern. Individual and combined tenders are possible.

2.3.3 What types of tendering procedure are there? (public building, private building,...)

See above

2.3.4 What are the limits for the national tendering process? (in relation to EU)

DKK 38,5 mio > X > DKK 500.000

2.3.5 Are there any time limits for the tendering procedure?

Each tender is valid for 1 year.

2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

In special situations.

2.4 Construction process – Denmark PP11

2.4.1 Are there any rules to comply during the construction?

All construction works in Denmark are governed by "Byggeloven" - The construction law: Read more:

http://www.ebst.dk/love_byggeloven/0/7/0 [3]

2.4.2 Is there an obligatory checking from the authorities?

Very limited.

Arbejdstilsynet – the official institute that check general working conditions may also check the construction site

2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?

No restrictions.

2.4.4 Is there obligatory construction supervision?

No.

2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?

No restrictions.

2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?

For apartment blocks the municipality must issue a "ibrugstagningstilladelse" permit that allows starting to use the buildings. Nothing is required for single family houses.

2.5 Operating/ facility management – Denmark PP11

2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?

There are no such kind of rules.

2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).

Construction costs vary from 8000 DKK to 18000 DKK per m2.

Operation costs

Heating: Oil, gas, district heating

Electricity: - per m2 - per person in the household

For new buildings designed and constructed according to Danish BR

2.6 Commercial parameters, housing industry key data – Denmark PP11

2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?

No - there has been support to solar heating systems - some years ago. Currently a “Boligforberedningspuljen” has been launched – supporting renovation projects in general – not energy renovation in particular.

2.7 References – Denmark PP11

- [1] "Country planning department" - "Landsplanafdelingen":
<http://www.lpa.dk/Venstremenuen/Plantyper/kommune-planlaegning/Informationstyper/Vejledninger/Vejledninger.htm>. 2009-6.
- [2] tendering procedure downloaded: <http://www.ebst.dk/byggeregler>. 2009-6.
- [3] "Byggeloven" - The construction law: http://www.ebst.dk/love_byggeloven/0/7/0. 2009-6.
- [4] source: <http://www.dst.dk>. 2009-6.

3.1 Demographic analysis of housing needs and the target group of population – Denmark PP12

3.1.1 How is the private-home ownership rate?

Ownership by housing type:

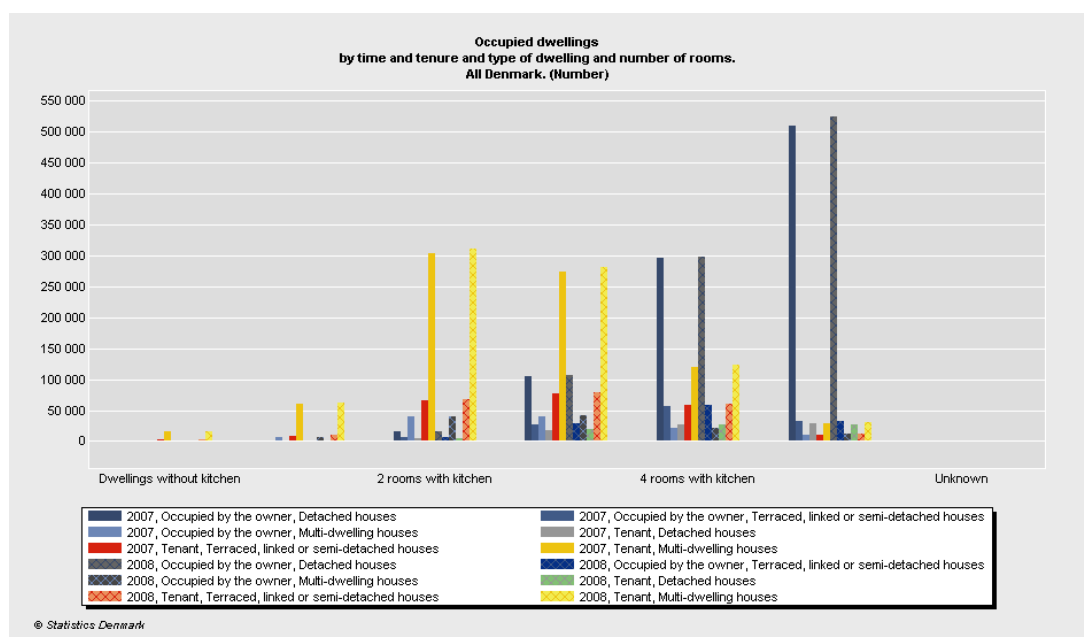
	Detached houses	Multi-dwelling houses
Individuals inclusive partnerships	1.022.909	140.760
Non-profit building society	9.464	362.425
Limited liability company, etc.	11.546	97.790
Housing societies	7.654	140.527
Public authorities	3.697	25.210
Owner-occupied flats	1.165	210.064
Other or unknown	4.445	43.117

3.1.2 What can be generally said about the residential buildings, e.g. - multi-storey buildings vs. detached houses, year of construction, private or public owner respectively hybrid forms such as associations?

Dwellings with 2 -3 rooms are normally for tenants, meanwhile dwellings 4 or more rooms are for private owners.

Due to financial upturn in the 60-ties there was a boom in building of detached houses for private owners. In the late 60-ties to aprox 1980 when the upturn has cooled down there was a boom in building multi storey buildings. for tenants.

Private owned or other dwellings make 2.548.240 in 2009. Non-profit dwellings make 526.202 in 2009 which makes 20.65% of the housing market.



3.1.3 What statements can be done about the residential structure, e.g. habitant per sq. km., living space per person, anticipated requirement of residential buildings in the next 5 years, predicted demographic trends for the country or the region?

The population density in Denmark is about 120 persons per km². Living space per person in multi-storey buildings and detached houses: 60m².

This table show the completed number of m² in the past 3 years and is such an indication of the anticipated development over the next years:

Population in Denmark the last 3 years:

Type of building	region	year of commencement	2006	2007	2008
New	Denmark	Same year	2 369 263	1 692 934	1 652 495
New	Denmark	1 previous year	4 213 208	4 720 249	4 068 934
New	Denmark	2 previous years	1 139 910	1 350 845	1 989 042

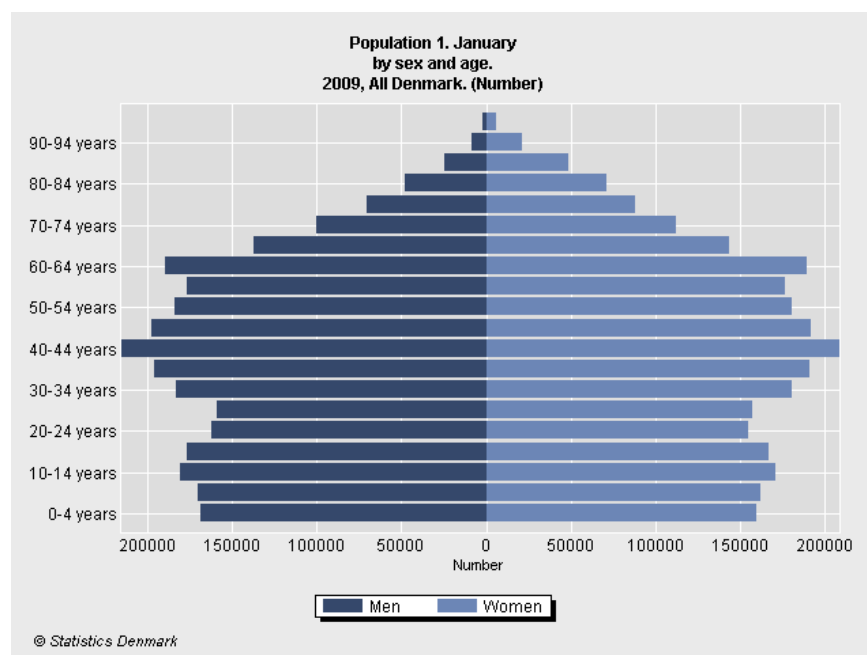
Population 1. January by region and timeUnit: Number

	2007	2008	2009
All Denmark	5 447 084	5 475 791	5 511 451
Province København by	648 889	656 582	667 228
Province Københavns omegn	503 407	504 481	508 183
Province Nordsjælland	441 318	441 849	444 215
Province Bornholm	43 135	42 913	42 659
Province Østsjælland	232 200	232 459	233 605
Province Vest- og sydsjælland	583 918	586 968	587 647
Province Fyn	480 616	482 410	484 346
Province Syddjylland	709 201	712 249	715 321
Province Østjylland	804 878	812 373	820 558
Province Vestjylland	422 550	424 668	427 174
Province Nordjylland	576 972	578 839	580 515

3.1.4 What can be said about the structure of the households, e.g. age distribution, distribution of income, amount in % for rental costs of net household income, development of the living standard, gross domestic product?

Around 16% (average rent for average size apartment – app. 540 € /mth) , total earnings (excluding nuisance bonus): app. 27 € per worked hour.

age distribution:



distribution of income:

Median, total earnings (excluding nuisance bonus) in DKK per worked hour:

sex	2005	2006	2007
men	204.88	211.89	222.17
women	186.33	192.78	204.86

Income by type of income, unit, region, owner/ tenant of dwelling and time

	2006	2007
1 Income, total (3+5+6+9+26)		
Average income for all families		
All Denmark		
Occupied by the owner	570 468	603 167
Tenant	288 968	295 714

Amount in % for rental costs of net household income is around 16% (average rent for average size apartment – 4000 DKK/mth)

For development of the living standard see more at:

<http://www.statbank.dk/statbank5a/default.asp?w=1680> [1]

Household members by age, sex, the ability of the household to make

ends meet and time	2005	2006	2007
Very difficult, difficult	7	8	7
Somewhat difficult	12	10	10
Fairly easy	25	23	22
Easy	36	38	40
Very easy	21	21	21

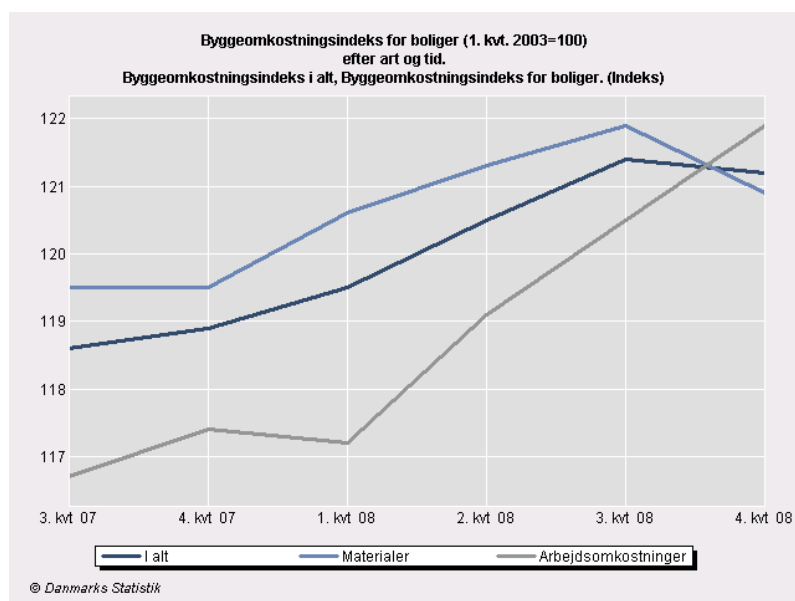
Gross domestic product is 120.786 per cap.

3.1.5 Are there any regional distinctions or similarities concerning the climate?

In Denmark we generally think the climate is the same all over – but there are areas with a little more sunshine than others and a less rain. But the impact on the energy consumption of houses cannot be seen.

3.1.6 Construction, maintenance and operation costs per m², m³? The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years. The dynamic of price development of living area per sq.m and the average salary in participating countries, Dynamics of expenses of average family for building maintenance, Dynamics of expenses of average family for building maintenance.

Costruction cost indices – app. 122 for Q4, 2008



Construction cost indices of dwellings – app. 122 for Q4, 2008; The first quater (Q1) of 2003 the index was 100.

Maintenance costs: see 3.4.5

operating costs: see 3.4.1

3.2 Sustainability aspects – Denmark PP12

3.2.1 How is the energy saving/sustainable construction of residential buildings connected with any financial support?

Currently, there is no connection.

3.2.2 Are there any existing capital allowances regarding sustainability building practice?

No, there are not any existing capital allowances regarding sustainability building practice.

3.3 Economical energy supply – Denmark PP12

3.3.1 What is (how high) the energy consumption per m² and what is the needed expense per m²?

The heating requirements vary a lot. Average 120-150 kWh/m²/year. Price varies also - depending on source: 0,06 - 0,11 € /kWh.

Electricity use is 1.500 - 2.000 kWh/person. Price is 0,29 €/kWh.

3.3.2 How was the development of energy costs for private household (incl. TAX) within the last few years?

The energy consumption for heating has fallen 28,6% from 1980 to 2007. Prices per energy unit have been quite stable the last couple of years.

Statistics are available at: [2]

http://www.ens.dk/da-DK/Info/TalOgKort/Statistik_og_noegletal/Sider/Forside.aspx

3.3.3 What is the rate of CO₂ –emission of the used energy resources of buildings? Dynamics of demand of energy resources per 1 sq. m. of living area (depending on fuel, materials, constructions; during building period and lifetime).

District heating: 36 kg. pr. GJ

Natural gas: 0,2 kg/kWh

Oil: 0,27 kg/kWh

Electricity: 0,55 kg/kWh

3.4 Evaluation of current maintenance and operating costs – Denmark PP12

3.4.1 What can be said about the operating costs?

Operating costs: 14 €/m² covering sanitation, common maintenance and planned and periodic maintenance and replacement.

3.4.2 What kind of performing benchmarks are available?

Benchmarking has been started. First data exists on administration costs.

3.4.3 Which costs can be listed in the bill of operating costs and which not?

Operating costs:

- 1- taxes, property official
- 2- water use, plumbing installations
- 3-
- 4-
- 5-
- 6-
- 7- cleaning
- 8-
- 9- electrical installations
- 10-
- 11- insurances
- 12-

renovation, energy use, contribution to LBF, administration, maintenance, savings for renewal, losses (missing rent), improvement, depreciation, damages on buildings, refurbishment

3.4.4 How was the development of maintenance and operating costs in the last few years?

Quite stable, but 2 to 3% per year.

3.4.5 What are the costs of maintenance and administration costs?

Maintenance: 17.50 €/m².

Administration: 401 €/m² per year.

3.4.6 What can be said about stability of value and life cycle costs? (development)

The general picture is:

→ Value decreases → maintenance and repair → value increases a little → this is repeated a few times → Then a mayor refurbishment is made and value increases to start value or higher → and the pattern is repeated

3.5 Housing development programmes of the participating countries – Denmark PP12

3.5.1 What kind of financial support does exist for owners and lodgers/renters, respectively for construction of residential buildings?

For social housing, special loans and a percentage support of 7% to be covered by the local authority is paid.

For other types there is no support.

3.5.2 Who is the target group for these supporting programs?

The tenants.

3.6 Management models , owner's structures – Denmark PP12

3.6.1 How can the structure of ownership, i.e. the proportion of “classic” real estate manager and yield-oriented investors be described?

The majority of apartments for renting are owned by social associations.

3.6.2 What are the procedures to make a decision within owners' associations?

Democratic – election of board members – holding of general assembly.

3.7 Condition of real estate management – Denmark PP12

3.7.1 What are national distinctions in the tenancy law?

The tenancy law in Denmark is: "Lejeloven".

3.7.2 How was the development of the rental prices in the last few years?

The prices increased between 0,5% to 2,7% from 2005 to 2006 depending on the type of dwelling.

3.8 Benefit analyses for owners and investors – Denmark PP12

3.8.1 What are the models of calculation of profitability? Examples.

Generally cost and expenses are calculated but loans are included with an amortization calculation, in some cases using a net present value method.

3.9 Financing and funding instruments and mechanism – Denmark PP12

3.9.1 What are the financing instruments on local/ regional/ national/ EU level for housing development/ such as public private partnership (PPP) respectively financial supports? Supporting instruments for house owner and renter/lodgers (see above).

Special loans are available. Support for social housing from the municipalities by law. For private homes 80% can be financed through "realkredit"-loans

3.9.2 How to make investment decisions and for which time period these decisions are planned and are validly?

A total economy calculation is made where the investments are compared to the savings over the coming years - for which the economical value is calculated to its present value.

3.10 References – Denmark PP12

- [1] For development of the living standard see more at:
<http://www.statbank.dk/statbank5a/default.asp?w=1680>
- [2] http://www.ens.dk/da-DK/Info/TalOgKort/Statistik_og_noegletal/Sider/Forside.aspx
- [3] Lejeloven : The tenancy law in Denmark

13.2 Details Germany

- Engineering and building technology standards in Germany
- Method of planning, permit and tendering procedures in Germany
- Economical and financial basis, industry and quality in Germany

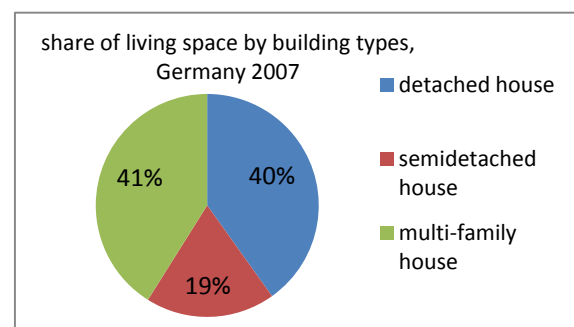
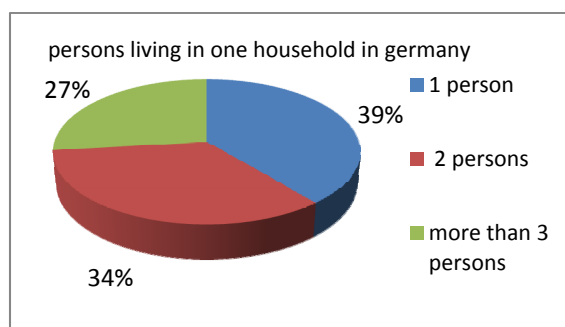
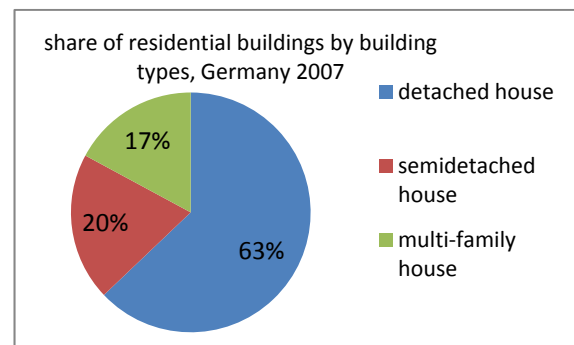
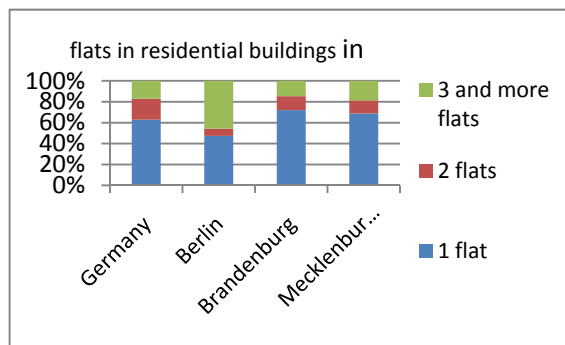


1.1 Architectural and Urban Design – Germany PP1

1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?

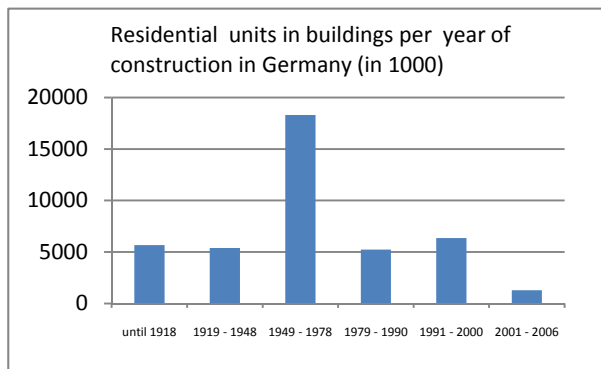
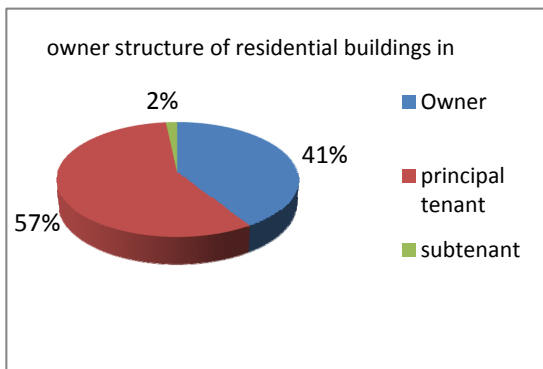
In Germany, 63% of all residential buildings are detached houses, 20% are semidetached houses and only 17% are multi-family houses. In 2007 there were about 39,9 million dwelling in Germany with about 3,44 billion sq.m of living space. The share of living space in detached houses(40%) is almost the same as in multi-family houses (41%). In the urban area of Berlin the part of the multi-family houses is higher (around 46%) but almost equal to the part of detached houses with about 47%. The general typologies are: old town houses with 4 to 5 storeys built in the 19th and early 20th century, large residential buildings made with precast concrete slabs of the postwar period and new town houses and detached houses.

[1]



1.1.2 What can be generally said about the residential buildings (e.g. year of construction, private or public owner respectively hybrid forms such as associations)?

In Germany there are more tenants than private owners and almost no subtenants. At about 1,6 million (85%) of all 1,9 million apartments in Berlin are tenants apartments (left side below). The amount of different numbers of dwellers in households is almost equally between one, two and three or more. But 1 and 2 dwellers in one apartment are more usual for Germany (right side below).

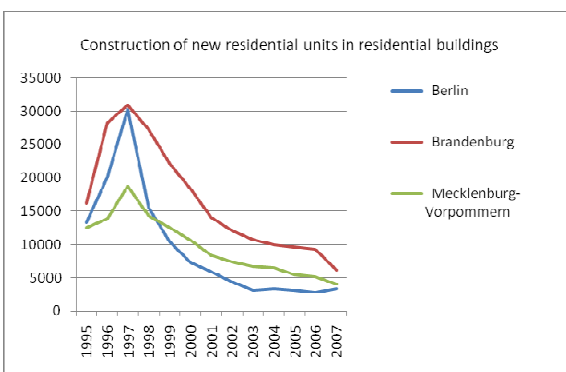
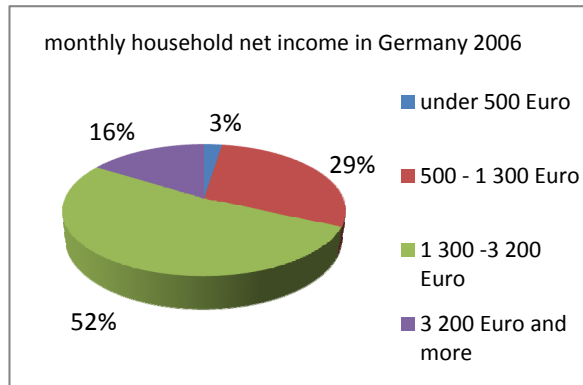
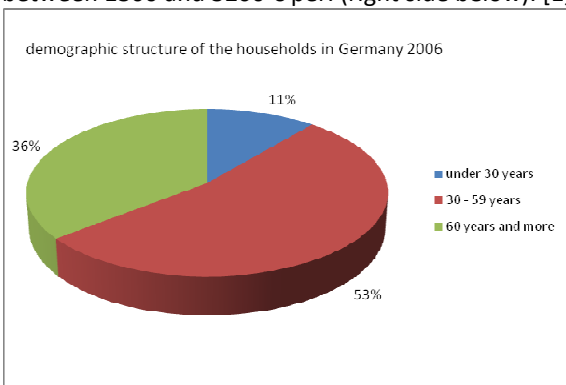


[1]

The amount of newly constructed residential buildings rose after the Second World War due to the destruction. After this it stays more or less at the same level (left side below). In the last fifteen years the amount of new residential units rose after the fall of the Wall but then declined to a very low amount of new constructions (right side below).

[1]

The demographic structure shows the importance of the barrier free construction as there is a third of all German people older than 60 years (left side below). The monthly household income in Germany lies mainly between 1300 and 3200 € per. (right side below). [1]



1.1.3 What is the common architectural design of residential buildings (pictures, drawings, floor plan, view)?

Existent residential buildings:

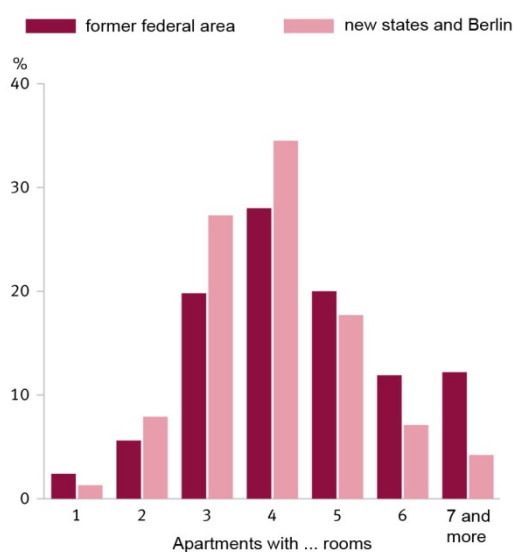
In Berlin a lot of old apartment buildings are of the time end of the 19th and early 20th century. These buildings normally have four or five floors with a pitched roof and more or less decoration in their facade. Some of the actual urban characteristics of Berlin are the eaves height of 22 m and a lot of gaps between the buildings which were caused by the bombings of the Second World War. Typical characteristics of the plan are the courtyards and the “Berlin room” – a room with different use in the inner corners of the buildings. In section one can say that the height of the rooms (until approximately four meters) is characteristic as well. The additional criteria of this typology is the clear height of 3,0 m. Until today, a lot of these buildings are already insulated and have better windows.

Another typology is defined by the buildings made with precast concrete slabs. They exist in Berlin as well as in all the states of the former GDR (important for us: Brandenburg, Mecklenburg – Vorpommern). They all were constructed after the Second World War as a modern living alternative. Nowadays they are rebuilt, changed or modernized in section and plan, sometimes they are stepped as well.

There were as well built a lot of different multi-family residential buildings in Berlin before and after the world war. One example is of the architect Bruno Taut, the other has been built during the building boom of the nineties. Nowadays, a very important building typology for families in the city centre are the town houses, sometimes they are semi – detached, sometimes detached or even exist as a row house. The difference is that they usually are inhabited by only one or maybe two families.

In the rural area of Brandenburg and Mecklenburg – Vorpommern the buildings have less floors but can look similar to the old buildings in Berlin, although the number of detached family houses with own garden is much bigger. As well, the use of bricks is very important in the area. The closer one comes to the sea, the more thatched roofs one can see – a typical regional appearance.

Structure of apartment existence 2006



1.1.4 What are the common requirements for living spaces? (number of rooms, number of persons per household, sq m per person, height of different rooms, min area of the living room, information about usual living spaces)

The average residential unit in Germany has 86 m² and has an average amount of 4.4 rooms. The average living space for one person is therefore 42 m² which accords to 2.1 rooms per person. [1]

1.1.5 Are there any building envelope design limitations (e.g material, windows, etc.)?

In the German federal building code there are no limitations for the building envelope but the different land building laws make definitions about fire resistance and window sizes. The minimal window size of a habitable room is defined with the minimal size of 1/8 of the room area. The most specific information for a certain site of construction one can find in the distinctive land development plans which can make regional limitations for material, form of the roof and windows as well as urban design. [2]

1.1.6 Are there any specific standards (e.g. elevator, cellar, entrance, etc.)?

Elevator:

According to the building law of Berlin § 39, houses with more than 4 floors or barrier free houses have to have an elevator which should be in a fireproof shaft disconnected from the staircase. [2]

Technical equipment:

In the §§ 40 to 47 of the building law of Berlin are described the conditions of all heating, cooling, ventilation and other systems. In these paragraphs there are mainly conditions for fire prevention. [2]

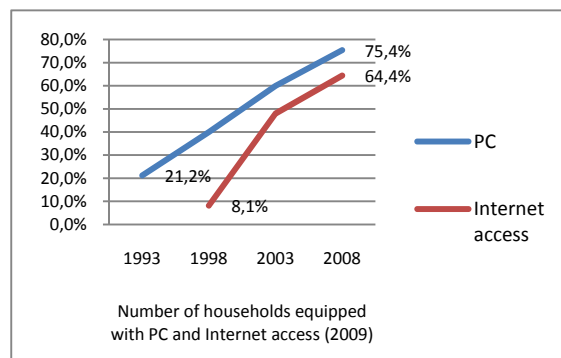
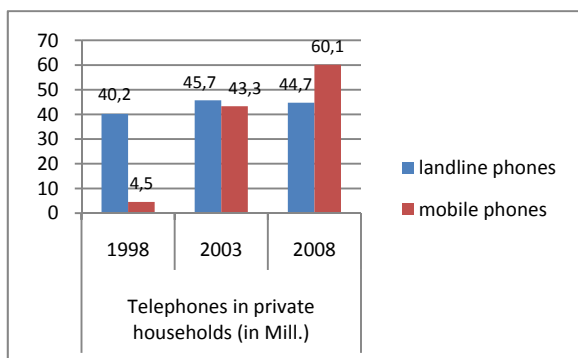
Residences:

According to § 49 of the building law of Berlin, every residence or apartment has to have a kitchen (with window or ventilation), a bathroom (with bathtub or shower), a storage room. If it is an apartment complex, there has to be built a storage room for all inhabitants or wheel chairs, bicycles and baby buggies. [2]

Garage/ parking space:

In Berlin, residential houses don't need garages or parking spaces, their construction is optional. In Brandenburg this is different. More information can be found in the building laws of Brandenburg. [2]

Telecommunication/internet: [1]



The different requirements of dwelling in the land

building laws are shown in following table:

spacial information in the federal states			
	building law Berlin [2]	Brandenburg building law [3]	building law Mecklenburg Vorpommern [4]
recreation room	§ 48	§ 40	§ 47
definition § 2	rooms that are not only made for temporary stay	rooms that are not only made for temporary stay	rooms that are not only made for temporary stay
clear height (m)	2,50	2,40	2,40
size	-	sufficient size for its use	-
window size (m ²)	at least 1/8 of the floor space of the room including floor space of glazed porches and loggias.	at least 1/8 of the floor space of the room including floor space of glazed porches and loggias.	at least 1/8 of the floor space of the room including floor space of glazed porches and loggias.
recreation room under roof: clear height (m)	2,30 over half of NIA, areas with height under 1,50 aren't considered	2,40 over half of NIA; areas with height under 1,50 aren't considered; for renovation 2,30 is allowed	2,30; not only under roof but as well for buildings of building class 1 + 2 according to § 2 (up to 7m of height,...)
storey	§ 2	§ 2	§ 2
storey	Storeys are storeys if their ceiling height is more than 1,40 m above the average ground level	Storeys are storeys if their ceiling height is more than 1,40 m above the average ground level	-
storey proper	Storey are storey proper if their ceiling height is more than 1,40 m above the average ground level and if their clear height is at least 2.30 m over at least 2/3 of its floor space.	-	Storey are storey proper if their ceiling height is more than 1,40 m above the average ground level. Storeys for technical facilities or space between last ceiling and roof without recreation rooms aren't storey proper.
uppermost storey	uppermost storeys are only storey proper if they have a clear height of 2,30 m over more than 2/3 of the floor space of the storey underneath	-	-

spacial information in the federal states			
	building law Berlin	Brandenburg building law	building law Mecklenburg Vorpommern
dwelling	§ 49	§ 41	§ 48
kitchen	kitchen/ kitchenette with window or ventilation	kitchen/ kitchenette with window or ventilation	condition for a kitchen with window or ventilation
bathroom	bathroom with shower or bathtub and one toilet	bathroom with shower or bathtub and one toilet	bathroom and a toilet with window or ventilation
storage room	For buildings of building class 3 - 5 according to § 2 there has to be a common storage room for bicycles and buggies; each dwelling needs a storage room of 5 m ² ; if the last one isn't inside of the dwelling, there has to be another one inside the dwelling with 1m ² .	For buildings of building class 3 - 5 according to § 2 there has to be a common storage room for bicycles and buggies; each dwelling needs a sufficiently big storage room.	For not small residential buildings there has to be a common storage room for bicycles, buggies and wheel chairs; there has to be a weatherproof parking area for bicycle as well.
more	Living rooms, sleeping rooms and corridors for escape do each need smoke alarm devices.	-	Not all recreation rooms may be in the north of the building.
outside facilities	§ 8	§ 7	§ 8
non overbuilt areas	have to be planted and have to be capable of water absorption	have to be planted and have to be capable of water absorption	have to be planted and have to be capable of water absorption
playground	A building with more than 6 dwellings needs a playground on the site for small children. 4m ² per dwelling but at least 50m ² . Buildings with more than 75 dwellings need a playground for older children as well. If the playground can't be constructed on the site, it is possible to pay a corresponding amount of money to the community	A building with more than 4 dwellings needs a playground according to § 81.	A building with more than 3 dwellings needs a playground on or close to the site. If there already is one close to the site, the playground isn't needed.

1.1.7 What are the definitions or guidelines for roof design?

Flat Roof Guidelines (Flachdachrichtlinien):[5]

The guideline gives hints for the professional planning and realization of layers and connections to other building parts in detail. Flat roofs have slope of 0° - 10° grade. Roof edge connection height has to be (roof with a slope of <5°) about 10 cm or (roof with a slope of >5°) about 5 cm over the surface covering or gravel. Roof edge connection has to have downward slope to the roof side. The usual materials for edge upturn beam are wood, concrete, masonry, metal.

Green Roof Guidelines (Dachbegrünungsrichtlinie):[6]

Quality assurance in green spaces - Green roof - Directives for planning, implementation and maintenance.

1.1.8 What are the functional guidelines (space efficiency, reusing ability, accessibility, and bicycle comfort)?

Accessibility:

According to § 30 the Federal Building Law (BauGB) the approach (infrastructure, water and sewage) is one of the factors for the acceptance of a project. The building law of Berlin gives more information for accessibility and escape ways in case of fire. [7, 2]

Bicycle comfort:

Every residence or apartment has to have a storage room for bicycles according to §49 of the building law of Berlin. [2]

Space efficiency:

See question 1.1.11

Reusing ability:

The land-use plan gives information of the corresponding building area of the site. The ten existing different areas are defined in §1 of the Land use Ordinance (BauNVO). §§ 2 – 14 give adequate information about possible uses in these areas (in case one wants to change a residential building to an office building). There is no rule or information about the architectural design of the space and its possibility to be changed. [8]

The German Institute of Standardization (Deutsches Institut für Normung, DIN) published the standard DIN 277, which determines the calculation of area spaces and capacity of buildings. According to this the gross external area (GEA) is the total of area spaces of all levels of a building, i.e. all full storeys of a building including the subterranean spaces like basement garage or cellar rooms.

The effective area (EA) is the total of all areas which are subjected to living and working, but also sanitary facilities and parking spaces. For an ideal space management the EA inside of a building should have a high proportion because it represents the purpose of usage of the building in effect.

The traffic area (TA) of a building, such as stairs, corridors and halls as well as emergency exits should restrict to the required dimension.

Characteristics of an estate, such as the site occupancy index (SOI) and the floor-space index (FSI), are declared in an official plat. They are necessary for the calculation of costs.

The SOI indicates the part of an estate which can be overbuilt. For example, a SOI of 0.5 means that 50 % of the estate can be overbuilt with a building.

The FSI indicates the ratio of the total floor area of a building to the size of the real estate.

In view of the reusing ability of an estate it is noticeable that a conversion of for example “business estate” to “living room” in Germany is strictly subject to approval. Therefore it has to be given a building licence. Furthermore it must be clarified if the property meets the condition of the planning laws. In an area zoned for

economic activities a conversion to living room is not possible.

1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?

Negative design limitation (§ 9 Land Building Law) and positive design limitations (land use plan). [2,3,4]

According to the Federal Building Law (BauGB) the building project has to fit to the place and neighbourhood. The adequate information and local design limitations can be found in the corresponding land use plan. [7]

1.1.10 What kind of requirements is defined for barrier free construction? Name of the code?

DIN 18025:

DIN 18025-part1: Accessible dwellings, Dwellings for wheel chair users, design principles [9]

This code applies to the design, execution, equipment, and modernizations of new tenanted and cooperative dwellings which are suitable for wheel-chair users and such estates.

e.g.

dimension of movement area must be at least 1,50m inner width and 1,50m inner length.

elevators must have a minimum inner width of 1,10m and an inner length of 1,40m.

slope of ramps must be under 6 grade.

(Draft)E DIN 18040:

(Draft)E DIN 18040-part1: Construction of accessible buildings – Design principles – Part 1: Publicly accessible buildings [10]

The document describes design principles for publicly accessible buildings. It deals with the planning, construction and interiors of publically accessible buildings and facilities outdoors which are suitable for disabled employees. This standard applies to new buildings and to buildings under reconditioning or modernization analogously.

Land Building Code: [2,3,4]

A residential building with more than 4 dwellings needs at least two apartments which can be reached without barriers.

1.1.11 Which plans control the local urban and architectural design, what are the common criteria and where can they be found?

Land use plan:

The land use plan contains federal, regional and community laws in text and plan.

The Land Use Ordinance (Baunutzungsverordnung BauNVO) gives information about the kind (living, industry, mixed areas) and dimension of the structural use, the footprint area and the local traffic area. According to § 30 of the Federal Building Law (Baugesetzbuch BauGB) these four criterias are significant for the acceptance of a new construction. The site development (traffic, water and sewage) has to be secured, too. Local criteria can exist for roof or facade design.[7,8]

The existence of a land use plan in Berlin can be checked at the following link:
<http://www.stadtentwicklung.berlin.de/geoinformation>.

After that it can be copied in the corresponding land registry office (Katasteramt).

1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept?

prEN 15643:

prEN 15643 Sustainability of construction work - Part 3 Social framework [11]

Social requirements are

Air quality, acoustic quality, distance to public traffic, shopping offers, local recreation area, green city, playgrounds, sports abilities,...

1.1.13 What criteria should be involved to describe the quality of the urban area of the site?

Air quality, acoustic quality, distance to public traffic, shopping offers, local recreation area, green city, playgrounds, sport facilities...


1.2 Structural Design – Germany PP1

1.2.1 What are the climatic conditions?

The climate in Germany is moderate. For more information see chart below. [12]

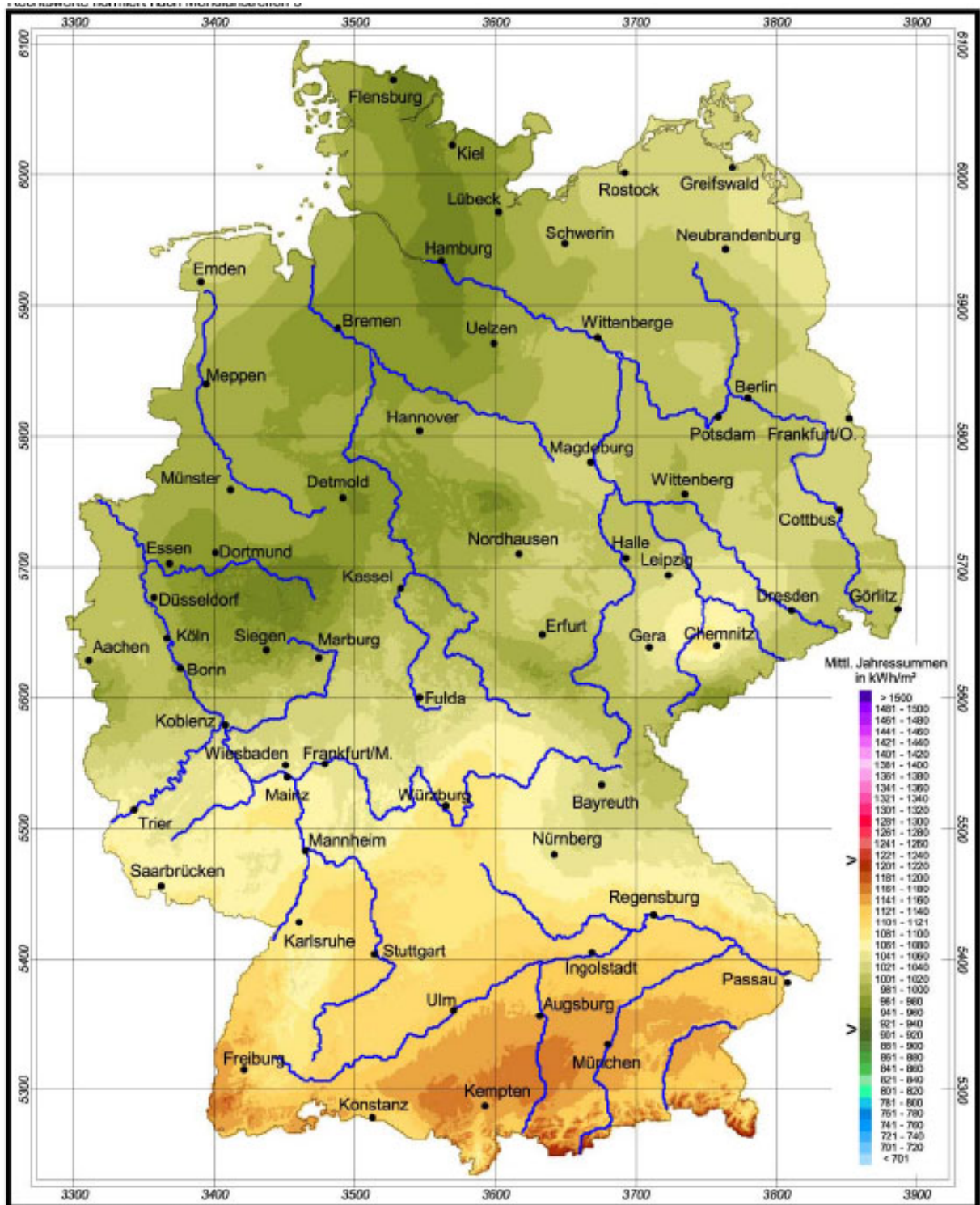
regional climatic conditions for calculation of load bearing structure and energy demand																
	wind q_{ref}		storms per year		snowloads $S_{k min}$		average annual sun radiation		average air tempera- ture		cooling days (temp above 25°)		heating days (temp under 10°)		annual precipitatio n	
unit	kN/m ²		number		kN/m ²		kWh/m ²		°C						mm	
	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high
FRG	0,39	0,56	46	59	0,85	13,8	900	1200	9	11	0	0	185		500	1000

Windloads according to DIN1055-4 (Wind loads) [13]

	Windzone	v_{ref}	q_{ref}
	WZ 1	22,5 m/s	0,32 kN/m ²
	WZ 2	25,0 m/s	0,39 kN/m ²
	WZ 3	27,5 m/s	0,47 kN/m ²
	WZ 4	30,0 m/s	0,56 kN/m ²

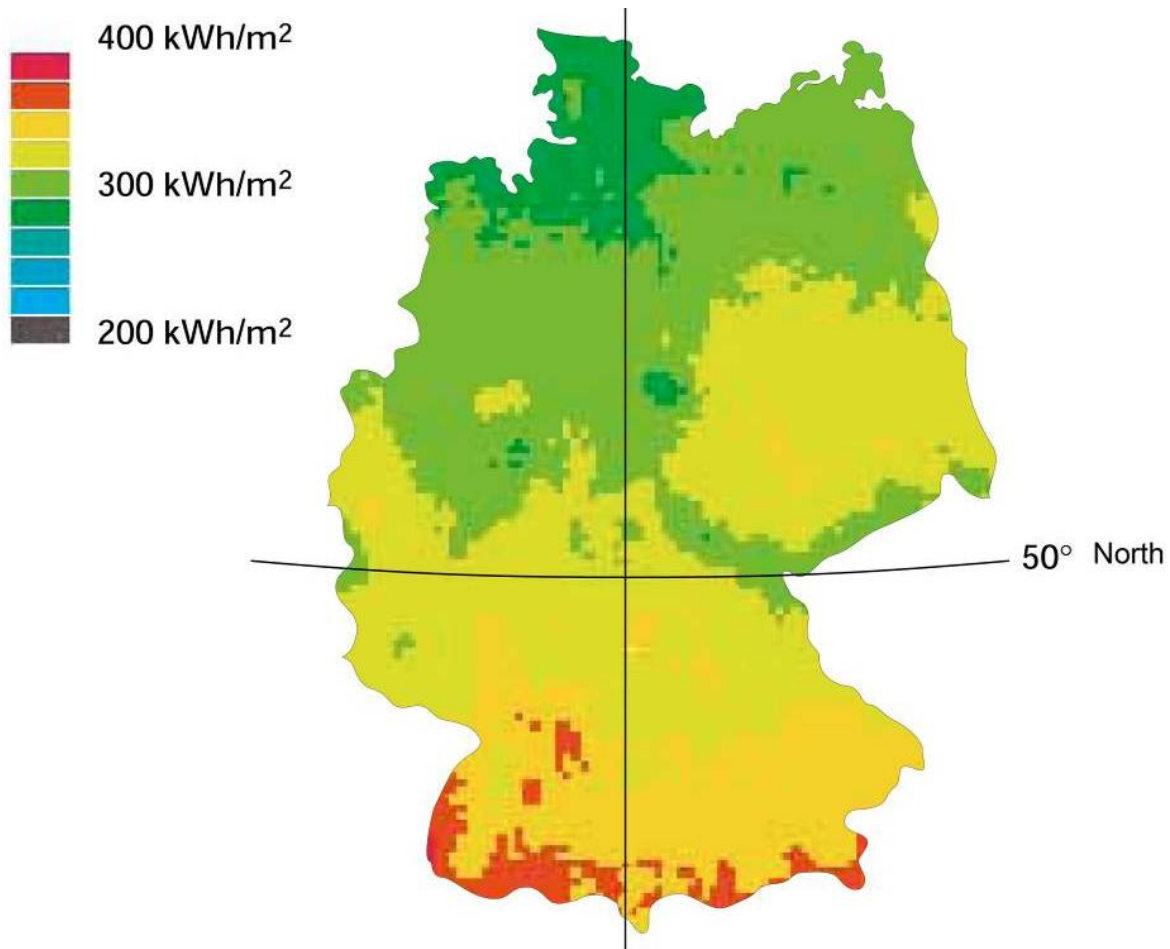
Global Radiance in Germany: [12]

average yearly summation, (1981 to 2000): from 900 to 1200 kWh/m²



Solar radiation supply in Germany:

Solar radiation on horizontal areas in the heating period (October – April) [14]



Average radiance intensity:

Schematic illustration of the 15 reference regions of the average radiance intensity in Germany

The first chart gives information about the heating days in each region according to the starting temperatures for heating (19, 15, 12, 10°C). The second chart gives information for the monthly radiation intensity (here only in region 4) according to the inclination and orientation of the wall. [15]



Region 4		Durchschnittliche monatliche Strahlungsintensität							Jährliches Strahlungs
1	2	3	4	5	6	7	8	9	10
Region	Referenzort	Heizgrenztemperaturen, in °C							
		19		15		12		10	
		Jahresbilanzierung		Heizperiodenbilanzierung					
		t_a d	$Gt_{19/19}$ Kd	t_{HP} d	$Gt_{19/15}$ Kd	t_{HP} d	$Gt_{19/12}$ Kd	t_{HP} d	$Gt_{19/10}$ Kd
	Deutschland	330	3700	275	3600	220	3300	185	2900
1	Norderney	357,9	3657	292,2	3503	230,5	3176	198,3	2923
	Husum	355,1	4030	310,3	3920	240	3541	208	3287
2	Hamburg	354,4	3806	293,3	3689	234,7	3377	201,7	3120
	Hannover	341,6	3739	287	3622	229,4	3314	197,4	3063
	Kiel	351,7	3864	299,5	3745	239,4	3421	205,5	3154
3	Arkona	357,8	4052	303,8	3925	245,6	3614	216,3	3384
	Warnemünde	351,9	3875	292,7	3737	234,4	3430	205,8	3202
4	Potsdam	333,0	3819	277,5	3711	227	3434	198,2	3210
	Schwerin	345,3	3914	293	3800	234,7	3487	205,7	3258
	Teterow	347,1	4015	294,4	3900	238	3597	209,2	3371
5	Braunschweig	341,1	3748	285,8	3633	229,3	3331	197,1	3080
	Dresden	330,7	3736	274,8	3623	224,4	3352	194,7	3120
	Wittenberg	332,0	3815	277,7	3703	227	3431	198,7	3210
6	Erfurt	344,0	4085	294,3	3979	240,4	3688	209,2	3443
	Harzgerode	354,8	4439	316,2	4368	264,2	4078	228,2	3796
	Lüdenscheid	348,5	4082	307	3996	254,7	3712	217	3415
7	Essen	338,5	3500	280,7	3380	222,5	3065	188,2	2796
	Köln	335,1	3439	273,5	3312	218,8	3020	185,8	2762
	Münster	339,9	3536	282,7	3413	223,9	3097	191,1	2841
8	Geisenheim	327,8	3419	265,4	3291	213	3009	184,9	2789
	Kassel	336,6	3727	282,5	3614	227,3	3317	196,8	3076
	Trier	338,7	3661	282,5	3544	229,3	3256	195,2	2989
9	Chemnitz	343,1	4090	295,1	3992	243,5	3714	210	3449
	Leipzig	332,0	3696	274,4	3580	222,4	3302	192,9	3072
10	Cham	337,9	4080	286,9	3975	239,2	3718	205,7	3456
	Hof	353,2	4623	314,7	4541	269,6	4294	234,7	4021
11	Freudenstadt	352,8	4532	317,9	4457	271,3	4207	237,7	3942
	Nürnberg	330,6	3817	276,2	3707	229,1	3456	198,9	3222
	Stuttgart	334,9	3776	278,6	3659	228,4	3390	197,4	3147
	Würzburg	329,5	3699	274,1	3587	222,8	3312	193,1	3079
12	Frankfurt/M.	325,1	3495	265,6	3374	215,2	3107	187,8	2892
	Mannheim	317,5	3305	254,6	3181	206,3	2924	179,1	2711
	Saarbrücken	337,1	3728	282,5	3614	230,9	3334	198	3077
13	Freiburg	311,7	3178	249,1	3060	199,6	2796	169,3	2560
	Konstanz	331,9	3700	273,1	3584	226,1	3331	197,3	3106
14	München	339,0	4063	288,1	3958	240,1	3699	207,9	3446
	Passau	337,9	4075	284,4	3965	236,6	3705	205	3458
15	Garmisch-P.	353,5	4496	307	4394	259	4136	226,2	3878
	Oberstdorf	357,7	4699	317	4610	269,3	4351	238,5	4109

Snowload zone:

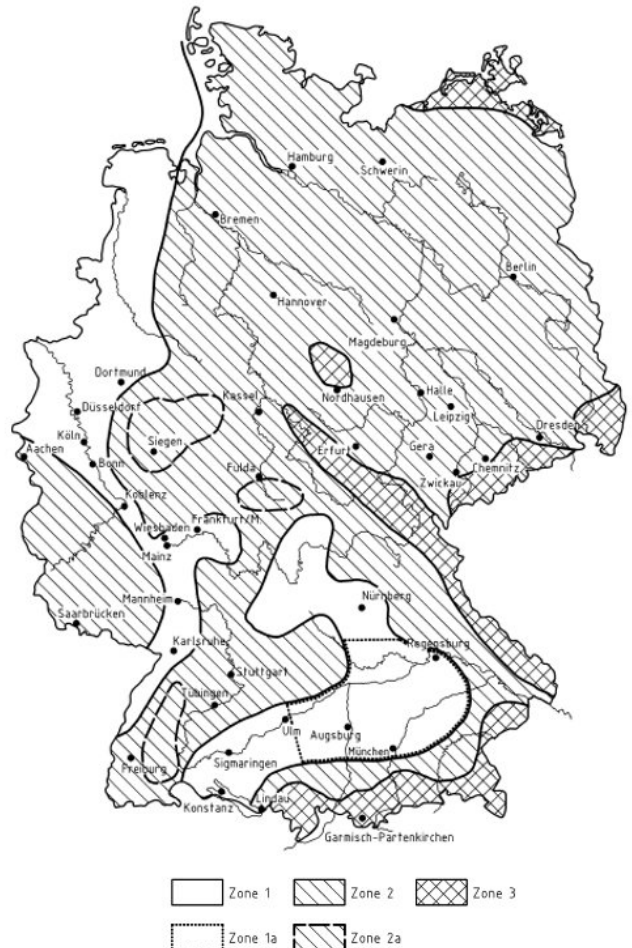
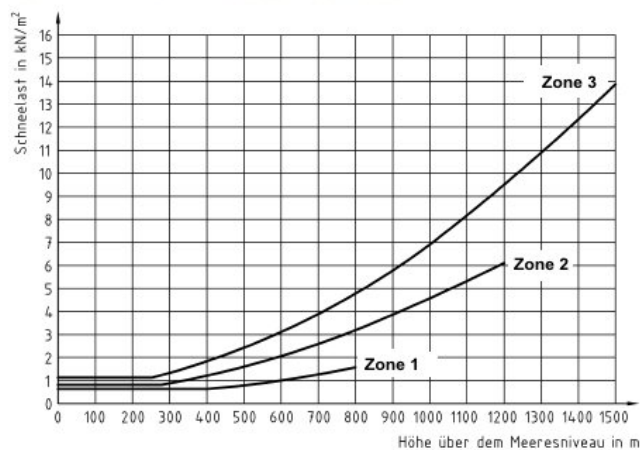
Map of zones, s_k = characteristic value of snowloads on the ground in kN/m², A = ground level above sea level in m. [16]

$$\text{Zone 1: } s_k = 0,19 + 0,91 \cdot \left(\frac{A + 140}{760} \right)^2 \quad \text{min. } s_k = 0,65 \text{ kN/m}^2$$

$$\text{Zone 2: } s_k = 0,25 + 1,91 \cdot \left(\frac{A + 140}{760} \right)^2 \quad \text{min. } s_k = 0,85 \text{ kN/m}^2$$

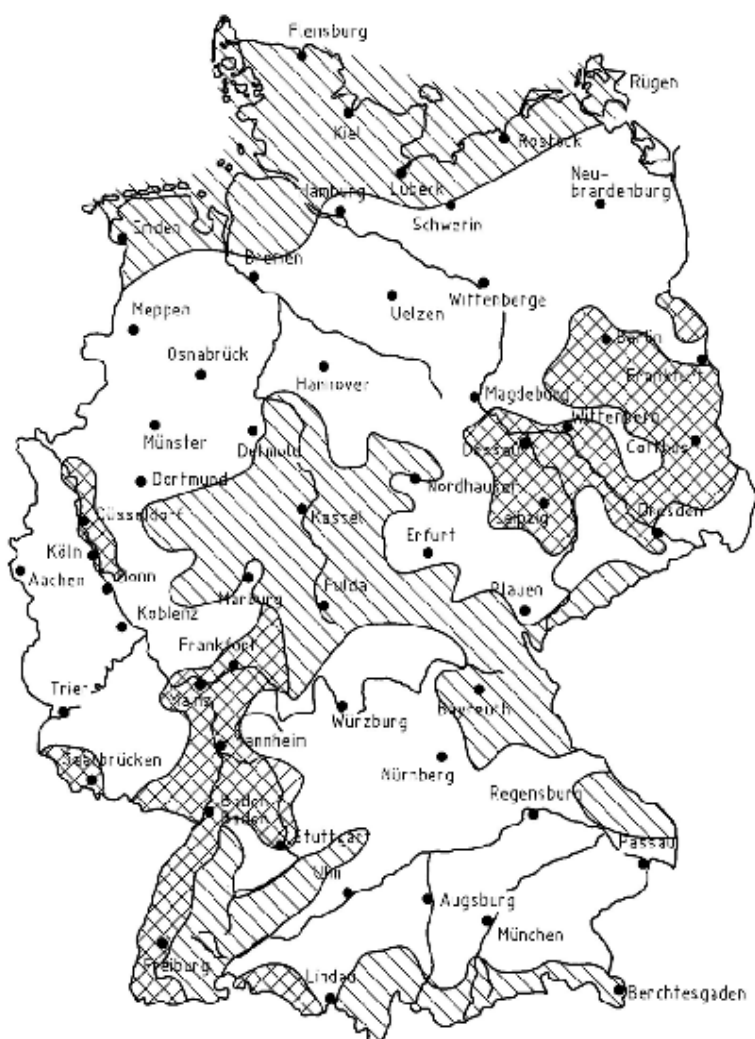
$$\text{Zone 3: } s_k = 0,31 + 2,91 \cdot \left(\frac{A + 140}{760} \right)^2 \quad \text{min. } s_k = 1,10 \text{ kN/m}^2$$

$$\text{Zone 3: } s_k = 0,31 + 2,91 \cdot \left(\frac{A + 140}{760} \right)^2 \quad \text{min. } s_k = 1,10 \text{ kN/m}^2$$



Summer heat protection:

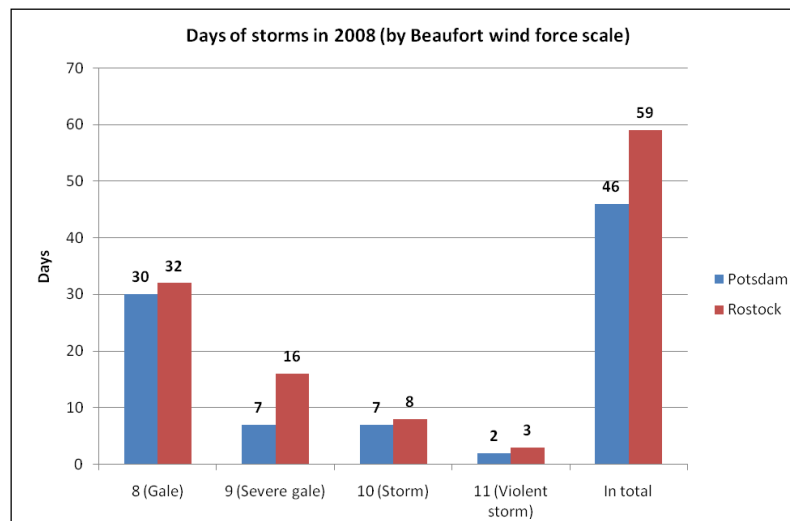
To protect interior rooms from overheating, there has to be a summer heat protection. For this case, the DIN 4108 part 2 makes a classification in three zones according to regional climate. The three zones have different limit values of the internal temperature (zone 1: summer cool: 25°C, zone 2: moderate: 26°C, zone 3: summer hot: 27°C). Another classification is made for the upper limiting value of average monthly external temperature θ (zone 1: $\theta \leq 16,5^\circ\text{C}$, zone 2: $16,5^\circ\text{C} < \theta < 18^\circ\text{C}$, zone 3: $\theta \geq 18^\circ\text{C}$). [15]



Legende:



Bild 3 — Sommer-Klimaregionen, die für den sommerlichen Wärmeschutznachweis gelten



Source: Deutscher Wetterdienst (2009)[12]

A short glossary of the Beaufort wind force scale with examples:

Beaufort wind scale 8: Gale (boughs are breaking; wind complicates the going)

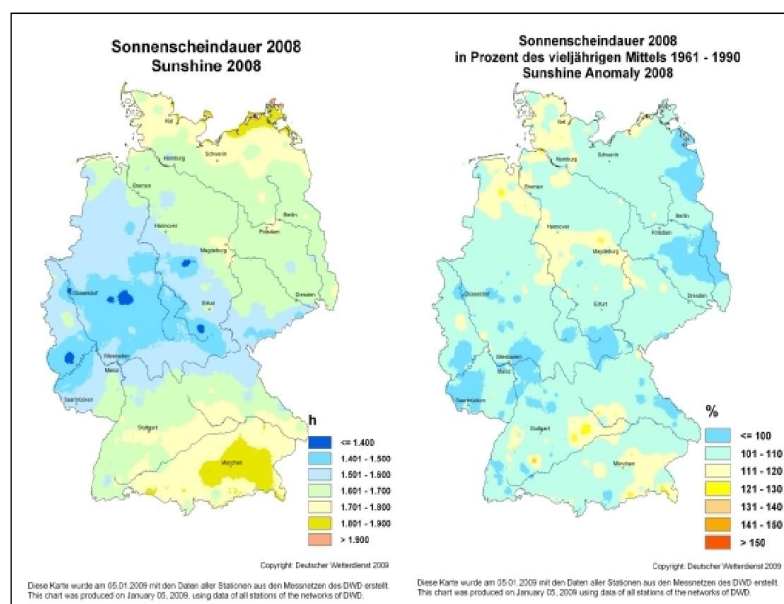
Beaufort wind scale 9: Severe gale (knobs are breaking; light losses on houses)

Beaufort wind scale 10: Storm (wind breaks trees; heavy losses on houses)

Beaufort wind scale 11: Violent storm (wind roots out trees; storm losses)

Days of sun annually

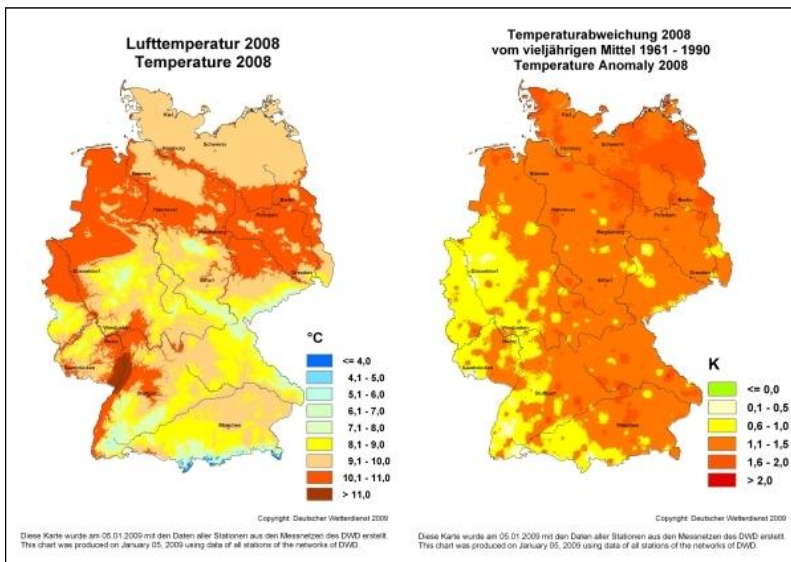
Abstract from the report of the German Meteorological Service (Deutscher Wetterdienst) for 2008 [12]: In the year 2008 there were 6 months with sunshine duration above the long term average and 6 months with sunshine deficits. However, the sunshine surpluses were mostly bigger than the deficits. Therefore the year as a whole can be considered as quite rich in sunshine duration. For the spatial mean of Germany a sunshine duration of 1626.7 h resulted. This is 98.3 h or 6.4 % more than in the reference period (1961-90). Thus 2008 was the 21st sunniest year since 1951.



Source: Deutscher Wetterdienst (2009) [12]

Temperature development p. a.

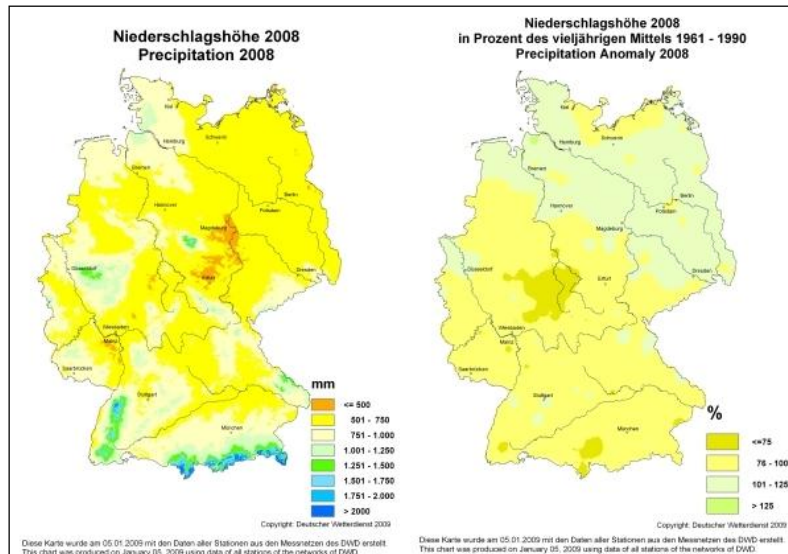
The German Meteorological Service DWD reports about the temperature development in 2008 that September 2008 was slightly cooler than average, but the year in total became very warm. The yearly mean temperature was 9.5°C and therewith 1.2°C above the value for the international climatological reference period 1961-90. Thus 2008 became the 10th warmest year since the beginning of the 20th century.



Source: Deutscher Wetterdienst (2009) [12]

Annual rainfall, air humidity

With respect to precipitation the year 2008 had extremely different months. All together the year had 6 months with more and 6 months with less precipitation than in the reference period 1961-90. But as the monthly deficits were mostly large than the surpluses, the yearly amount of precipitation did not reach the reference value. The areal average of the amount of precipitation for the year 2008 was 759.3 mm. This is 29.7 mm or 3.8 % less than normal. Thus 2008 became the 45th driest year since the beginning of the 20th century.



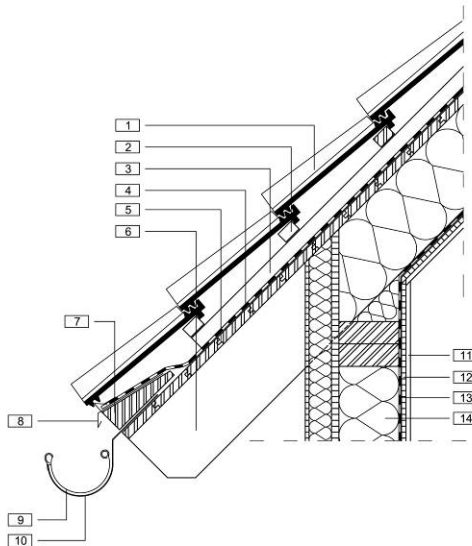
Source: Deutscher Wetterdienst (2009) [12]

Annual snow depth: the annual snow depth is 0.65 – 1.10 kN/m².

Number of heating and cooling days: there are 290 heating days.

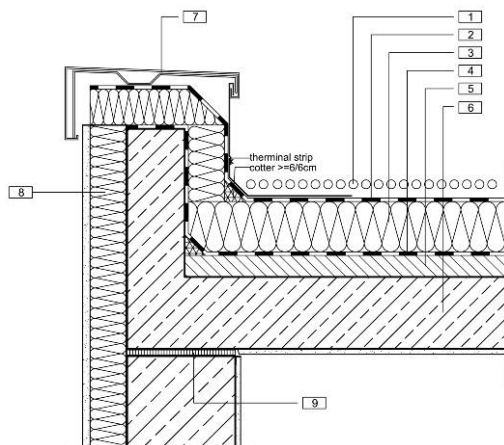
1.2.2 What types of roof structure are used in residential houses?

The most traditional roof structure is pitched roof. Other possibilities are flat roof and monopitched roof. In Berlin, there exists a variation of pitched and flat roof: the edge is made in a traditional way (pitched roof) meanwhile the middle is flat in order to be able to walk over it. Wooden rafter roof and wooden beam ceiling are typical for single-family buildings.



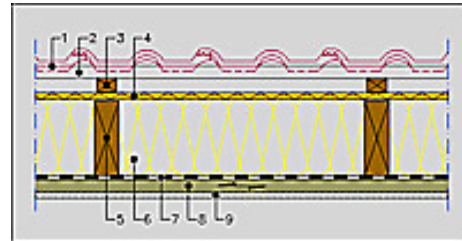
Roof structure, not ventilated, with insulation between rafters and rainwater pipe

1 roofing tile 5 planking



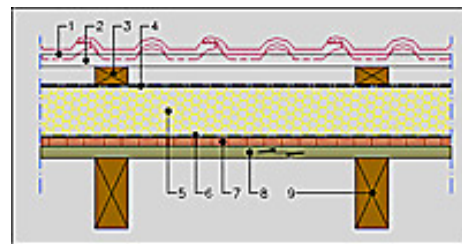
Flat roof, not ventilated, single-leaf exterior wall, roof border with attica

1 gravel fill 4 polyethylene plastic sheet, double ply down-grade floor screed 7 protective steel sheet
2 moisture separator 5 thermal insulation 8 thermal insulation composite system
3 thermal insulation 6 floor ceiling 9 floating bearing



Not visible rafter construction

Visible rafter construction



The flat roofs are usually used for new residential buildings. The most of constructions are reinforced concrete solid sheet, profile metal sheet or reinforced concrete load bearing structures. Flat roofs can be performed as warm roof (not ventilated roof) or as cold roof (ventilated roof), also it can be reversal structure with external thermal insulation.

Mansard roof you can meet on the building of 20's, this form of the roof offers living spaces on the upper floor like mansard apartments.

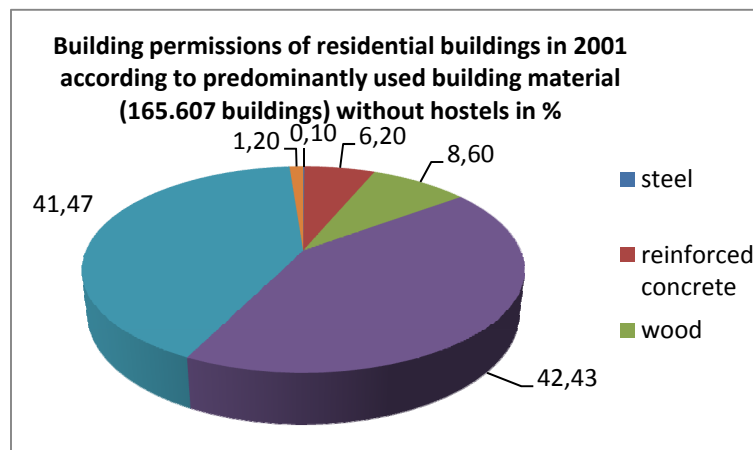
Berlin roof has generally asymmetrical roof form. Facing the courtyard there is an easy down-grade element with wood cement as a case maybe roofing cardboard on the pitch roof covered with wooden batten. [16]



1.2.3 What types of load bearing structure are used in residential houses?

The predominated load bearing structure are walls of brick or building stone masonry, prefabricated slabs of reinforced concrete (length: 6,50m), partially prefabricated slabs of reinforced concrete, prestressed concrete slabs (length: 15,50m). In residential building build before 1950 it was common to construct joist ceiling of

wood. The pitched roof structure is still mainly build in traditional wood construction (see pic.1.2.2) but for large scale residential buildings such as made from prefabricated slabs as concrete flat roof. Foundations are made as single or strip foundation or foundation mat of reinforced concrete. [17]



1.2.4 Is there any national code to calculate load structures?

DIN 1055-1:2002-06: [18]

The document is part of a new series of standards for actions on structures

which are developed on the basis of related European Standards and which are supposed to replace the existing series DIN 1055. The document is derived from DIN V ENV 1991-2-1 "Eurocode 1 - Basis of design and action on structures - Part 2-1: Action on structures; Densities, self-weight and imposed loads". The document specifies characteristic values for densities and self-weights of building materials and dead loads of commercial, industrial and agricultural goods as well as for friction angles of bulk materials for the determination of action on structures. Goods and liquids stored in silos tanks are not covered by this standard but in the revised version of DIN 1055-6.

DIN 1055-1:2002-06: [18]

Action on structures - Part 1: Densities and weights of building materials, structural elements and stored materials

DIN 1055-2:2002-06: [19]

Actions on structures - Part 2: Soil properties. Gives soil properties, which apply for the determination of actions on structures due to the soil load and the earth pressure

DIN 1055-3:2002-06: [20]

Action on structures - Part 3: Self-weight and imposed load in building

DIN 1055-4:2002-06: [21]

Action on structures - Part 4: Wind loads. This standard gives general procedures and the action for the determination of wind loads for the design of structures, including chimneys, for a height up to 300 m. Further rules for the determination of wind loads for traffic and railroad bridges with spans up to 200 m as well as pedestrian bridges with spans up to 30 m are given. Moreover the determination of wind loads for execution situations of structures and for structures with a limited working live is described.

DIN 1055-5:2002-06: [22]

Actions on structures - Part 5: Snow loads and ice loads

DIN 1055-7:2002-06: [23]

Actions on structures - Part 7: Thermal actions

1.2.5 How highly-developed are the industrial prefabricated materials?

Usage of prefabricated concrete elements in residential building is being more and more popular because of the efficiency of this construction method, possibility of the integration individual and ecological sustainable building solutions. The other reasons are low building costs and short construction time.

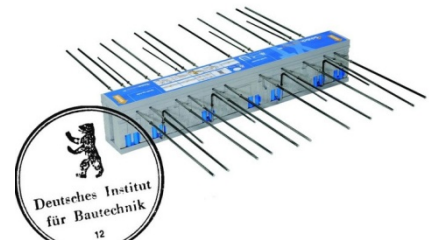
The most popular prefabricated elements are:

prefabricated site concrete slabs, concrete staircases in different forms, mullion-transom-façades.

Prefabricated slab- filigree slab is half prefabricated slab that consists of prefabricated, depending on demand 6-14 cm thick and till 14,0 m long slab elements. The width and the form of the slab depend on the floor plan. The filigree slab has to be completed to the final slab thickness after laying of the site with in-situ concrete. [24]

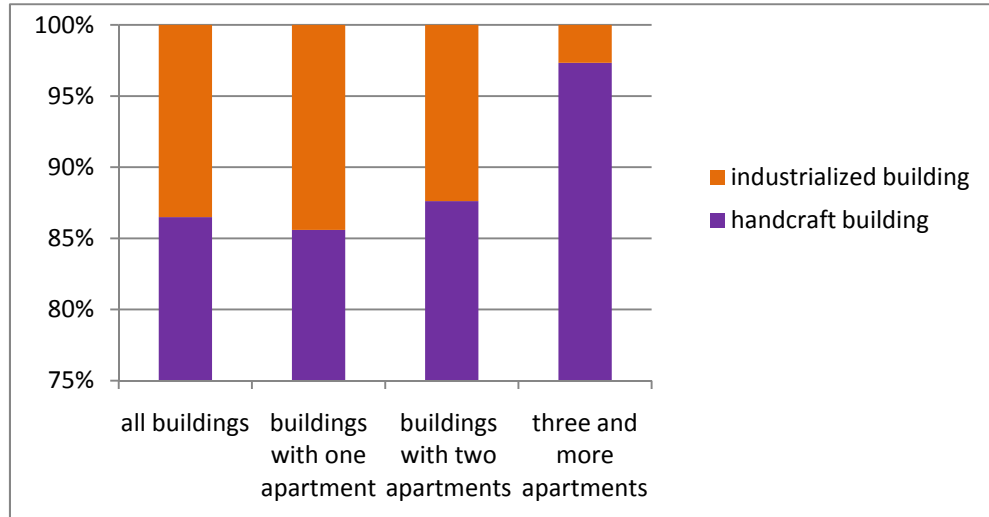
Schöck-isokorb (insulation basket), is used as rational solution for the thermal and sound insulation, impact sound insulation and reinforcement for the prefabricated building elements. [25]

Prefabricated façade elements are used for the thermal insulation for the reconstruction of existing buildings.



1.2.6 How is the proportion between handcraft building method and industrialised building?

Only 13 % of all buildings are built in prefabricated manner. Multi-family buildings almost always are built in handcraft building, only single and double family houses are built industrialized manner. [1]



1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?

The main reasons of choice of certain construction method are economical reasons, construction time, technical feasibility and quality. Sometimes ecological criteria play also a role by making the decision.

1.3 Energy standards – Germany PP1

1.3.1 Is there any national code for Energy efficiency of buildings?

EnEV 2007: [26]

EnEV 2007- German Energy Saving Regulation is used to calculate a primary energy demand for new buildings under normalized terms. The EnEV 2007 became effective on 1 October 2007, as a result of which the Energy Performance Certificate will be introduced in stages for existing buildings in Germany. From 1 July 2008, an Energy Performance Certificate must be provided for residential buildings completed before 1965 which are up for sale or rent. It will become compulsory for newer buildings from 1 January 2009. Energy Performance Certificate shows the energy efficiency of a building and also provides concrete advice on how refurbishment can save energy.

There are 2 variants of Energy Performance Certificate gives – as Demand Certificate and Consumption Certificate. The Demand Certificate contained objective details about energy demand of the residential buildings, that calculation is based on technical analysis of the building volume and the heating system. The Consumption Certificate specify of the residents during last 3 years for heating and hot water heating. The result of the Consumption Certificate depends on individual consumer behavior.

DIN 4107-10:

DIN 4107-10 Energy efficiency of heating and ventilation systems in buildings - Part 10: Heating, domestic hot water supply, ventilation. This Prestandard offers for architects and mechanical and sanitary engineers a tool to calculate the energy demand of heating, domestic hot water and room ventilation systems in the design stage of a building. The results of the calculation may be used as proof of the total energy demand of a building according to the German Energy Saving Regulation (EnEV). This Prestandard specifies a general energy efficiency calculation method and it gives energy efficiency factors for common used systems of heat transmission to the room, the heat distribution in the building and the heat generation. The building forms the limits for the calculation. The primary energy source will be taken into account with a Primary Energy Factor. [27]

DIN V 4108-6:

DIN V 4108-6 Thermal protection and energy economy in buildings - Part 6: Calculation of annual heat and energy use. This Prestandard gives the definitions for the heating balance of a building and describes the calculation procedure of the annual energy use for heating in accordance with DIN EN 832 with respect to boundary conditions in Germany. The method is applicable for residential buildings and for buildings which are temporarily heated [28]

EnEV 2009 + DIN V 18599-1:2007-02:

with EnEV 2009 (valid from October 2009) also DIN V 18599-1:2007-02 Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting – can be used to calculate the energy demand for residential buildings. [29,30]

Part 1: General balancing procedures, terms and definitions, zoning and evaluation of energy sources

Part 2: Net energy demand for heating and cooling of building zones

Part 3: Net energy demand for air conditioning

Part 4: Net and final energy demand for lighting

Part 5: Final energy demand of heating systems

Part 6: Final energy demand of ventilation systems and air heating systems for residential buildings

Part 7: Final energy demand of air-handling and air-conditioning systems for non-residential buildings

Part 8: Net and final energy demand of domestic hot water systems

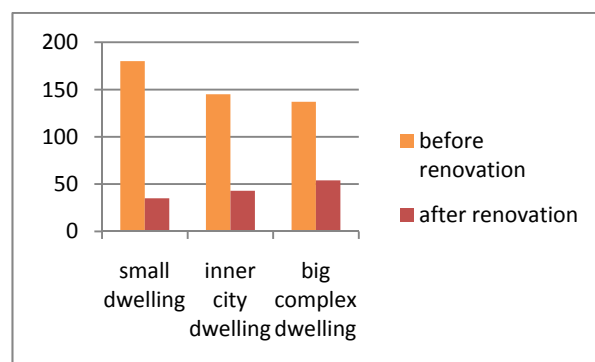
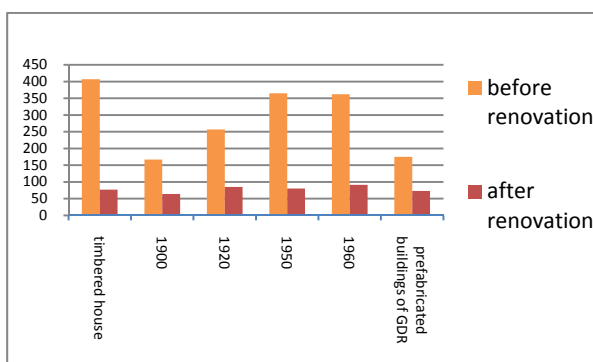
Part 9: Final and primary energy demand of combined heat and power generation plants

Part 10: Boundary conditions of use, climatic data

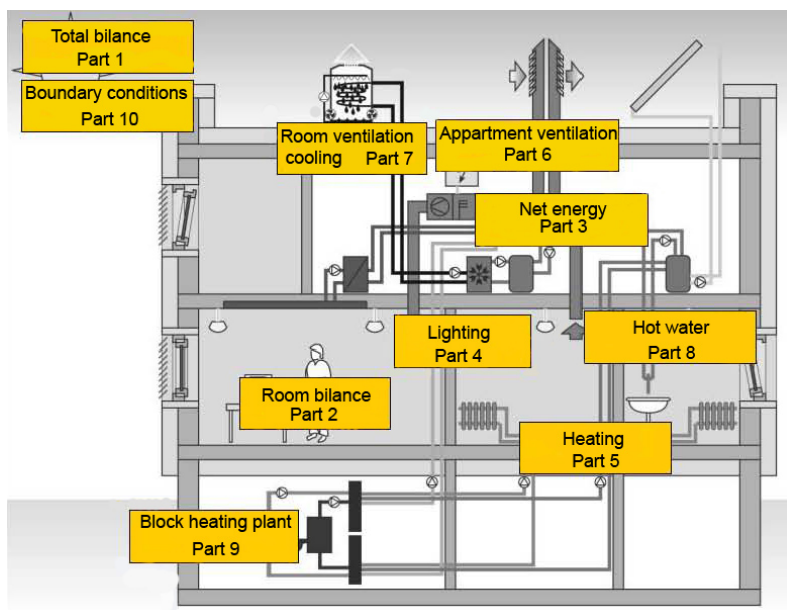
DIN 18599 [30]

Maximal specific heat transmission losses per m ² thermal envelope and typology in W/Km ²						
	name and date of code	isolated residential building		one - sided built - on residential building	all other residential buildings	building extensions
		with effective area A _E < 350 m ²	with effective area A _E > 350 m ²			
Germany	ENEV 2009	0,40	0,50	0,45	0,65	0,65

U-values for temperature difference between room and... through... in W/Km ²						
	name and date of code	external air	soil	external air	external air	external air
		wall	wall/ floor above	roof	window	roof window
Germany	ENEV 2009	0,28	0,35	0,20	1,30	1,40



Overview of the parts of the DIN 18599 [30]



1.3.2 What is average specific heat consumption of residential buildings in kWh/m²a?

Annual energy consumption according to construction age in kWh/m²a [31]: left side

Annual energy consumption of a small amount of dwellings according to typology in kWh/m²a [32]: right side

Annual energy consumption in kWh/m²*a			
	name and date of code or house type	annual primary energy consumption Q_p	annual heating requirement Q_h
Germany	KfW Efficiency House 70	< 60	
	KfW Efficiency House 55	< 40	
	Passive house	< 40	< 15

1.3.3 Is there any national code for thermal insulation of buildings?

DIN 4108: Thermal insulation and energy economy in buildings. [33]

DIN 4108 (Part 1-4) - Thermal insulation an energy economy in buildings.

DIN 4108-7 Thermal insulation and energy economy in buildings - Part 7: Air tightness of buildings, requirements, recommendations and examples for planning and performance. Thermal insulation and energy economy in buildings - Thermal bridges - Examples for planning and performance.

1.3.4 What method is implemented to calculate energy demand?

Annual primary energy demand:

Annual primary energy demand for residential buildings can be calculated according to DIN EN 832: in connection with DIN V 4108-6 and DIN V 4701-10. [34,33,35]

Annual net heating demand:

The annual net heating demand of the building (heating demand Q_h and domestic hot water demand Q_{DHW}) has to be known for the calculation of annual primary energy demand as well as expenditure of energy:

$$Q_p = (Q_h + Q_{DHW}) \cdot e_p$$

Q_p annual primary energy demand for the building

Q_h annual heating demand

Q_{DHW} annual heating demand for the domestic hot water

e_p expenditure of energy

Annual heating demand:

Annual heating demand (Q_h) has to be calculated according to the monthly balance method (DIN 4108-Part 6, Annex D), or according to the seasonal balance method (also called simplified method), that is described in DIN V 4701-10. [33]

Annual heating demand for the domestic hot water:

Annual heating demand for the domestic hot water (Q_{DHW}) is defined in DIN V 4701-10 as 12,5 kWh/ (m²a). [33]

Expenditure of energy:

Expenditure of primary energy e_p describes the proportion of the primary energy contained from system technology in relation to net heat supplied by it.

The whole system technologies of the building (heating, ventilation, heating of domestic hot water) during the certain use period have to be considered for the calculation of expenditure of energy e_p .

Primary energy demand of the systems includes four loss parts:

- losses during the generation
- losses during the distribution
- losses during the storage
- losses during the benefit transfer

In addition the required auxiliary energy has to be calculated, e.g. for the heat pump and the burner motor. Furthermore, the energy loss has to be considered during the primary energy transformation to the final energy.

The annual heat demand is covered by 3 parts:

$$Q_h = Q_{h,DHW} + Q_{h,V} + Q_{h,H} \quad (\text{equation 20})$$

$Q_{h,DHW}$ heat thermal credit item through hot water system losses

$Q_{h,V}$ ventilation contribution at the annual heating demand

$Q_{h,H}$ heating contribution at the annual heating demand

For each part there should be done a separate calculation. It should be started with hot water heating, because those losses are integrated in the heating. The required primary energy for the building resulted from

the sum of primary energy for 3 net energy parts:

$$Q_p = Q_{DHW,P} + Q_{V,P} + Q_{H,P}$$

$$Q_{i,P} = (q_{i,TE,P} + q_{i,AE,P}) \cdot A_N$$

$q_{i,TE,P}$ specific thermal energy for the process i with

i=DHW, V, H, valued as a primary energy

$q_{i,AE,P}$ specific electric auxiliary energy for the process i with

i= DHW, V, H, valued as a primary energy

A_N effective area of the building

Seasonal balance method and monthly balance method:

There are used two ways to calculate the heating energy demand of the building according to DIN 4108-Part 6: seasonal balance method and monthly balance method.[33]

The calculation of the annual heating demand according to the DIN 4108-Part 6 is based on monthly period. The monthly heating demand outcomes according the following equation:[33]

$$Q_{h,M} = Q_{l,M} - \eta_M \cdot Q_{g,M} \quad (\text{equation 20})$$

$Q_{l,M}$ monthly thermal losses

$Q_{g,M}$ monthly thermal gains

η_M monthly utilisation factor

Thermal losses $Q_{l,M}$ in kWh/Month have to be calculated according to the equation

$$Q_{l,M} = 0,024 H_M (\theta_i - \theta_{e,M}) t_M \quad (\text{equation 21})$$

0,024 in kWh=1Wd;

H_M specific thermal loss

$\theta_i - \theta_{e,M}$ temperature difference between internal air temperature and external air temperature $\theta_{e,M}$

t_M number of days the mentioned month

NOTE: for the calculation of specific thermal loss H notice, that losses to the ground depend on the month according to DIN EN ISO 13370. [36]

Thermal gains in monthly average $Q_{g,M}$ in kWh/month have to be calculated in the following way:

$$Q_{g,M} = 0,024 (\Phi_{S,M} + \Phi_{i,M}) t_M \quad (\text{equation 22})$$

$\Phi_{S,M}$ average solar radiance thermal gains per month

$\Phi_{i,M}$ thermal gain from internal thermal sources (average internal thermal benefit)

t_M number of the days of the mentioned month

The monthly solar thermal gain $\Phi_{S,M}$ results from the equation:

m

$$\Phi_{S,M} = \sum_{j=1}^m I_{s,M,j} \sum F_F F_S F_C g_i A_i \quad (\text{equation 23})$$

$I_{s,M,j}$ monthly average radiation intensity

F_F reduction ratio for the frame ($F_F = 0,7$; or detailed calculation)

F_S reduction ratio for shadow (Table 9 - 11 of DIN 4108-Part 6) [33]

F_C reduction ratio for anti-glare shield (Table 7 of DIN 4108-Part 6) [33]

i building part

j orientation (j=South; East, West, North)

NOTE: the efficient total energy transmittance has to be used for g.

For the monthly average radiation intensity $I_{s,M}$ look in the appendix A.

The average internal thermal gain $\Phi_{i,M}$ (kWh/month) results according to the following equation:

$$\Phi_{i,M} = q_{i,M} A_B \quad (\text{equation 24})$$

$q_{i,M}$ the average internal thermal benefit related to the area (Table 2 or Appendix D of DIN 4108-Part 6)

A_B reference area [33]

According to DIN 4108-Part 6 Appendix D $A_B = A_N = 0,32 V_e$ (V_e - gross volume) . [33]

The specific thermal loss H has to be calculated in the following way:

$$H = H_T + H_V \quad (\text{equation 25})$$

H_T specific transmittance thermal loss

H_V specific ventilation thermal loss

The annual heating demand Q_h (kWh/a) results according to the following equation:

$$Q_h = \sum Q_{h,M/pos} \quad (\text{equation 26})$$

$Q_{h,M/pos}$ is the monthly heating demand with positive thermal balance

$$Q_{h,M} > 0$$

Annual heat energy demand

annual heat energy demand Q results according to the equations from the DIN V 4701-10 [35]

Heat limit temperature

Heating period has to be calculated by comparing external air temperature and heat limit temperature according to the following

equation:

$$\theta_{ed} = \theta_i - \eta_0 Q_{g,M} / (H_M t_M 0,024) \quad (\text{equation 27})$$

θ_{ed} heat limit temperature

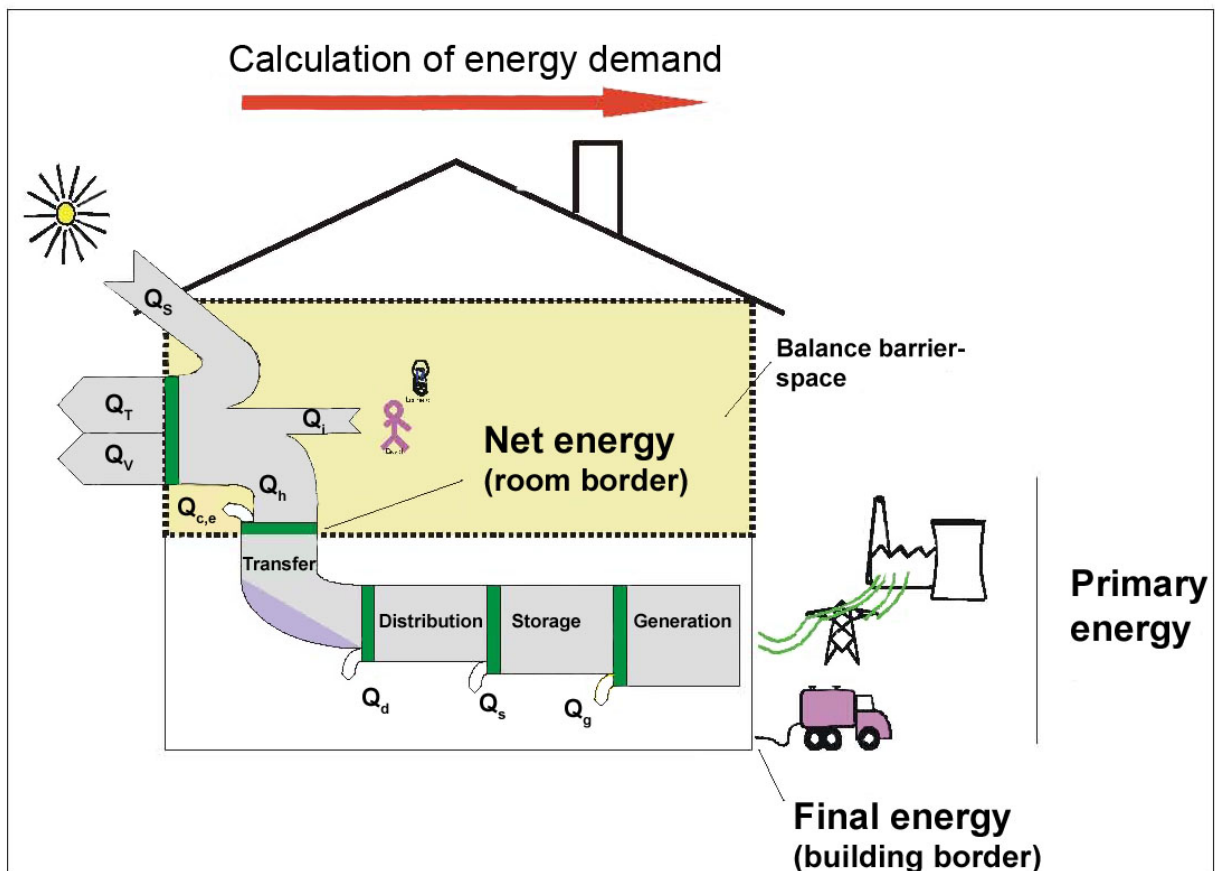
η_0 utilization factor, $\gamma=1$

$Q_{g,M}$ monthly thermal gain (kWh)

t_M number of the days of the month (days)

H_M specific thermal loss (W/K)

If the heat limit temperature > external air temperature, heating days in the heating period have to be counted.



The seasonal balance method is a simplified method, according to that the annual heating energy demand has to be defined in one balance step for the whole heating period. According to EnEV the heating period is 185 days. The following table shows the differences between the seasonal balance method and the monthly balance method. [37]

	Heating seasonal balance method	Monthly balance method [37]
Principle	Balance of the total heating period (185d)	Balance of the each month; addition
Appliance limitations	Exclusively for residential building with window surface rate < =30%	No
Netto-internal volume V	constant with $V=0,8*V_e$	Differentiation in small buildings till 3- storey building: $V=0,76*V_e$ Larger buildings: $V=0,8*V_e$ accordingly individual calculated V
Building parts in unheated areas and in the ground	Fixed considered $F_{xi}=0,6$	Differentiated considered (depends on the case $F_{xi}=0,25-0,9$)
Thermal bridges	Constructions according to the design examples pursuant to DIN 4108, supplement sheet 1: fixed raise $\Delta U_{TB}=0,05W/m^2K$; Without the consideration of design examples: monthly balance method	Either: fixed with $\Delta U_{TB}=0,1W/m^2K$; or: applying of design examples according to DIN 4108, supplement sheet 1: $\Delta U_{TB}=0,05W/m^2K$; or: exact proof of thermal bridges according to DIN V 4108-6
Cardinal directions	Consideration only the main cardinal directions (North, South, East, West)	Consideration of 8 cardinal directions (N,S,E,W,NE,NW,SE,SW)
Considered grades	Horizontal(0°) and vertical (90°)	$0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$
Solar gains of external surfaces	Not considered	Considered
Unheated glass porches	Not considered	Considered
Transparent thermal insulation	Not considered	Considered
Storage capacity	Not considered	Considered
Rate of window frames	Fixed	Individual
Shadow	Fixed	Individual
Extra losses of surface heating	Not considered	Considered
Auto ventilation with and without thermal recovery	Not considered	Considered
Internal gains	fixed	Individual
Individual heating temperature lowering	Not considered	Considered

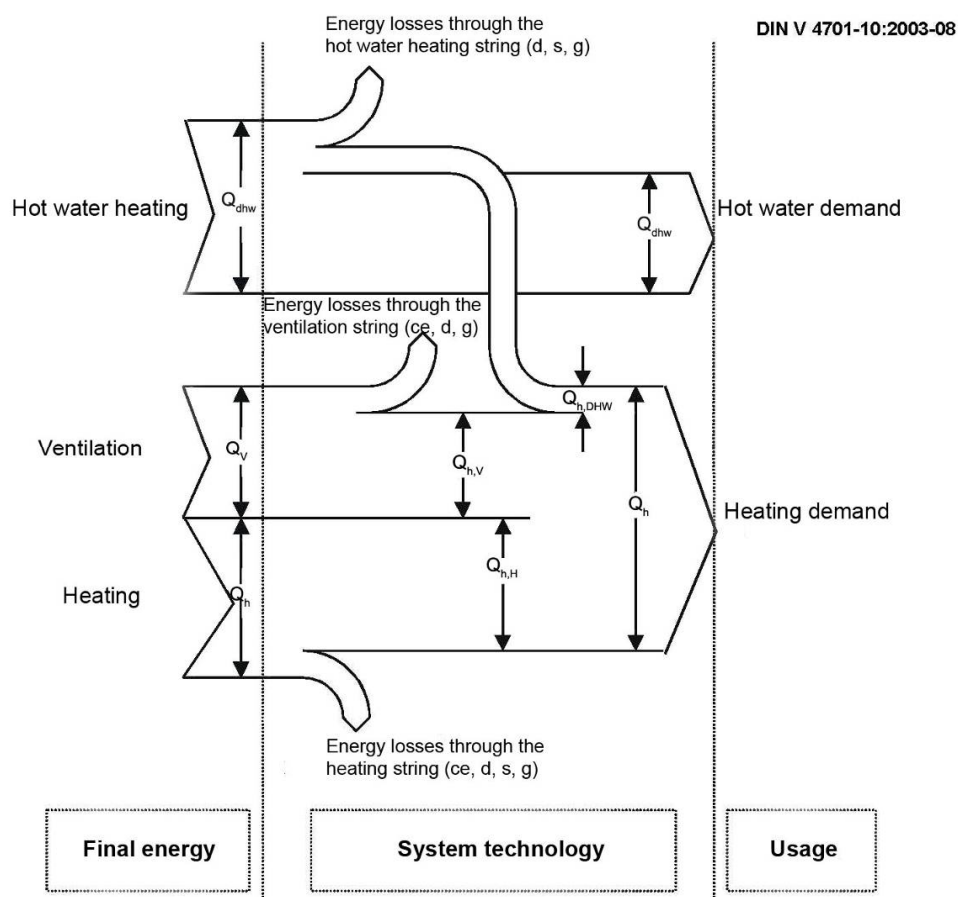


Image
for

of energy
stream
the

calculation of heating, ventilation and hot water heating [35]

The preparation of heat to the coverage of hot water heating demand (the same for the heating) through the hot water string can be generally classified to 5 process steps:

- Transfer of the hot water from the water plug to the user (index 'ce'- control and emission)
- Distribution of the hot water from the heat generator/storage to the water plug (index 'd'-distribution)
- Storage of the hot water in the hot water storage (index 's'- storage)
- Generation of the heated water (index 'g'-generation)
- Transformation of the primary energy (coefficient f_p)

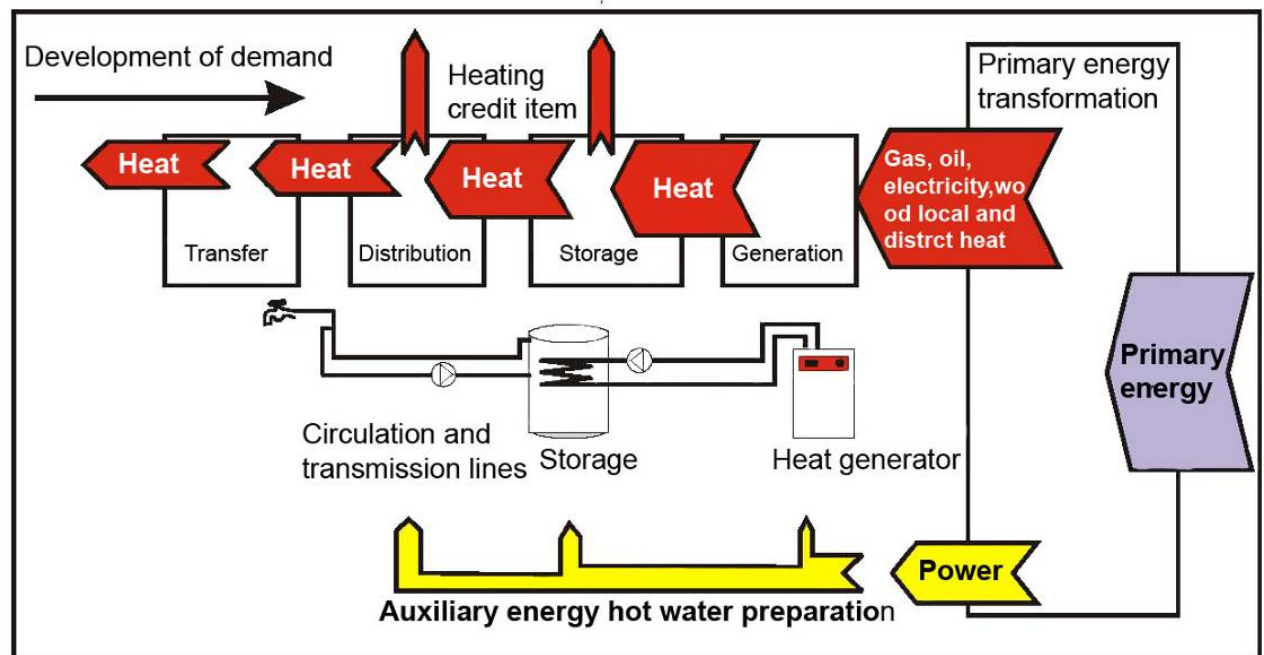
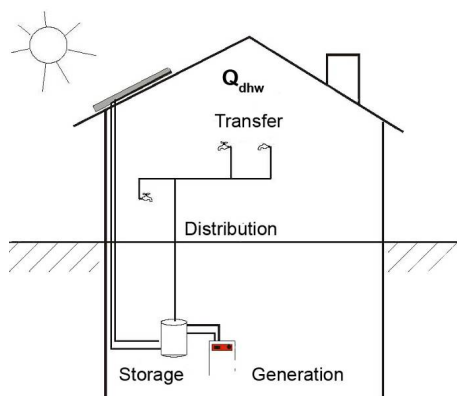


Image of the calculation schema for the hot water string [35]



Exemplary illustration of the hot water string [35]

The preparation of the heat through the ventilation string is been classified to 5 steps:

- Transfer of the heat in the room (index 'ce')
- Distribution of the heat to the place of transfer (index 'd')
- Generation of the heat (index 'g')
- Transformation of the primary energy (coefficient f_p)
- Generation of the heated water (index 'g'-generation)

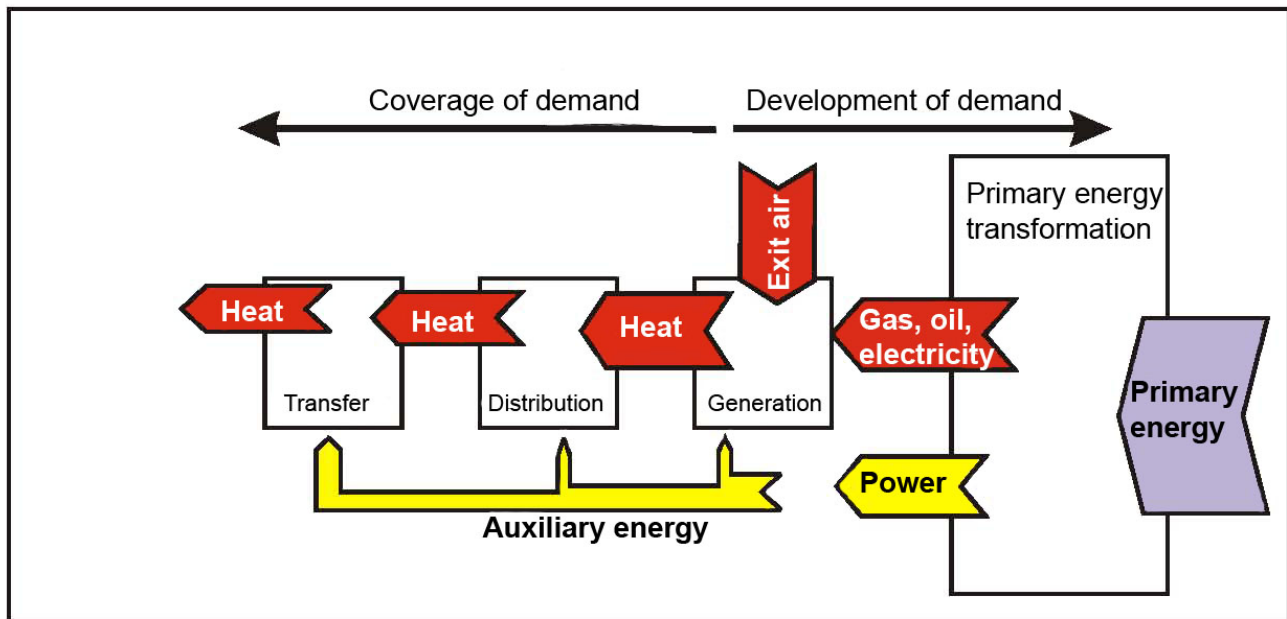
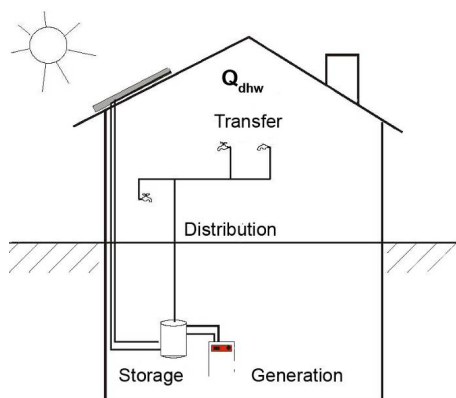


Image of the calculation schema for the hot water string [35]



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- Generation of the heated water (index 'g'-generation)

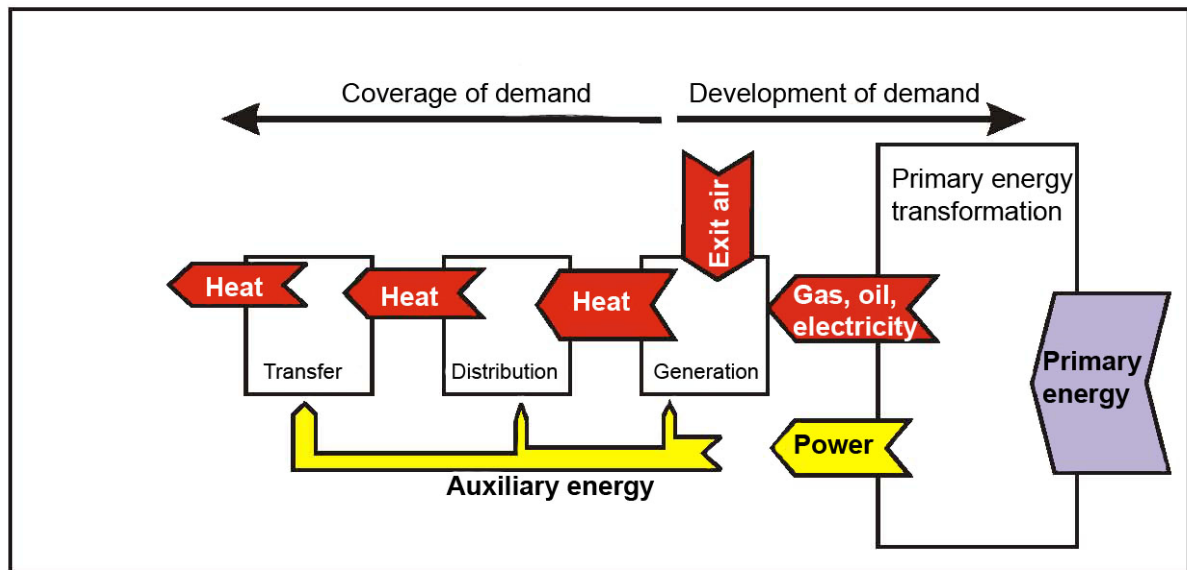
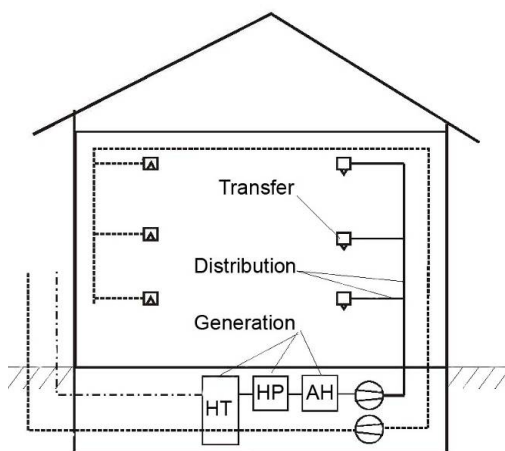


Image of the calculation schema for the ventilation [35]



Exemplary illustration of the ventilation string [35]

I. Input		HOT WATER		HEATING		VENTILATION	
$A_N =$		$t_{HP} =$ 185					
absolute demand	$Q_{dhw} =$	0 kWh/a		$Q_h =$			
specific demand	$q_{dhw} =$	12,5 kWh/m ² a		$q_h =$			
II. System description							
transfer							
distribution							
storage							
generation							
coverage part							
generator							
energy source							
III. Results							
coverage of Q_h	$q_{h,DHW} =$	0,0 kWh/m ² a		$q_{h,H} =$	0,0 kWh/m ² a		$q_{h,V} =$
							0,0 kWh/m ² a
ENERGY SOURCE							
Thermal energy (TE)		1.		2.		3.	
Auxiliary energy (AE):		power					
Annual final energy demand		$Q_F = \Sigma Q_{TE,F} + Q_{AE,F}$					
Annual primary energy demand		$Q_P = \Sigma Q_{TE,P} + Q_{AE,P}$					
Specific annual primary energy demand		$q_P = Q_P / A_N$					
Expenditure of energy		$e_P = Q_P / (Q_h + Q_{dhw})$					
PRIMARY ENERGY							
$Q_{TE,1,P}$		0 kWh/a		$Q_{TE,1,P}$		0 kWh/a	
$Q_{TE,2,P}$		0 kWh/a		$Q_{TE,2,P}$		0 kWh/a	
$Q_{TE,3,P}$		0 kWh/a		$Q_{TE,3,P}$		0 kWh/a	
$Q_{AE,P}$		0 kWh/a		$Q_{AE,P}$		0 kWh/a	
$Q_P =$		0 kWh/a		$Q_P =$		0 kWh/a	
$q_P =$		kWh/m ² a		$q_P =$		kWh/m ² a	
$e_P =$		[-]		$e_P =$		[-]	

Calculation according to the German Energy Saving Ordinance (EnEV2007) - residential buildings - simplified method, seasonal balance (according to DIN V 4108-6) -							
Building: _____							
1	1. Data of the building						
2	volume (external dimension) [m³]	$V_e =$ _____					
	effective area [m²]	$A_N = 0,32 * V_e = 0,32 * \text{_____} = \text{_____}$					
	A/V _e -proportion [1/m]	$A / V_e = \text{_____} * \text{_____} = \text{_____}$					
3	effective area of the whole building (as refers to system technology) [m²] $A_{N, total} =$ _____ (if no input=> $A_{N, total} = A_N$)						
3	2. Heat losses						
4	2.1 Heat transmittance losses [W/K]						
5	element	short term	area A_i [m²]	heat transfer coefficient U_i [W/(m²K)]	$U_i * A_i$ [W/K]	temperature-correction-factor F_{xi} [-]	$U_i * A_i * F_{xi}$ [W/K]
6	external wall	AW 1				1	
7		AW 2				1	
8		AW 3				1	
9		AW 4				1	
10	windows	W 1				1	
11		W 2				1	
12		W 3				1	
13		W 4				1	
14	entry door	T 1				1	
15	roof	D 1				1	
16		D 2				1	
17		D 3				1	
18	top floor ceiling	D 4				0,8	
19		D 5				0,8	
20	wall to back room	AbW 1				0,8	
21		AbW 2				0,8	
22	wall and ceiling to unheated rooms	AB 1				0,5	
23		AB 2				0,5	
24	cellar ceiling/wall to unheated cellar	G 1				0,6	
25		G 2				0,6	
26	floor to soil	G 3				0,6	
27		G 4				0,6	
28		G 5				0,6	
29	$\Sigma A_i = A =$			definition of heat transmittance losses $\Sigma U_i * A_i * F_{xi} =$			
30	heat transmittance losse	$H_T = \Sigma (U_i * A_i * F_{xi}) + DU_{WB} * A$ $H_T = \text{_____} + 0,05 * \text{_____}$					$H_T =$ _____
31	2.2 Ventilation heat losses [W/K]						
32	ventilation heat losses without blower door test	$H_V = 0,19 * V_e * \text{_____}$					$H_V =$ _____
33	ventilation heat losses with blower door test	$H_V = 0,163 * V_e * \text{_____}$					$H_V =$ _____

1) In the simplified method as a correction value of the thermal bridge: $UTB = 0,05 \text{ W/(m}^2\text{K)}$

HOT WATER HEATING

HEAT (H)					
	calculation rule/ source	dimension			
q_{dhw}	from EnEV	[kWh/m²a]	+	12,50	generator 2
$q_{DHW,ce}$	table C.1.1	[kWh/m²a]		0,00	
$q_{DHW,d}$	tables C.1.2a or rather C.1.2c	[kWh/m²a]			
$q_{DHW,s}$	table C.1.3a	[kWh/m²a]			
q^*_{DHW}	$(q_{dhw} + q_{DHW,ce} + q_{DHW,d} + q_{DHW,s})$	[kWh/m²a]		12,50	
			generator 1	generator 2	generator 3
$\alpha_{DHW,g,l}$	table C.1.4a	[--]	0,00	0,00	0,00
$\alpha_{DHW,g,l}$	tables C.1.4b,c,d,e or f	[--]			
$q_{DHW,g,l}$	$(q^*_{DHW} \times \alpha_{DHW,g,l} \times \alpha_{DHW,g,l}) - (q^*_{DHW} \times \alpha_{DHW,g,l})$	[kWh/m²a]	0,00	0,00	0,00
$q_{DHW,F,l}$	$q^*_{DHW} \times (\alpha_{DHW,g,l} \times \alpha_{DHW,g,l})$	[kWh/m²a]	0,0	0,0	0,0
energy source:					
$f_{p,l}$	table C.4.1	[--]			
$q_{DHW,P,l}$	$\sum q_{DHW,F,l} \times f_{p,l}$	[kWh/m²a]	0,0	0,0	0,0
AUXILIARY ENERGY (AE)					
	calculation rule/source	dimension			
$q_{DHW,ce,AE}$	table TC.1.1	[kWh/m²a]	+	0,00	
$q_{DHW,d,AE}$	table C.1.2b	[kWh/m²a]			
$q_{DHW,s,AE}$	table C.1.3b	[kWh/m²a]			
			generator 1	generator 2	generator 3
$\alpha_{DHW,g,l}$	table C.1.4a	[--]	0,00	0,00	0,00
$q_{DHW,g,AE,l}$	tables C.1.4b,c,d,e or f	[kWh/m²a]			
$q_{DHW,g,AE,l}$	$q_{DHW,g,AE,l} \times \alpha_{DHW,g,l}$	[kWh/m²a]	0,00	0,00	0,00
$\sum q_{DHW,AE,l}$	$q_{DHW,ce,AE} + q_{DHW,d,AE} + q_{DHW,s,AE} + \sum (\alpha_{\epsilon} \times q_{g,l})$	[kWh/m²a]		0,00	
energy source:					
f_p	table C.4.1	[--]		power	
$q_{DHW,AE,P}$	$\sum q_{DHW,AE,l} \times f_p$	[kWh/m²a]		3,0	
		[kWh/m²a]		0,0	

$$2) f_{Gt} = 66 \text{ kKh/a}$$

³⁾ The area related demand is generally signified with Q'' or with q .

Parameter		Cabel nr.
	calculation rule/ source	dimension
q_{dhw}	from EnEV	12,5 kWh/m ² a
A_N		0,0 m ²
Q_{dhw}	$q_{dhw} \times A_{N,i}$	0 kWh/a

Thermal heat credit items

$q_{h,DHW,d}$	table C.1.2a	kWh/m ² a
$q_{h,DHW}$	$q_{h,DHW,d} + q_{h,DHW,s}$	0,00 kWh/m ² a

The summ of the coverage parts is not 1!

final energy

$q_{DHW,F}$	$S_{DHW,F,i}$	$0,0 \text{ kWh/m}^2\text{a}$
-------------	---------------	-------------------------------

primary energy

Primary energy	$q_{DHW,P}$	$Sq_{DHW,P,i}$	$0,0 \text{ kWh/m}^2\text{a}$
----------------	-------------	----------------	-------------------------------

The summ of the coverage parts is not 1!
Results have to be checked in the cover sheet!

final energy

$q_{DHW,AE,F}$	0,0 kWh/m ² a
----------------	--------------------------

primary energy

q _{DHW,AE,P}	0,0 kWh/m ² a
-----------------------	--------------------------

final energy:	Q _D 1.	S _{QDHW,H1,F} x A _N	0 kWh/a
	2.	S _{QDHW,H2,F} x A _N	0 kWh/a
	3.	S _{QDHW,H3,F} x A _N	0 kWh/a
primary	Q _{DHW,AE,F}	power	0 kWh/a
	Q _{DHW,P}	(Q _{DHW,P} + Q _{DHW,AE,P}) x A _N	0 kWh/a

VENTILATION

		cabel nr.	
	source	dimen	sion
A_N		0,0	m ²
F_{GT}	table 5.2	kKh/a	
n_A		1/h	
f_g	table 5.2-3	[-]	

HEAT (H)		generation			distribution (table C.2-2)	transfer (table C.2-1)	change of ventilation, adjustment	air contribution at Q_h
calculation rule/source	dimension	1 HR with heat transfer	2 air heat pump	3 damper register				
$q_{v,g}$	annex C.2.3.1	[kWh/m ² a]	+	+	-	-	=	0,0
$e_{v,g}$	annex C.2.3.1	[kWh/m ² a]						
$q_{v,g,v}$	$(q_{v,g,i} \times e_{v,g,i}) - q_{v,g,i}$	[kWh/m ² a]		0				
$q_{v,g,F}$	$q_{v,g,i} \times e_{v,g,i}$	[kWh/m ² a]	energy source:					
f_p	table C.4.1	[-]						
$q_{v,P}$	$q_{v,g,F,i} \times f_{p,i}$	[kWh/m ² a]		0,00	+			0,00
AUXILIARY ENERGY (AE)								
calculation rule/source	dimension	generator HR with heat transfer	generator air heat pump	generator damper register				
$q_{v,g,AE}$	table C.2.3.1	[kWh/m ² a]	+	+				
$q_{v,ce,AE}$	table C.2.1	[kWh/m ² a]						
$q_{v,d,AE}$	table C2.2	[kWh/m ² a]						
$q_{v,AE,F}$	$S q_{v,g,HE,i} + q_{v,ce,HE} + q_{v,d,HE}$	[kWh/m ² a]		0,00				
energy source:				power				
f_p	table C.4-1	[-]		3,0				
$q_{v,AE,P}$	$S q_{v,HE,F} \times f_p$	[kWh/m ² a]		0,00				
final energy:				$Q_{v,H,F}$	1.	$Sq_{v,H1,F} \times A_N$		kWh/a
					2.	$Sq_{v,H2,F} \times A_N$		0 kWh/a
					3.	$Sq_{v,H3,F} \times A_N$		0 kWh/a
				$Q_{v,AE,F}$	power	$Sq_{v,AE,F} \times A_N$		0 kWh/a
primary energy:				$Q_{v,P}$		$(q_{v,H,P} + q_{v,AE,P}) \times A_N$		0 kWh/a

primary energy		$q_{v,P}$	$Sq_{v,P,i}$	0,0	kWh/m ² a
-----------------------	--	-----------	--------------	-----	----------------------

final energy		$q_{v,AE,F}$		0,0	kWh/m ²
---------------------	--	--------------	--	-----	--------------------

primary energy		$q_{v,AE,P}$		0,0	kWh/m ²
-----------------------	--	--------------	--	-----	--------------------

HEATING

HEAT (H)		calculation rule/ source	dimension			
q_h		according to annex 4.1	[kWh/m ² a]			0,00
$q_{h,DHW}$		from hot water heating calculation	[kWh/m ² a]			0,00
$q_{h,V}$		from ventilation calculation	[kWh/m ² a]	-		0,00
$q_{h,ce}$		table C.3.1	[kWh/m ² a]			
$q_{h,d}$		tables C.3.2a, b oder d	[kWh/m ² a]	+		
$q_{h,s}$		table C.3.3	[kWh/m ² a]			
q^*_H		$(q_h - q_{h,DHW} - q_{h,V} + q_{h,ce} + q_{h,d} + q_{h,s})$	[kWh/m ² a]			0,00
$\alpha_{H,g,i}$		table C.3.4a	[--]	generator 1	generator 2	generator 3
$e_{H,g,i}$		table C.3.4b,c,d oder e	[--]			
$q_{H,g,i}$		$(q^*_H \times e_{H,g,i} \times \alpha_{H,g,i}) - (q^*_H \times \alpha_{H,g,i})$	[kWh/m ² a]	0,00	0,00	0,00
$q_{H,f,i}$		$q^*_H \times (e_{H,g,i} \times \alpha_{H,g,i})$	[kWh/m ² a]	0,0	0,0	0,0
energy source:						
$f_{P,i}$		table C.4.1	[--]			
$q_{H,P,i}$		$\Sigma q_{H,f,i} \times f_{P,i}$	[kWh/m ² a]	0,0	0,0	0,0
AUXILIARY ENERGY (AE)						
calculation rule/ source						
$q_{H,ce,AE}$		table C.3.1	[kWh/m ² a]			
$q_{H,d,AE}$		table C.3.2c	[kWh/m ² a]			
$q_{H,s,AE}$		table C.3.3	[kWh/m ² a]	+		
$\alpha_{H,g}$		table C.3.4a	[--]	generator 1	generator 2	generator 3
$q_{H,g,AE}$		table C.3.4b-e	[--]	0,00	0,00	0,00
$\alpha \times q_{g,AE}$			[kWh/m ² a]	0,00	0,00	0,00
$\Sigma q_{H,AE}$		$(q_{ce,AE} + q_{d,AE} + q_{s,AE} + \Sigma \alpha q_{g,AE})$	[kWh/m ² a]			
energy source:						
f_P		table C.4.1	[--]			
$q_{H,AE,P}$		$\Sigma q_{H,AE} \times f_P$	[kWh/m ² a]			

final energy	1.	$\Sigma q_{H,HE1,F} \times A_N$	0 kWh/a
	2.	$\Sigma q_{H,HE2,F} \times A_N$	0 kWh/a
	3.	$\Sigma q_{H,HE3,F} \times A_N$	0 kWh/a
primary energy:		$\Sigma q_{H,HE,F} \times A_N$	0 kWh/a
		$(q_{H,P} + q_{H,HE,P}) \times \gamma$	0 kWh/a

Parameter

Parameter	calculation rule	cabel nr.	dimension
q_h			0,0 kWh/m ² a
A_N			0,0 m ²
Q_h	$q_h \times A_N$		0 kWh/a

The summ of the coverage parts is not 1!
Results have to be checked in the cover sheet!

final energy

$q_{H,F}$	$\Sigma q_{H,F,i}$	0,0 kWh/m ² a
-----------	--------------------	--------------------------

Primary energy

$q_{H,P}$	$\Sigma q_{H,P,i}$	0,0 kWh/m ² a
-----------	--------------------	--------------------------

final energy

$q_{H,AE,F}$		0,0 kWh/m ² a
--------------	--	--------------------------

primary energy

$q_{H,AE,F}$		0,0 kWh/m ² a
--------------	--	--------------------------

1.4 Building materials – Germany PP1

1.4.1 What kind of building materials are used for: roof structure, load bearing structure, foundation, external wall, internal wall, floor, ceiling, façade, windows, thermal insulation?

Roof structure	wood and tiles, reinforced concrete and bitumen
Load bearing structure	walls of brick and building stone masonry, reinforced concrete
Foundation	Strip, single or mat foundation of reinforced concrete
External wall	normally plaster and colour and building stone or brick masonry
Internal wall	light separation walls of gypsum plaster boards
Floor	wood, floor tiles, linoleum, carpet
Ceiling	wood, prefabricated slabs of reinforced concrete, partially prefabricated slabs of reinforced concrete, prestressed concrete slabs
Facade	metal, glass, reinforced concrete,
Windows	Double or triple insulating glazing with frames of PVC, wood or wood-aluminium
Thermal insulation	mineral wool insulation, expanded polystyrene hard foam (EPS), polyurethane (PUR), polystyrene extruded foam, insulating lightweight building board

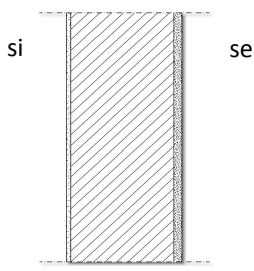
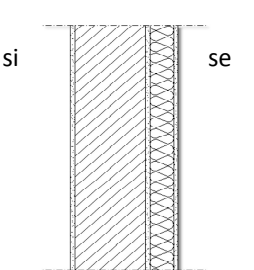
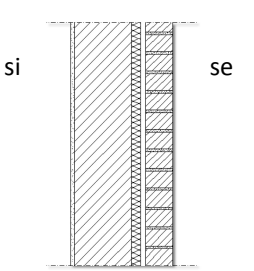
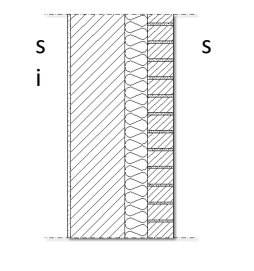
Characteristic data of several insulation materials according to thickness						
	primary energy demand	thermal conductivity λ	heat storage capacity c	fire behaviour	bulk density ρ	water vapour diffusion resistance
Units	kWh/m ³	W/mK	kJ/kgK	DIN 4102 class	kg/dm ³	
Mineral wool insulation	500,0	0,03-0,04	0,8	A2/A1	15-80	1
Expanded polystyrene hard foam (EPS)	390-1050	0,03-0,04	1,2	B1	15-30	20-100
Polyurethane (PUR)	840-1330	0,02-0,03	1,4-1,5	B1,B2	33	40-200
Polystyrene extruded foam (XPS)	350-1050	0,025-0,035	1,4	B1	33	80-200
Wood fibre insulating building board	160-200	0,04-0,05	2,1	B2	160,0	5-10
Cellulose	70,0	0,03-0,04	2,0	B2	35-100	1-2

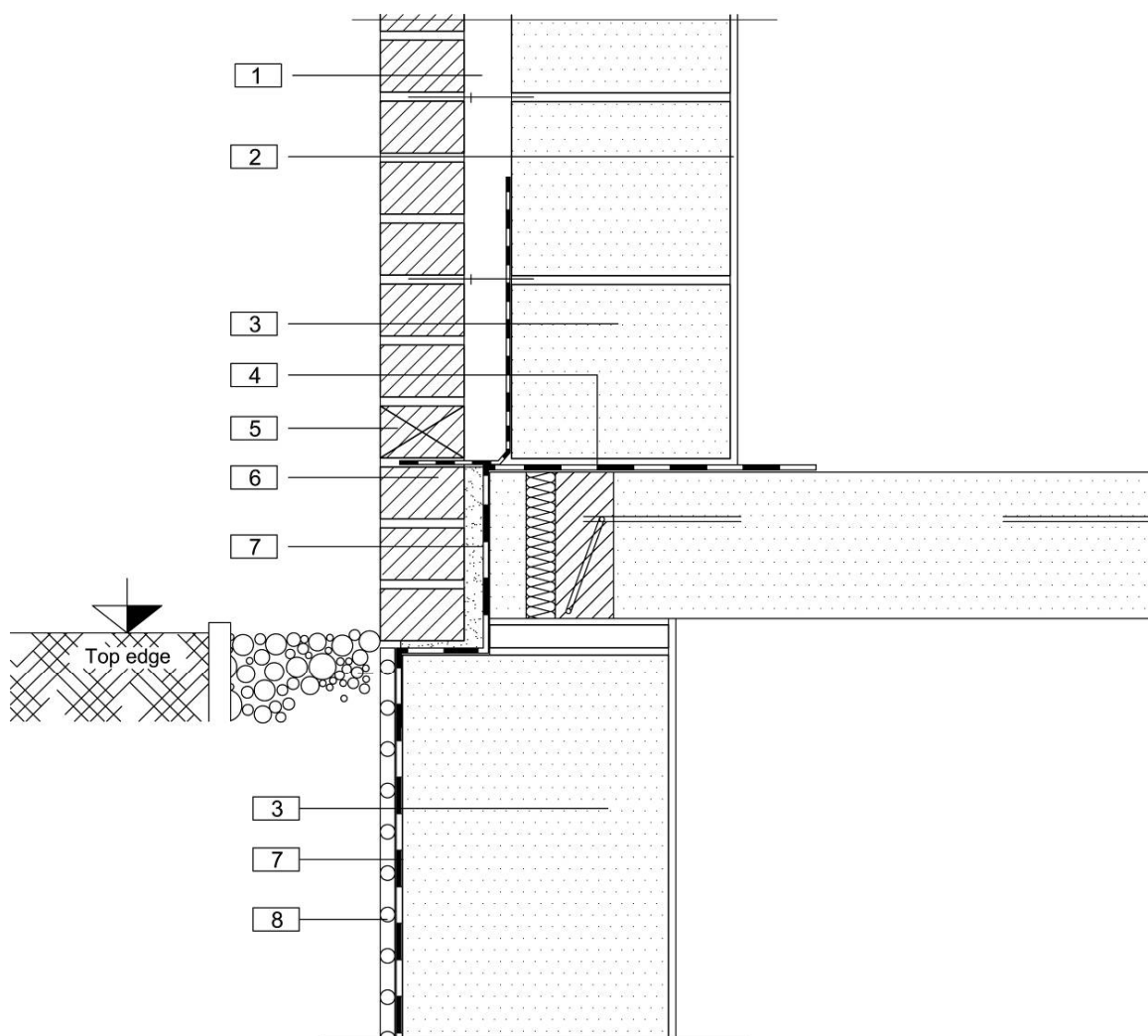
Insulation material in Germany 2003 in % (source: Gesamtverband Dämmstoffindustrie)	mineral wool insulation	expanded polystyrene hard foam (EPS)	polyurethane (PUR)	polystyrene extruded foam	insulating lightweight building board
Deutschland	59,11	30,36	5,44	5,08	0,01

Characteristic data of several stone types according to thickness						
	thickness	U-value	thermal conductivity λ	strength class	fire resistance	bulk density class ρ
Units	cm	W/m ² K	W/mK	N/mm ²	class	kg/dm ³
Light-weight concrete precision full block	30	0,3	0,1	2	F-60-A	0,45
Light-weight concrete precision light block	30	0,36	0,12	2	F-90-A	0,5
Light-weight concrete precision hollow block	30	0,25	0,3	2	F-90-A	0,8
Porous concrete precision block	30	0,28	0,1	2	A1	0,4

Type of glass	Construction* (Glass thickness, inter-pane cavity), [mm]	U _g value [W/m ² K]	G value [Overall energy transmittance]	τ_v [Light transmittance]
2 IGU, argon	4/12 – 16/#4	1.4 – 1.1	0.63 – 0.53	0.80 – 0.75
3 IGU, krypton	4#/8 – 12/4/8 – 12/#4	0.7 – 0.5	0.55 – 0.47	0.72 – 0.68
2 Vacuum	4/0.7/#4	0.5	0.54	0.73

* from outside inwards (IGU = insulating glass unit, # = position of the low-ε coating(s))

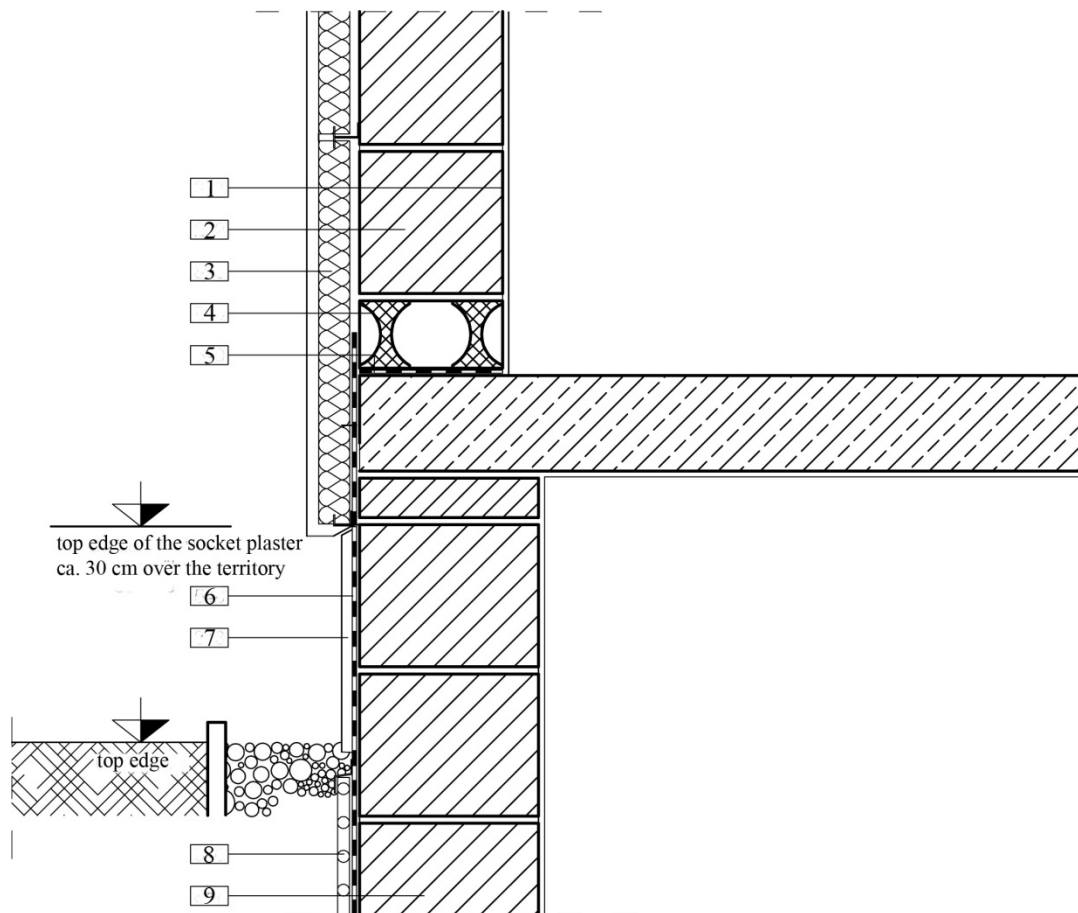
Masonry construction	Typical construction according to EnEV 2007 [26]
<p>Single leaf wall. plastered on both sides</p> 	<p>Back cover masonry: vertically perforated brick, porous concrete, lightweight concrete with lightweight surcharge</p> <p>Thickness: 30-36,5 cm</p> <p>λ Masonry = 0,09 – 0,14 W/(mK)</p> <p>$U = 0,23 – 0,35$ W/(m²K)</p> <p>Exterior plaster: lightweight plaster, isolating plaster</p>
<p>Single leaf wall with insulation layer (thermal insulation composite system)</p> 	<p>Back cover masonry: sand-lime brick, vertically perforated brick with and without lightweight surcharge</p> <p>Load-bearing masonry: 15-24 cm</p> <p>$\lambda = 0,14 – 1,1$ W/(mK)</p> <p>Insulation: 10 – 20 cm ($\lambda = 0,035 – 0,045$)</p> <p>$U = 0,20 – 0,30$ W/(m²K)</p>
<p>Double-leaf exterior wall with air layer and insulation</p> 	<p>Back cover masonry: sand-lime brick, vertically perforated brick, porous concrete, lightweight concrete with lightweight surcharge</p> <p>Load-bearing masonry: 15-24 cm</p> <p>$\lambda = 0,14 – 1,1$ W/(mK)</p> <p>Insulation: 8-10 cm ($\lambda = 0,030 – 0,035$)</p> <p>$U = 0,20 – 0,35$ W/(m²K)</p>
<p>Double leaf exterior wall with core insulation</p> 	<p>Back cover masonry: sand-lime brick, vertically perforated brick, porous concrete, lightweight concrete with lightweight surcharge</p> <p>Load-bearing masonry: 15-24 cm</p> <p>$\lambda = 0,14 – 1,1$ W/(mK)</p> <p>Insulation: 10-15 cm ($\lambda = 0,035 – 0,040$)</p> <p>$U = 0,20 – 0,35$ W/(m²K)</p>



Exterior wall, double leaf masonry,
rear ventilated

- | | | | | | |
|---|--------------------------|---|-------------------------------|---|-----------------------------|
| 1 | air layer | 4 | horizontal moisture separator | 7 | vertical moisture separator |
| 2 | interior plaster | 5 | open straight joint | 8 | protection mat |
| 3 | concrete precision block | 6 | clinker brick | | |

[38]



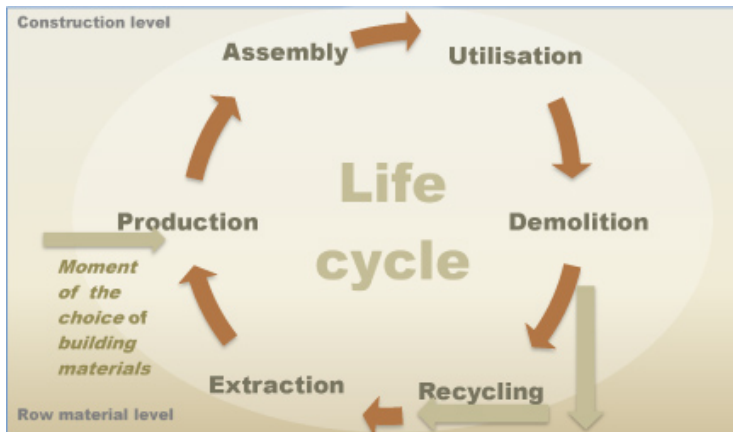
Exterior wall, with thermal insulation composite system,
basement ceiling over the top edge

- | | | |
|---------------------------------------|---------------------------------|------------------|
| 1 interior plaster | 4 thermal insulation element | 7 socket plaster |
| 2 vertically perforated brick | 5 horizontal moisture separator | 8 basement wall |
| 3 thermal insulation composite system | 6 vertical moisture separator | 9 protection mat |

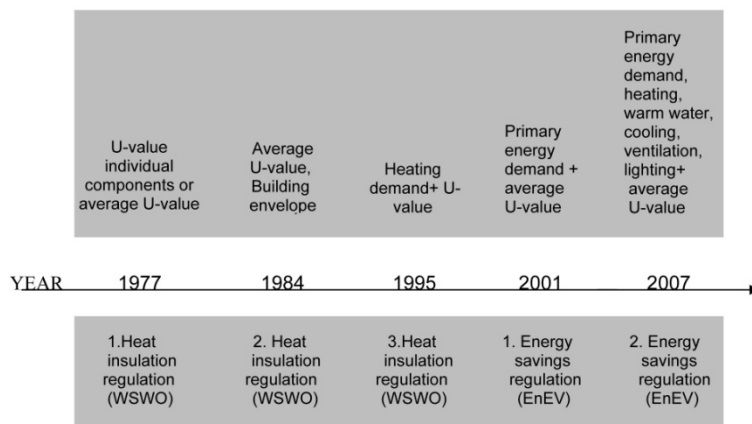
[38]

1.4.2 What are the reasons of the material usage?

Technical, economical, ecological, habits, tradition, regulations, aesthetical reasons:
raw materials, energy effort, recycling, transit, harmful substances, long life cycle



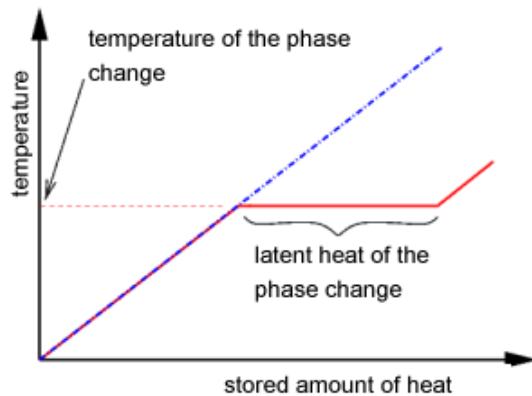
1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?



Description of the further development of the balancing framework to prove the demands on energy-efficient buildings in Germany [39]

Phase Change Materials:

When heat is stored, e.g. in a hot water tank or in a tiled stove, it usually involves large temperature changes of several tens of degrees C. The temperature of the storage medium increases (blue line) when heat is stored in it. This form of thermal storage is thus also called storage of sensible heat.



Comparison of the storage processes for sensible (blue) and latent (red) heat. [40]

As no temperature increase can be observed over a long period of time, despite the application of heat, the heat stored during the phase transition is called "latent heat". For a solid-liquid phase transition, the latent heat is equal to the heat of melting or crystallization of the storage material.

Latent heat storage is widely known in the form of heat packs which are "charged" in hot water. Use of stored ice or snow from winter to provide cooling or air conditioning in summer was widespread until the introduction of compression chillers. The concept is being discussed again today as an approach to save energy.

However, latent heat storage can also be applied in other temperature ranges. For each application, a material with an appropriate phase change temperature must be selected. Different classes of materials are used for different temperature ranges.

Storage of latent heat means storing heat in a material which undergoes a phase change, a so-called phase change material (abbreviation: PCM). The most commonly used phase change is between the liquid and solid states, but the phase change between two solid states can also be used in principle. However, the latter usually have a much lower storage density. When heat is fed into the storage material, the material begins to melt once the phase change temperature has been reached. Although further heat is applied, the temperature of the material does not increase until it has melted completely. Only then does the temperature rise again (red line).

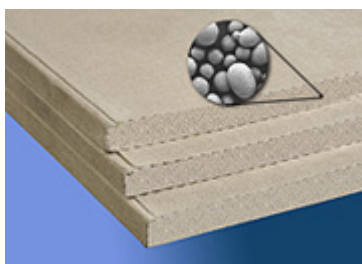
VIG, TABS

temperature ranges.

Examples for building products:

Knauf PCM Smartboard™ are gypsum boards

with a modified gypsum core and with board liner made of fiber glass fleece.

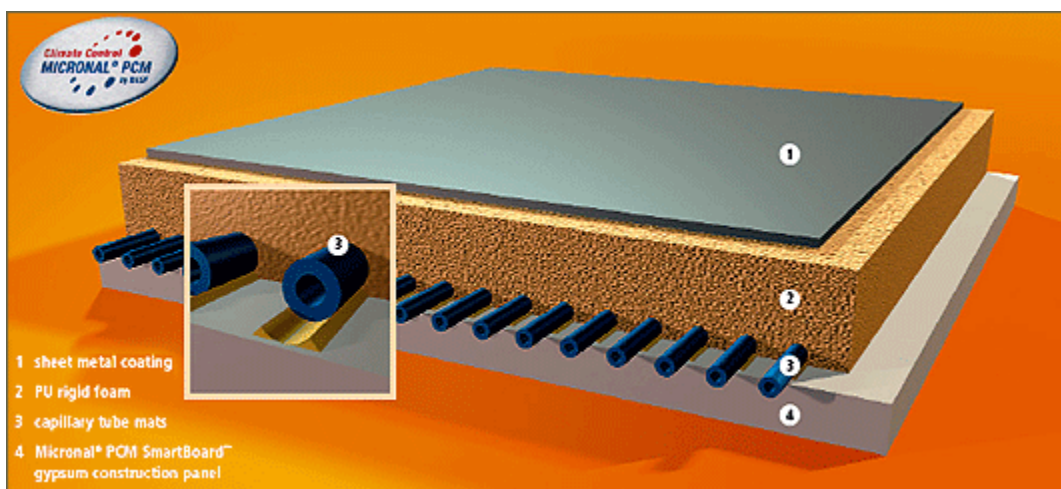


Celbloc Plus H&H by H+H Deutschland GmbH



ILKATHERM Air Conditioning Systems

ILKATHERM Walls, Ceilings and Sails



ILKATHERM products demonstrate their versatility mainly through the materials used and the wide range of applications.

The successful eccentric cam locks are foamed into the panels and – in combination with the tongue-and-groove joints – guarantee a swift and easy assembly. The construction elements exhibit outstanding heat insulating properties

and are also suited to soundproof rooms.






The system can be adapted to various conditions by foaming in cable troughs to measure. Another advantage in comparison with conventional dry mortarless construction systems is that special shelf elements for fixing heavy objects can be foamed in as well. ILKATHERM is capable

of taking up a suspended load of 100 kg per hook without using thicker panels.

1.4.4 s there any ecological declaration of building materials?

In Germany there are various ecological declarations of building materials with different criteria. Some building materials are also declared according to the international standard ISO 14025 - Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006) but it is not obligatory. There are following ecological declaration labels: [41]

natureplus	www.natureplus.org
GEV-EMICODE EC1	www.emicode.de
FSC-Siegel	www.fsc-deutschland.de
Euro-Blume	www.eco-label.com/german

Ecology labels:

natureplus

GEV-EMICODE EC1

FCS-Siegel

Euro-Blume

www.natureplus.org






www.emicode.de

www.fsc-deutschland.de

www.eco-label.com/german

1.4.5 What criteria are involved in this declaration?

Green house potential, ozone depletion potential, photochemical ozone creation potential, acid potential, eutrophication potential, emissions, health risks, risks for local and global environment, lifecycle, sustainability [42]

		material to test (all, wood, plastic,...)	green house potential (GWP)	ozone depletion potential (ODP)	photochemical ozone Creation potential (POCP)	Acid Potential (AP)	Eutrofication Potential (EP)	longtime emissions	short time emissions	health risks	carcinogen	risks for local and global environment	lifecycle	sustainability
	natureplus	no information							according to DIN V EN 13419 (VOC)	yes				
	emicode GEV	group 3.4.1 and 3.5 according to european and german toxic law						yes		yes	yes (three levels for carcinogen materials K1, K2, K3)		yes	
	fsc-deutschland	wood / forrest	yes									yes	yes	sustainable forestry
	eco-label	products											yes	yes
	Der Blaue Engel	products		yes	yes			yes	yes	yes	yes	yes	yes	yes

1.4.6 Are there any declarations or codes for waste materials?

Waste Catalogue Ordinance

- Ability for recycling
- Ability for deconstruction
- Ability for removal

European Waste Catalogue shows all possible waste materials.

ISO 14025 shows all waste materials during production and construction process.[41]

1.5 Building physics – Germany PP1

1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?

U-value $[W/(K \cdot m^2)]$ - thermal transfer or transmission coefficient- the amount of heat flow that passes from one face of a building material to another.

λ -value $[W/(m \cdot K)]$ - thermal conductivity is a material property that indicates the quantity of heat flow across a unit area, through a unit thickness for a temperature gradient of $1^\circ C$. It refers to the total isolation value of a building. λ -value is obtained by multiplying the form factor of the building (= the total inward surface of the outward walls of the building divided by the total volume of the building) with the average U-value of the outward walls of the building.

μ -value - water vapor proof is the resistance of the material used for the water vapour transfer.

ρ -value- bulk density $[kg \cdot m^{-3}]$ is defined as the mass of many particles of the material divided by the total volume they occupy.

c- specific heat capacity $[kJ/kgK]$ is the measure of the heat energy required to increase the temperature of a unit quantity of a substance by a certain temperature interval.

1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?

DIN 4108-2 Thermal protection and energy economy in buildings - Part 2: Minimum requirements to thermal insulation [43]

This standard defines a maximum characteristic solar value to avoid overheating in the summer.

$$S = (\sum_j A_{w,j} \cdot g_{total,j}) / AG$$

$A_{w,j}$ area of the window in direction j $[m^2]$

$g_{total,j}$ total solar energy transmittance of the glazing including sun protection according to DIN EN 13363-1

AG net internal area $[m^2]$

S_{max} maximum characteristic solar value is the addition of different characteristic solar value according to table 9 in DIN 4108-2 (depends on the climate region, type of construction, night ventilation, orientation, angle of inclination of the window)

$$S < S_{max}$$

DIN EN 15251 Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics [44]

To specify the criteria for indoor environment and how they are used to meet the requirements in the Energy Performance of Buildings Directive (EPBD), how to establish indoor environmental input parameters for the energy performance calculations, methods for long term evaluation of the obtained indoor environment as a result of calculations or measurements, how different categories of indoor environment can be used and criteria for measurements to be used by inspection or monitoring of the indoor environment in existing buildings. In addition, there will be a special section for natural ventilated buildings without mechanical cooling.

1.5.3 What requirements are defined for acoustic comfort? Name of the code?

DIN 4109 Sound insulation in buildings –

Part 1: Requirements of Sound insulation in buildings; construction examples and calculation methods[45]

The standard specifies requirements for sound insulation with the aim of protecting persons in buildings from unacceptable levels of noise arising from sound transmission. The method of assessing whether the degree of sound insulation required exists is also laid down.

Sound insulation in buildings; guidelines for planning and execution; proposals for increased sound insulation; recommendations for sound insulation in personal living and working areas

requirements for sound insulation according to DIN 4109:

	Requirements	
	R'_{w}	$L'_{n,w}$
	in dB	in dB
Floors to different dwellings	54	53
Wall to different dwellings	53	-
Doors from corridor of dwellings to stairways	27	-
Doors from living room of dwellings to stairways	37	-

Supplement 2: guidelines for planning and execution; proposals for increased sound insulation;

The supplement 2 contains guidelines for planning and execution as well as suggestions for improved insulation against noise transmission from other living and working areas, recommendations for sound insulation to prevent noise transmission within personal living and working areas, suggestions for improved insulation against noise from installations in buildings.

Supplement 3: Calculation of R'_{w} , R for assessing suitability as defined in DIN 4109 on the basis of the sound reduction index R_w determined in laboratory tests

The document specifies a method of determining the design value as specified in DIN 4109, clause 6.4.1, of components whose weighted sound reduction index R_w was measured in accordance with DIN EN 20140-3[46] or DIN 52210-1 [47](in test stands without flanking transmission). The conversion method applies only to single-number ratings for R_w determined in accordance with DIN EN 20717-1 [48] (on the basis of the one-third octave band values of the sound reduction index R obtained on test stands in accordance with DIN EN ISO 140-1 [49]or DIN 52210-2 [50].

1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?

DIN 5034-4 Daylight in interiors - Part 4: Simplified determination of minimum window sizes for dwellings [51]

The document makes possible a simplified determination of necessary sizes of windows in rooms, which should receive adequate daylight according to DIN 5034-1 [52]. For this purpose the relevant parameters are fixed and window-dimensions are given in tables according to the individual room dimensions and the amount of obstruction.

DIN 5034-6 Daylight in interiors - Part 6: Simplified determination of suitable dimensions for roof lights [53]

The document enables its user to roughly determine the appropriate transparent roof area by fixing general parameters concerning obstruction, glazing properties and room-reflectances.

1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?

DIN 4108-3 Thermal protection and energy economy in buildings - Part 3: Protection against moisture subject to climate conditions; Requirements and directions for design and construction [54]

1.5.6 What requirements are defined for the building envelope? Name of the code?

Here are some possible requirements for the facade construction:

- Structural stability
- Thermal insulation (DIN 4108-6) [33]
- Moisture proofing (DIN 4108-3) [55]
- Air-tightness (DIN 4108-7) [56]
- Natural lighting (DIN 5034) [57]
- Sound insulation (DIN 4109) [45]
- Heat capacity
- Moisture balance ability
- Fire prevention (DIN 4102) [58]
- Hygiene

1.5.7 What requirements are defined for fire prevention? Name of the code?

DIN 4102-1 Fire behaviour of building materials and building components - Part 1: Building materials; concepts, requirements and tests [59]

DIN 4102-4 Fire behaviour of building materials and building components; synopsis and application of classified building materials, components and special components [60]

This document contains categorised results of fire tests of buildings materials, components and construction types. Due to the assignment to the classes of building materials according to DIN 4102 part 1 and the fire resistance classes of the other parts of DIN 4102 respectively, further fire tests for the verification of usability required by the building regulations are not necessary.

1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?

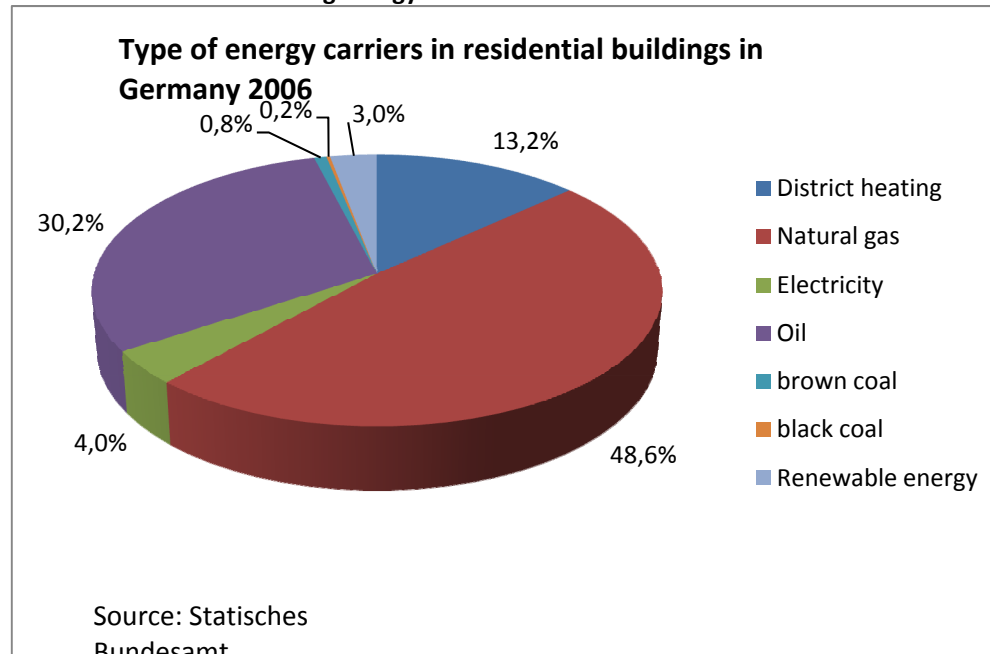
The land use plan of the distinctive site gives information about footprint area of each site respectively about the area not to seal. Normally it is called the site occupancy index SOI (Grundflächenzahl GRZ) which shows the proportion of Gross External Area to land area. In § 19 of the Land use Ordinance (Baunutzungsverordnung Bau NVO) you can find more information and exceptions [8]

1.5.9 What criteria are involved to determine Energy Efficiency of building?

See question 1.3.1

1.6 Technical facilities and services – Germany PP1

1.6.1 What kind of heating energy sources are used in residential houses?



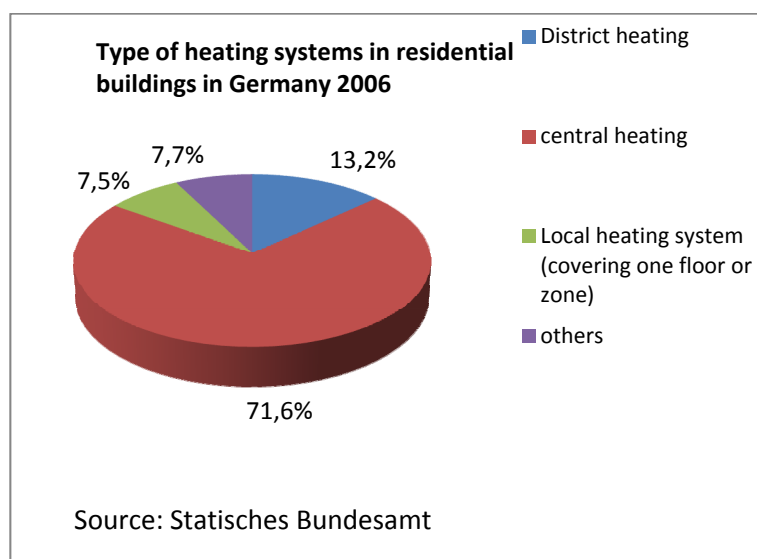
1.6.2 What kind of heating system is used in residential houses? Central heating, district heating etc.? What kind of heating generators are used?

Classification of heating systems through:

- location of the heat generator: individual heating, central heating, district heating, Standard boiler, low temperature boiler, condensing boiler, heat pump heating
- art of energy: coal heating, gas heating, oil heating, electrical heating, solar heating (collectors, storage with heat exchanger, control of the pump function, photovoltaic),
- heat carrier: hot water heating, steam heater, air heating
- heat distribution: radiators, convectors, heat surface plates, special (e.g. floor heating)
- art of heat emission: convection heating, radiation heating, air heating, combined heating

Heating generators:

- condensing boiler
- low temperature boiler
- wood pellet boiler
- electric heat pump
- solar heating system



1.6.3 What kind of cooling system is used in residential houses?

Conventional cooling system, passive cooling system

1.6.4 What type of ventilation system is used in residential houses?

window ventilation, mechanical exhaust air-plant without and with heat recovery

DIN 1946-6

Ventilation and air conditioning - Part 6: Ventilation for residential buildings - General requirements, requirements for measuring, performance and labeling, delivery/acceptance (certification) and maintenance[61]

This document is specified for the natural and mechanical ventilation for apartments and similar used groups of rooms. It describes the ventilation components and units for installations for the natural and

mechanical ventilation for engineering, construction and bringing into service, operation and maintenance with regard to constructional, ventilation-technically, hygienic and energetic aspects. It contains a scheme for a labeling for natural and mechanical ventilation-systems.

DIN EN 13141-6 Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 6: Exhaust ventilation system packages used in a single dwelling [62]

This European standard specifies laboratory methods for measuring the aerodynamic and acoustic performance characteristics and energy consumption of assembled exhaust ventilation system packages for single dwelling. The object of this standard is to provide tested characteristics for a system package in extreme conditions to enable the user to be assured that the same values will be achieved on site when the system package is installed in accordance with the manufacturer's instruction and within these limits of the test conditions.

1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)

According to the Energy Savings Ordinance (ENEV 2007) §12 air conditioning has to undergo an energetic inspection every ten years. It gives additional information about the initiation of boilers in §13. [24]

VDI 6022 Hygienic requirements for ventilating and air-conditioning systems and air-handling units [71]

The guideline VDI 6022 applies to all ventilating and air-conditioning systems and air-handling units supplying air to rooms or occupied areas in rooms which are intended for use by persons on more than 30 days per year or more than two hours per day on a regular basis [1]. It applies to all systems and central or decentralised components thereof (including units such as recooling plants), which influence the quality of the supply air. Only then will this guideline apply to extract-air systems if these can influence the quality of supply air by recirculation.

VDMA 24186 The document includes performance program for the maintenance of technical installations and equipment in buildings [72]

1.6.6 What requirements are defined for water supply and domestic sewage?

Drinking Water Regulation

DIN EN 806-1 Specifications for installations inside buildings conveying water for human consumption - Part 1: General; German version EN 806-1:2001 + A1:2001 [63]

This technical rule gives as amendment to EN 806-1 a graphical symbol and an advice for the use of a security device against backflow of polluted water into the drinking water installation.

Domestic sewage Regulation

DIN 4045 This standard specifies definitions for terms of wastewater engineering. This standard contains significant terms in the field of wastewater engineering and such terms which were not unambiguous until now. [64]

1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.

From 1995 to 2004 the water consumption per person and day reduced from 132l to 126l (5%).

Water and domestic sewage consumption per person and day in l				
	1995	1998	2001	2004
Germany	132,0	129,0	127,0	126,0

1.6.8 What requirements are defined for security? Bulger security in doors, in windows?

DIN V ENV 1627 Windows, doors, shutters - Burglar resistance - Requirements and classification [65]

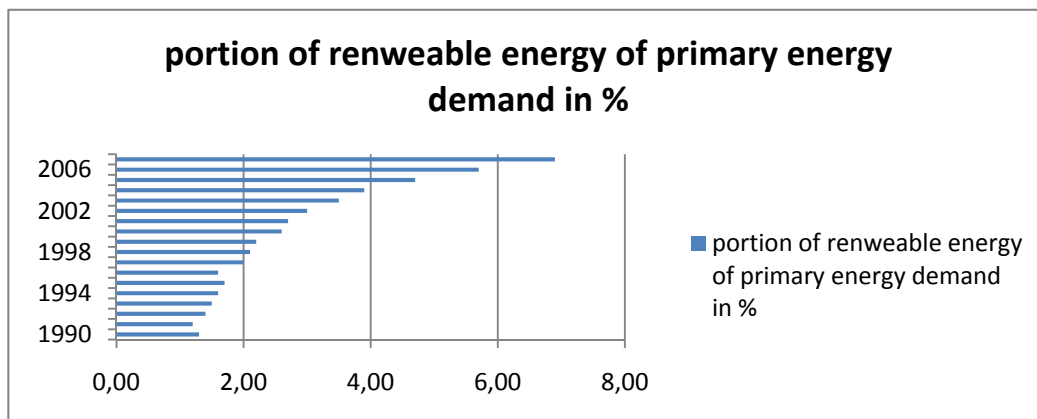
The document specifies requirements and classification for burglar resistance properties of doors, windows and shutters. It is applicable to the following means of opening: turning, tilting, folding, turn-tilting, top or bottom hung, sliding (horizontally and vertically) and rolling, as well as fixed constructions. It is not applicable to manipulation and burglary attempts in respect of electronic or electromagnetic security devices.

1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels



to heat, cool or ventilate buildings? (percentages of total energy demand)

Portion of renewable energy of primary energy demand increased from 1,6% in 1990 to 6,9% in 2006



[1]

1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?

There are used distinctive renewable heating sources which are all aided by the state:

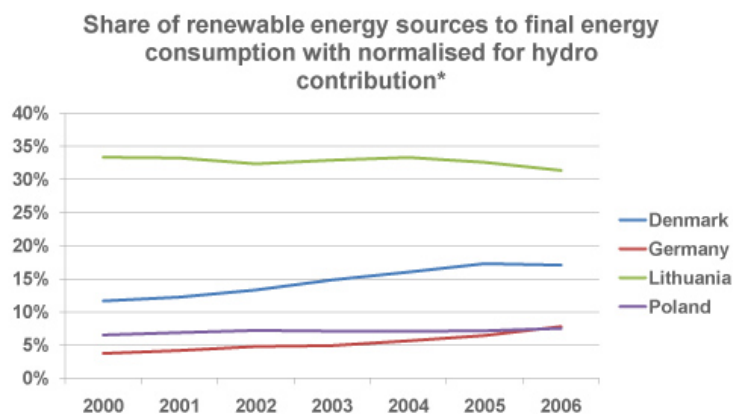
Solar collectors have to fulfil RAL-UZ 73 (of 2004).

Heat pumps have a basis aid and can get an efficiency bonus in two steps for good efficiency.

Pellet ovens with a nominal heating capacity above 5 kW get 500 € for each installation.

Bio mass installations are aided with a nominal heating capacity above 100kW.

Installations that convert bio gas to domestic gas are aided up to 350m³/h.



*including consumption of the energy branch for electricity and heat generation and distribution losses

Source: Eurostat, December, 2008

1.6.11 How popular is the usage of renewable heat sources in residential houses?

About 350000 heat pumps are installed. About 1/3 in 2007 and 2008. The total produced PV-power increased from 76 GWh (2001) to 2220 GWh (2006). The number of installed solar heating system increased from 1999 to 2004 about 260% to total 700000.

1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.

In the last 10 years energy demand for space heating decreased about 28% from 199,3 kWh/m² to 142,7 kWh/m². But in the same time electric power consumption per person increased about 16%. [1]

Energy demand per day (kWh)			
Number of persons	2	3	4
Germany	3,7	5,6	7,4

1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?

There are not special energy efficient requirement on fans, pumps and temperature efficiency of heat recovery, according to the Norm DIN EN 15459:2007, DIN EN, EnEV 2009 and numbers of the interrelated Norms the designer calculate the energy consumption under the actual situation, they choose the optimal fans, pumps and the heat recovery.

1.7 Quality of process and integration of sustainable aspects – Germany PP1

1.7.1 If there exist “Energy Performing Certificates” for houses in your country which standards signifies these certificates? Show example.

DIN EN 15217 Energy performance of buildings - Methods for expressing energy performance and for energy certification of buildings [66]

This European Standard specifies: a) overall indicators to express the energy performance of whole buildings, including heating, ventilation, air conditioning, domestic hot water and lightning systems. This includes the different possible indicators; b) ways to express energy requirements for the design of new buildings or renovation of existing buildings; c) procedures to define reference values; d) ways to design a procedure for building energy certification.

1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?

German sustainable building certificate



The focus of the DGNB is on awarding the certification for sustainable building. The first time it was awarded for the system variation “New Construction Office and Administration, Version 2008”. As a clearly arranged and easy to understand rating system, the German Sustainable Building Certification covers all relevant topics of sustainable construction and awards outstanding buildings in the categories bronze, silver, and gold. Six subjects affect the evaluation: ecology, economy, social-cultural and functional topics, techniques, processes, and location. The certificate is based on the concept of integral planning that defines, at an early stage, the aims of sustainable construction. [67]

See www.dgnb.de

1.7.3 Which standards signify a “low energy house”, “passive house”, “zero energy building”?

Low energy house is the house, that energy demand is min. 25% under the current energy saving ordinance. The heat energy parameter for German climatic conditions is about 70 kWh/m² for detached house and at about 55 kWh/m² for multi storey house.

Passive house is described as a building with very low heat demand that is less than 15 kWh/m². The primary energy demand including hot water and electricity is allowed to be max. 120 kWh/m². The calculation regulations for passive houses differ in some way from German Energy Saving Ordinance. The one of the main components is very good insulated building envelope with insulation thickness between 25 and 40 cm.

Zero energy building (ZEB) or net zero energy building is a building with zero net energy consumption and zero carbon emissions annually. Zero energy buildings are autonomous from the energy grid supply - energy is produced on-site. This design principle is gaining considerable interest as renewable energy is a means to cut greenhouse gas emissions.

1.7.4 Following up procedure of the performance of the building energy system.

see answers 1.3

1.8 Definition of quality standards – Germany PP1

1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?

DIN EN 15643 (Draft) [68]

Sustainability of construction work-

Sustainability assessment of buildings

Part1: General Framework

Part2: Frame for environmental quality

Part3: Frame for social quality

Part4: Frame for economical quality

ISO 15686 part 1-10 [69]

Criteria for the German Sustainable Building Certificate*

Quality of the project's preparation

1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

DIN EN 15643 (Draft) [68]

Part2, Part4

prEN 15804 environmental product declaration [70]

1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?

Criteria of DGNB - certification: 1. low-waste construction site 2. Low-noise construction site 3. Low-dust construction site 4. Environmental protection at the construction site and DIN EN 15643 (Draft)

Part2, Part4

prEN 15804 : environmental product declaration.

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- Part 4: Net and final energy demand for lighting
- Part 5: Final energy demand of heating systems
- Part 6: Final energy demand of ventilation systems and air heating systems for residential buildings
- Part 7: Final energy demand of air-handling and air-conditioning systems for non-residential buildings
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Part2: Frame for environmental quality
Part3: Frame for social quality
Part4: Frame for economical quality
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 - [72] VDMA 24186 The document includes performance program for the maintenance of technical installations and equipment in buildings

2.1 Currently applied planning methods – Germany PP2

2.1.1 Describe the currently applied planning methods in your country in short words.

Answer:

In Germany we have a three-phase system of the building land planning law between the federal, the federal countries and the local authority districts.

1. extent: Federal law = is the construction code of law (Addition No. 1) [1]
2. extent: Federal state law = building code (Addition No. 2) [2]
3. extent municipal law = statutes

In addition, there are orders and directives of the European Union, the federal republic, the federal states and the local authority districts!

2.1.2 What local or national planning laws do exist?

Construction code of law of the federal republic, the building codes of the federal countries and statute and orders of the local authority districts.

2.1.3 What kind of energy and sustainable needs are required according to the planning law?

1. The observance of the energy saving order (EnEV) (Addition No. 3) [3]

The energy saving order (EnEV) is a share of the German building law. In this constructional standard standards are prescribed by the Federal Government on the legal basis for suretyship of the authorisation by the energy conservation law (EnEG) to developer to the efficient company energy consumption of the building or construction project. It is valid for residential building, office building and certain factories.

2. The regulation of the building application process.

With of the application of the building project the proofs must be produced according to the EnEV and have to be presented with the necessary execution subscriptions.

2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)

Required documentations for the establishment and change of buildings must be created by a property planner who is entitled for the required documentation. It is a person, who

1. has an occupation-qualifying Master's certificate of a regulated study in the field Architecture, building construction or civil engineering proves,
2. has afterwards at least two years of occupational experience in the property planning of buildings,
3. orders of sufficient knowledge of the public building law, in particular of the building code right, building products right and building design right, and
4. is entered with a chamber as a required documentation-entitled architect or required documentation-entitled engineer.
5. The proof of the authorisation to present building documents is led by a document or certificate of the respective architect's chamber or engineer's chamber of the federal countries.

The people who have not acquired occupational qualification in the scope of the basic law are entitled for the required documentation - if their occupational qualification is recognised after the regulations applying for it as equivalent.

2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)

For the development of the required documentations ordered property planners must be suitable after knowledge and experience for the preparation and monitoring of the respective building project and are responsible for the completeness and usefulness of the planning. The property planner has to provide for the fact that the implementation planning is compiled and the single subscriptions necessary for the execution, individual calculations and order are delivered.

The property planner is responsible for the fact that the building project is carried out after the sanctioned or displayed required documentations and corresponds to the public law regulations. If the property planner does not have the necessary knowledge or experience in single branches, he must involve suitable professional planners (e.g. structural engineer, landscape architect, town planner, professional engineers etc.). The professional planners are responsible for their plannings. For proper interlocking of all departmental plannings the property planner remains responsible.

2.2 Building permit rules – Germany PP2

2.2.1 Describe the building permit procedure in short words. How long is it valid?

The applicant (Proprietor, representative of the Proprietor or developers) sends a satisfactory and signed application form (Addition No. 4) with the responsible authority. [4]

Land Brandenburg / The State of Brandenburg
Anlage zur VVBggBauVorIV / Addition to the (VVBggBauVorIV)
(Administrative procedure Brandenburg required documentation order)

<p>An die untere Bauaufsichtsbehörde To the lower construction supervising body Landkreis / Administrative district Stadt / City</p> <hr/> <p>Eingangsvermerk / Entrance note</p> <hr/> <p>Aktenzeichen / Reference numbers</p> <hr/> <p>Verfahren durch die untere Bauaufsichtsbehörde Procedure by the lower construction supervising body</p> <p><input type="checkbox"/> Bauanzeigeverfahren (§58 BbgBO) Construction notification procedures</p> <p>Antrag auf / Application on</p> <p><input type="checkbox"/> Baugenehmigung (§56 BbgBO) building permission</p> <p><input type="checkbox"/> vereinfachtes Baugenehmigungsverfahren- (§57 BbgBO) simplified proceeding on the Building permission</p> <p><input type="checkbox"/> Vorbescheid (§59 BbgBO) Preliminary notice</p> <p><input type="checkbox"/> Zulassung einer Abweichung (§60 BbgBO) Registration / authorisation of a deviation</p> <p><input type="checkbox"/> Zulassung einer Ausnahme / Befreiung (§31 BbgBO) Registration of an exception / exemption</p>	<p>An die Gemeinde / das Amt To the municipality / the office</p> <hr/> <p>Eingangsvermerk / Entrance note</p> <hr/> <p>Aktenzeichen / Reference numbers</p> <hr/> <p>Verfahren durch die Gemeinde / das Amt als Sonderordnungsbehörde (bei genehmigungsfreien Vorhaben nach § 55 i.V. m. § 53 Abs. 1 BbgBO) Procedure by the municipality / the office as a special order authority (with projects free of licence after §55 i. V. m. §53 paragraph 1 BbgBO)</p> <p>Antrag auf / Application on</p> <p><input type="checkbox"/> Sonderbehördliche Erlaubnis für die Errichtung einer Werbeanlage (§61 Abs. 2 BbgBO) Special-official permission for the edification of an advertising structure</p> <p><input type="checkbox"/> Zulassung einer Abweichung von einer örtlichen Bauvorschrift (§61 Abs. 2 BbgBO) Authorisation/Registration of a deviation of a local building regulation</p> <p><input type="checkbox"/> Zulassung einer Ausnahme / Befreiung (§61 Abs. 2 BbgBO i.V. m. § 31 BauGB) Registration of an exception / exemption</p>
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1. Kurzbeschreibung des Vorhabens / Brief description of the project

☐ **Errichtung / Edification**
☐ **Änderung / Amendment**
☐ **Nutzungsänderung / Amendment of the use**

2. Baugrundstück / building plot
☐

Bauherr ist Grundstückseigentümer
Proprietor is the owner of the building plot

☐

Bauherr ist nicht Grundstückseigentümer
Proprietor is not the owner of the building plot

Gemarkung / District		Flur / Field	Flurstücke / Field parts
Straße / Street	Hausnummer House Number	PLZ / POST CODE	Ort / Place / City

3. Antragsteller / Bauherr / Baugemeinschaft
Applicant / Proprietor / construction community

Name / Firma Name / company				Vorname First name
Straße / Street	Hausnummer House Number	Land Country	PLZ post code	Ort / Place / City
Telefon / Phone	Fax / Telefax	E-mail		

4. Vertreter Representative
☐

Erklärung des Vertreters nach § 62 Abs.5 BbgBO ist beigefügt
Declaration of the representative after §62 Abs.5 BbgBO is added

Name / Name				Vorname / First Name
Straße / Street	Hausnummer House Number	Land Contry	PLZ post code	Ort / Place / City
Telefon / Phone	Fax / Telefax	E-mail		

5. Objektplaner / Property planner

Name / Name				Vorname / First Name
Straße / Street	Hausnummer House Number	Land Contry	PLZ post code	Ort / Place / City
Telefon / Phone	Fax / Telefax	E-mail		

6. Genaue Fragestellung zum Vorbescheid / Exact question to the preliminary notice

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7. Begründung des Antrages auf Abweichung / Ausnahme / Befreiung
Grounds of the application for deviation / exception / exemption

8. Hinweise zum Datenschutz / Remarks to the secrecy obligation/ obligation to observe confidentiality data protection

Wird nicht übersetzt / It is not translated

9. Bestellung des Objektplaners / Order of the property planner

<p>Zur Wahrnehmung der Aufgaben nach § 48 Abs. 1 und § 49 Abs. 1 BbgBO habe ich entsprechend § 47 Abs. 1 BbgBO den unter Nr. 5 benannten Objektplaner bestellt.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Unterschrift des Bauherrn Signature of the Proprietor</p> </div>	<p>Zur Wahrnehmung der Aufgaben nach § 48 Abs. 1 und § 49 Abs. 1 BbgBO habe ich entsprechend § 47 Abs. 1 BbgBO den unter Nr. 5 benannten Objektplaner bestellt.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Unterschrift des Objektplaners Signature of the property planner</p> </div>
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10. Die angekreuzten Bauvorlagen sind beigelegt

- ☐ 1 x Auszug aus der Liegenschaftskarte M 1: 1000 / *Extract from the immovable card (M 1:1000)*
- ☐ 1 x Amtlicher Lageplan (§2 BbgBauVorV) / *Official plan of site*
- ☐ 3 x Objektbezogener Lageplan (§3 BbgBauVorV) / *Property-related plan of site*
- ☐ 3 x Außenanlagenplan (§4 BbgBauVorV) / *Outside layout plan / plan of the creation of the private green areas*
- ☐ 1 x Grundstücksentwässerungsplan (§5 BbgBauVorV) / *Sewerage system plan / Plan to the drainage of the plot of land*
- ☐ 3 x Bauzeichnungen (§6 BbgBauVorV) / *Drawings*
- ☐ 3 x Baubeschreibung mit den erforderlichen Berechnungen (§7 BbgBauVorV) / *Description of the building measure with necessary calculations*
- ☐ 1 x Besondere Bauvorlagen (§9 BbgBauVorV) / *Special required documentations*
- ☐ 1 x Nachweis der Bauvorlageberechtigung (§48 Abs.4 BbgBO) / *Proof of the authorisation to present building documents*

- ☐ 1 x Erklärung des Objektplaners nach § 57 Abs. 2 BbgBO / Declaration of the property planner after §57 Abs.2 BbgBO
- ☐ 1 x Erhebungsbogen für Baustatistik (36 HBauStatG) / Elevation form for construction statistics

Zusätzlich für gewerbliche Anlagen / In addition, for commercial ground / investment

- ☐ 3 x Betriebsbeschreibung / Company description
- ☐ 1 x Übersichtsplan mit Eintragung vorhandener Nutzung / General plan with registration of in existence use
- ☐ 1 x Maschinenaufstellplan / Plan for the installation of machines

Zusätzlich für land- und forstwirtschaftliche Betriebe

- ☐ 3 x Betriebsbeschreibung / Company description
- ☐ 1 x Übersichtsplan mit Eintragung vorhandener Nutzung / General plan with registration of in existence use

Zusätzlich für Werbeanlagen

- ☐ 3 x Betriebsbeschreibung / Company description
- ☐ 1 x Übersichtsplan mit Eintragung vorhandener Nutzung / General plan with registration of in existence use

11. Bautechnische Nachweise (§8 BbgBauVorV)

Die bautechnischen Nachweise sind bei der zuständigen unteren Bauaufsichtsbehörde zur Prüfung einzureichen. Es ist jedoch nicht erforderlich, diese Nachweise zusammen mit dem Bauantrag vorzulegen. The constructional proofs are to be submitted to the responsible lower construction supervising body to the audit. Nevertheless, it is not necessary to present these proofs together with the building application.

Die Prüfung der bautechnischen Nachweise für Wohngebäude mittlerer Höhe bis einschließlich der Bauwerksklasse 3 kann auch direkt bei einem im Land Brandenburg anerkannten Prüfingenieur beantragt werden. The audit of the constructional proofs of residential building of middle height to the structure class 3 including can be also applied directly with a audit engineer approved in the State of Brandenburg.

Mit der Prüfung der bautechnischen Nachweise des Wärmeschutzes und der Energieeinsparung oder des Schallschutzes kann für Wohngebäude mittlerer Höhe bis einschließlich der Bauwerksklasse 3 auch ein bauaufsichtlich anerkannter Sachverständiger direkt beauftragt werden. With the audit of the constructional proofs of the heat insulation and the energy conservation or the sound insulation an appraisal approved expert can be appointed for residential building of middle height to the structure class 3 including also directly.

12. Erklärung des Bauherrn zum Bauantrag im vereinfachten Baugenehmigungsverfahren

Ich bin damit einverstanden, dass über meinen Bauantrag im normalen Baugenehmigungsverfahren nach § 56 BbgBO entschieden wird, wenn die Voraussetzungen für das vereinfachte Baugenehmigungsverfahren nach § 57 BbgBO nicht vorliegen.

I agree with the fact that BbgBO is decided on my building application in the normal proceeding on the granting of permission after §56 BbgBO, if the requirements for the simplistic proceeding on the granting of permission are not given after §57 BbgBO.

- ☐ einverstanden / agree ☐ nicht einverstanden / not agree

13. Unterschriften / Signatures

Ort / Place	Datum / Date	Ort / Place	Datum / Date
Unterschrift des Bauherrn/Antragstellers/Vertreters Signature of the Proprietor / of applicant / of representative		Unterschrift des Objektplaners Signature of the property planner	

The authority checks the application for completeness and for accordance with the juridical requirements. In addition, the authority can include external professional experts. Then the authority can approve or not approve. It can also require additional information, calculations or proofs.

2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)

1. For the building application there are with the respective local authority districts finished building application documents (example layout). Besides, it must be applied at the same time for which the application is made, e.g., for: [2]

- Construction notification procedures (§58 BbgBO) (with plans free of licence after §55 i. V. m. §53 paragraph 1 BbgBO)
- Application at the request of on planning permission (§56 BbgBO)
- Application for simplistic proceeding on the granting of permission (§57 BbgBO)
- Preliminary notice (§59 BbgBO)
- Registration of a deviation (§60 BbgBO)
- Registration of an exception / exemption (§31 BbgBO)

2. With the building application following documents must be submitted:

- Brief description of the plan
- Specifications to the building plot
- Specifications to the applicant
- Specifications to the sales representative
- Specifications to the property planner
- Grounds of the application

In addition, following bases must be added:

- Extract from the immovable card (M 1:1000)
- Official plan of site
- Property-related plan of site
- Outside layout plan
- Sewerage system plan
- Drawings
- Specifications with necessary calculations
- Special required documentations
- Explanation of the property planner
- Elevation arcs for construction statistics
- Constructional proofs like proofs to the heat insulation, the energy conservation or sound insulation (can be also supplied later)

2.2.3 What kind of national or local building permit rules do exist?

Is under point 2.1.1 described. For the building permission the lower construction supervising body or the local authority district is always responsible.

2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?

Applicant is the proprietor. So the person who wants to build (for example, the owner of a building plot or his representative or a developer). If the proprietor is not an owner of the building plot, he needs the approval of the plot of land owner. A community of proprietors can also put a building application. The proprietor can use a representative who makes the application (e.g., a building contractor). The representative must issue a declaration (§62 to paragraph 5 BbgBauO). [2] (Addition: Explanation of the representative):

„Herewith I agree as a representative of the Proprietor to take over all liabilities being incumbent according to the public law regulations of the representing, including the payment of the expenses according to construction tariff system.“

No, there are no special laws for developers from foreign countries. The same laws are also valid for a foreign developer. It is important that the developer / proprietor or representative of the proprietor has a property planner who is entitled to the template of the building application.

2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)

In the proceeding relating to building permit take part:

- the proprietor or his sales representative or the developer, as a client and financier
- the property planner, as a responsible planner. If necessary under use of other professional planners and engineers (e.g., structural engineer, landscape architect, town planner, professional engineers etc.
- the responsible authority, as a permit authority and audit authority. If necessary under use of certificated test engineers
- furthermore it can become essential other instances consult, as for example: the fire department, the neighbours of the building plot if exemption or subserviency are necessary,...

2.2.6 How does the inspection system work and who checks the documents?

The authority is to be carried out entitled special appraisal measures / controls independently (paragraph 3, §§73-78 BbgBauO) [2]. See in addition point 2.4.2.

2.2.7 How much time has the administration to finish the procedure and is there any law to force this?

With a simplistic proceeding on the Building permit (§56 BbgBO) the licence must follow after 4 weeks if all default was kept.

With a process after Construction notification (§58 BbgBO) the construction supervising body to the proprietor must confirm the entrance of the Construction notification and has for it 1-week time.

With the execution of construction it can be begun at the end of one month after entrance of the Construction notification with the construction supervising body, provided that the construction supervising body has not prohibited the execution of construction or has released before. That is five weeks after submission of the application it can be begun with the building.

With an application for building permission (§56 BbgBO) [2] the construction supervising body decides within a period of one month after entrance of all statements of other authorities. The other authorities have as a rule 2-4-week time for their statements.

That is from six to eight weeks after submission of the application after that follows the authorisation. A norm are 3 months. One can sue the authority (responsible administration) because of failing to act (Administrative Procedure Act). (personal remark: The chances are like zero).

2.2.8 What does a building permit cost?

The expenses of a building permit are directed after the respective tariff systems of the countries / local authority districts (Addition: Brandenburg construction tariff system - BbgBauGebO). In the tariff systems the expenses are performed for every administrative act. (personal remark: The authorisation expenses for a normal single-family-house amount to approx. 1,800 EURO net)

2.3 Tendering rules and laws – Germany PP2

2.3.1 Describe the tendering procedure in short words.

For public tenders of public clients (e.g., the federal republic, countries, towns and municipalities and public buildings or with use of subsidy programmes) are valid special regulations on account of the public procurement law. The procedure is regulated in Germany in:

- the allocation and contract order for construction works (VOB) (Addition No. 5) [5],
- the allocation and contract order for performances (VOL) [6] and
- the allocation and contract order for freelance performances (VOF). [7]

According to the EU regulation in the standard form introduced in 2005 for the publication of allocation announcements are valid without other implementation directly in the member states of the EU. They are directly retrievable in the Internet.

Not of the invitation of tenders duty is defeated In House allocation or In House business. People / companies stand in the corruption register, can be excluded from the invitation of tenders.

2.3.2 What kind of national or local tendering rules and laws do exist?

see previous point 2.3.1

2.3.3 What types of tendering procedure are there? (public building, private building,...)

One makes a distinction with the allocation in the allocation kinds:

1. below the EU-guideline (threshold values):

public invitation of tenders, limited invitation of tenders after public participation competition, limited invitations of tenders, freehand allocation and

2. above the EU-guideline (threshold values):

open procedure, non-open procedure, competitive dialog, hearing procedures.

2.3.4 What are the limits for the national tendering process? (in relation to EU)

Category / Kategorie	EU-guideline (threshold values) (plus VAT) / Schwellenwerte (zzgl. MwSt)
Building orders / Bauaufträge	€ 5.150.000
To delivery order and service orders / Liefer- und Dienstleistungsaufträge	€ 206.000
To delivery order and service orders in the sector sphere / Liefer- und Dienstleistungs-aufträge im Sektorenbereich	€ 412.000
To delivery order and service orders of the uppermost or upper authorities of the federal republic / Liefer- und Dienstleistungsaufträge der obersten oder oberen Bundesbehörden	€ 133.000

2.3.5 Are there any time limits for the tendering procedure?

A sufficient deadline is not to be intended for the treatment and submission of the offers, also with urgency less than 10 calendar dates. With the open procedure the deadline amounts to 52 calendar dates, at least 22 days if on time a previous announcement in the Official Journal of the European Union (OJ) has followed. With the not open procedure the deadline to the delivery of the application amounts to 37 calendar dates and to the offer deadline 40 calendar dates. With announcements in the Internet portal of the European Community the deadline can be shortened about 7 calendar dates. The least deadline may not lie less than 15 calendar dates.

2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

According to the Brandenburg building code an environmental compatibility audit must be carried out for building project in the proceeding relating to permission.

With a new residential building must be kept the EnEV. [3]

The client (customer) can formulate criteria of the sustainability, as for example:

- Insertion of ecological building materials (Ecological objective, building materials with low environmental impact in production and processing; economical material insertion, use of recycling building materials; an easy disposal, to prevent building materials with undesirable content substances
- Insertion of power-saving heating systems (resource care by energy optimisation)

The surcharge for an offer should follow taking into account all criteria, as for example quality, price, aesthetics, environmental properties, operating and facility costs, execution deadlines, date observance etc...

Only the lowest offer price is not decision (§25 VOB).[5]

The client (customer) is able to do also exclusion criteria formulating, as for example of the ban of harmful substances.

2.4 Construction process – Germany PP2

2.4.1 Are there any rules to comply during the construction?

The rules are determined in the respective building codes of the countries. Furthermore the assignments are described in the fee order for architects and engineers for every phase of the planning and the construction. In addition, there is with the DIN (German Institute for Standardization) a set of rules which exactly describes every measure.

2.4.2 Is there an obligatory checking from the authorities?

The construction supervising body is to be carried out entitled special appraisal measures independently (paragraph 3, §§73-78 BbgBauO [2]), e.g.:

- Arrange ending of the construction works
- arrange partial or entire removal of the built shares
- check the observance of the regulations subject to public law and standards
- the fulfilment of the duties in the building involved check
- Specimens of building products infer and check
- Insight into the authorisations, registrations, test certificates, declarations of compliance, certificates of compliance, monitoring proofs, reports and recordings about the audits is to be granted to the construction supervising body any time by building products, in the construction diaries and other prescribed recordings.
- The construction supervising body can require that you are informed the beginning and the ending of certain construction works. The construction supervising body can require that construction works only are continued or the physical structures are only used when they have been checked by her, a test engineer or an appointed expert.
- The Proprietor has to advertise the completion of the building measure of the construction supervising body and to present all necessary documents, testimonies, certificates, audit reports etc.

2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?

Required documentations for the establishment and change of buildings must be created by a property planner who is required documentation-entitled. It is required documentation-entitled, who

- 1 an occupation-qualifying Master's certificate of a regulated study in the field Architecture, building construction or civil engineering proves,
- 2 afterwards at least two years of occupational experience in the property planning of buildings has,
- 3 orders of sufficient knowledge of the public building law, in particular of the building code right, building products right and building design right, and
- 4 is entered with a chamber as a required architect or required engineer.

As a rule certified structural engineers with this assignment are appointed.

The same laws are also valid for a foreign architect and engineers. It is important that the qualification is comparable with in Germany and an entry has followed with the chamber or arrangements between the national architect's chambers and engineer's chambers consist.

2.4.4 Is there obligatory construction supervision?

see point 2.4.2.

2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?

The construction supervision is carried out by the construction supervising body or by her authorised audit engineers.

To the second share of the question nothing is known to me.

2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?

The Proprietor has to advertise the completion of the building measure of the construction supervising body and to present all necessary documents, testimonies, certificates, audit reports etc.

The obligation to the documentation of the building measure is included in the performance phase HOAI 9. (Addition No. 6) [8]

2.5 Conditions and habits of operating/ facility management – Germany PP2

2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?

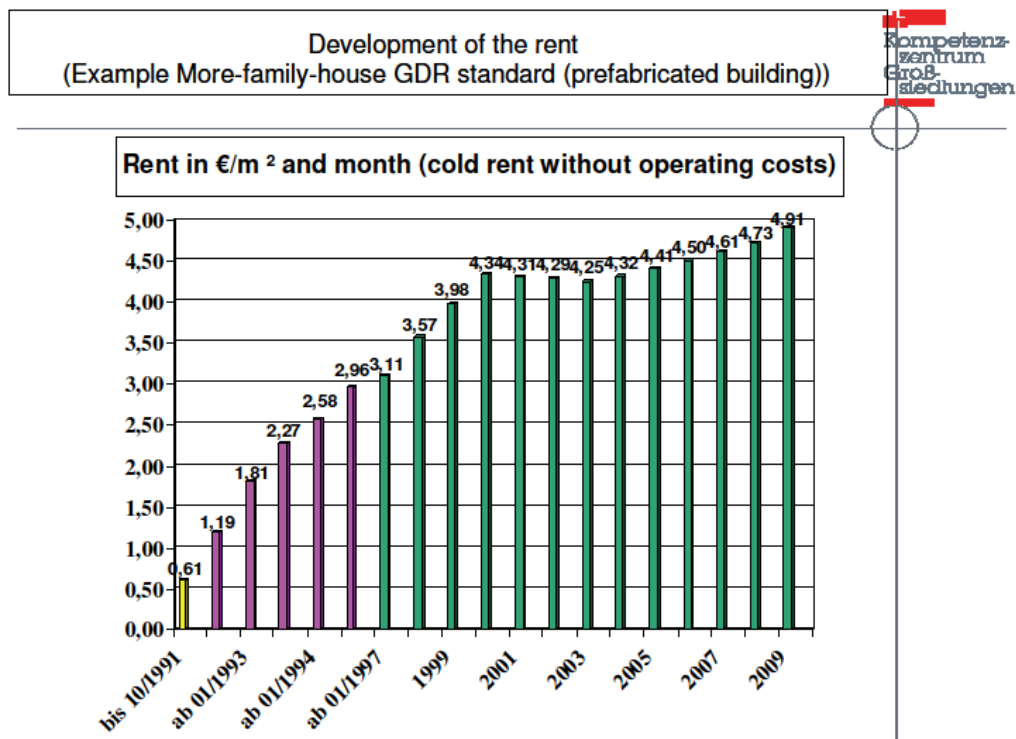
No.

2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).

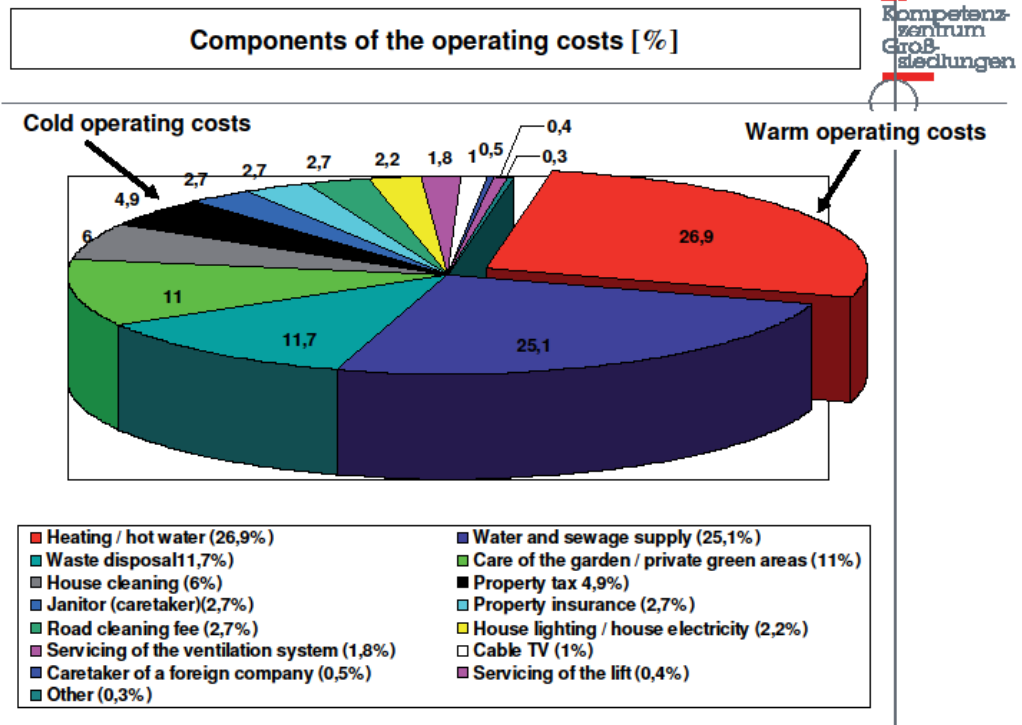
operation costs:

See schema of a typical residential building (prefabricated building - More-family-house in Berlin):

(Addition No. 7): Development of the rent and components of the operating costs



[9]



[9]

Construction costs:

The costs for a typical single-family-house (at no cost to fees, connections and plot of land and planning) amount to approximately 850 -1.500 EURO.

2.6 Commercial parameters, housing industry key data and housing situation – Germany PP2

2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?

Within the scope of laws there are the regulations of the ENEV [3]. The implementation of these standards are supported by support programmes of the federal republic and the countries.

2.6.2 Please give some key data concerning costs (diagrams and schedules): rent tables, average income p. person, etc.

Moreover I can provide only information from Berlin-Hellersdorf, typical Large Housing Estates in Berlin.

1. the average rent (net cold rent) amounts to 4; 95€/m² and month.
2. The average size of households amounts to 2.2 people.
3. The average flat size amounts to 61 m²
4. the average income (Haushaltsnettoeinkommen) amounts: approx. 1,650€ / month
5. The pro-head income amounts to approx. 700€ per month

2.7 References – Germany PP2

- [1] BauGB German Federal construction law
- [2] BgbBauO Building Code of the Land Brandenburg
- [3] ENEV Energy saving order
- [4] German Building application in English German
- [5] VOB the allocation and contract order for construction works
- [6] VOL the allocation and contract order for performances
- [7] VOF the allocation and contract order for freelance performances
- [8] HOAI Order about the honorariums for architect and engineer performances
- [9] Development of the rent and components of the operating costs
- [10] Expert opinions Demographic change : <http://www.bmvbs.de/-,302.1082376/Stellungnahme-BMVBS-zum-Gutach.htm>

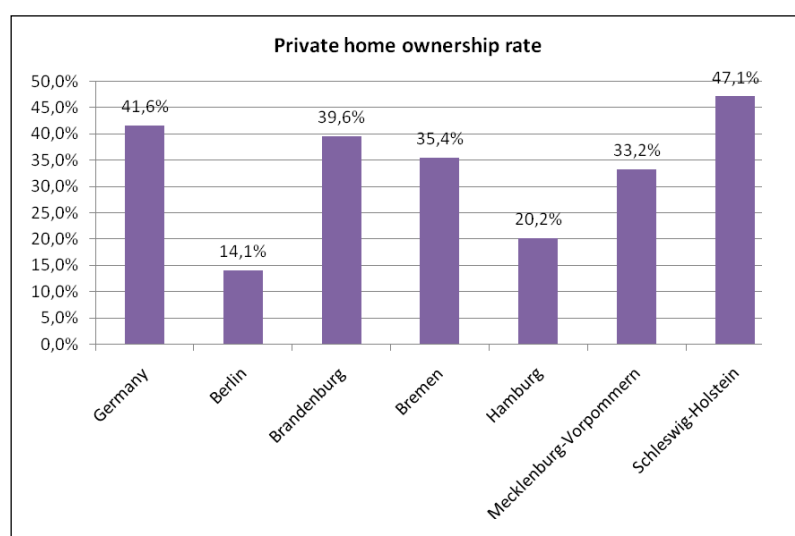
3.1 Demographic analysis of housing needs and target group of population – Germany PP3

3.1.1 How is the private-home ownership rate?

Following a statistics of the Federal Statistical Office a total of approx. 36.198.000 dwellings are existing in Germany in 2006. Approx 41.6 % of these belong to private property and 58.4 % are rented, therefore it can be said that on one “owner housing unit” comes nearly 1.4 “rented flat”.¹

In the Federal States of the Baltic Sea Region², where approx. 16.8 % of the dwellings are located, the private home ownership rate is about 30.3 %. It can be said that on one “owner housing unit” comes nearly 2.3 “rented flat”.

In the Federal State of Brandenburg, with approx. 1.126.000 dwellings (about 18.5 % of the stock of the BSR-States) the private home ownership rate is about 39.6%. On one “owner housing unit” comes nearly 1.5 “rented flat”.



Source: Statistisches Bundesamt (2008)

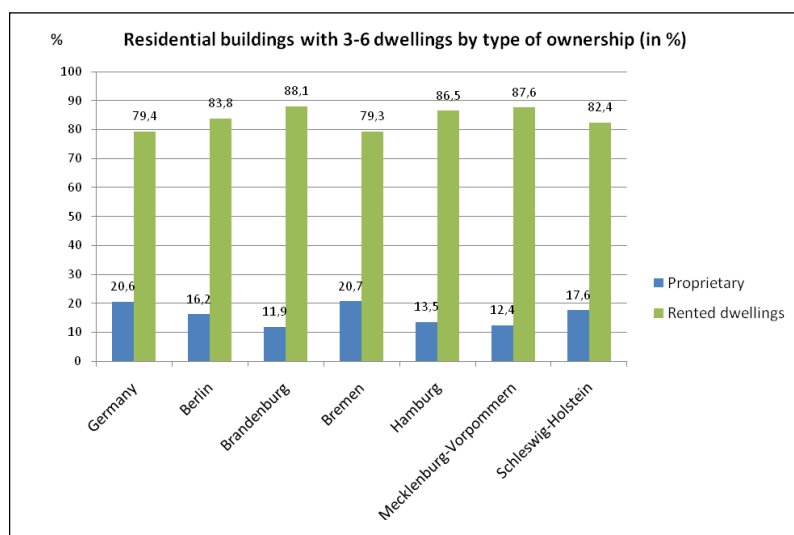
Within the German Federal States of the Baltic Sea Region Brandenburg has the second highest home ownership rate (39.6 %) after Schleswig-Holstein (47.1 %). Tail light forms Berlin with 14.1 %.³

¹ Statistisches Bundesamt (2008), Bautätigkeit und Wohnungen. Mikrozensus-Zusatzerhebung 2006. Bestand und Struktur der Wohneinheiten. Wohnsituation der Haushalte, Wiesbaden (Fachserie 5, Heft 1), p. 19.

² Berlin, Brandenburg, Bremen, Hamburg, Mecklenburg-Vorpommern, Schleswig-Holstein. Niedersachsen is neglected.

³ Statistisches Bundesamt, Bautätigkeit und Wohnungen, p. 19.

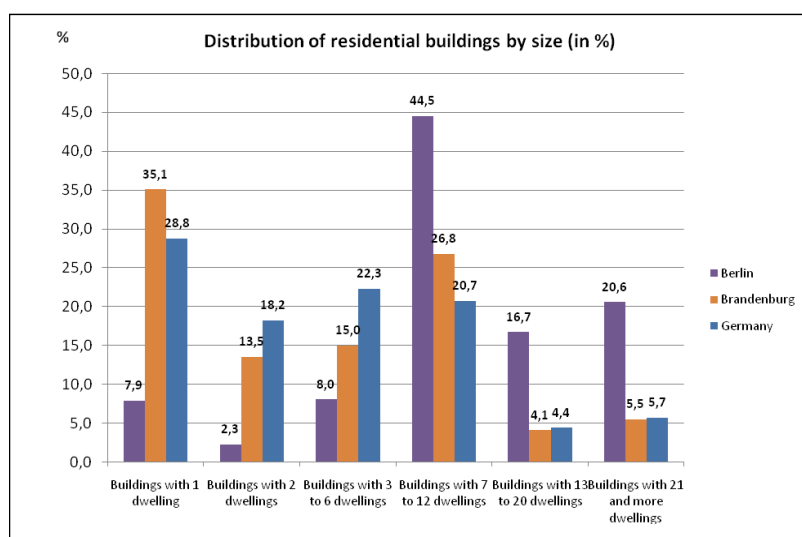
Following chart reflects the distribution of residential buildings by the type of ownership in Germany and the BSR-Federal States:



Source: Statistisches Bundesamt (2008)

3.1.2 What can be generally said about the residential buildings, e.g. - multi-storey buildings vs. detached houses, year of construction, private or public owner respectively hybrid forms such as associations?

Multi-storey buildings vs. detached houses



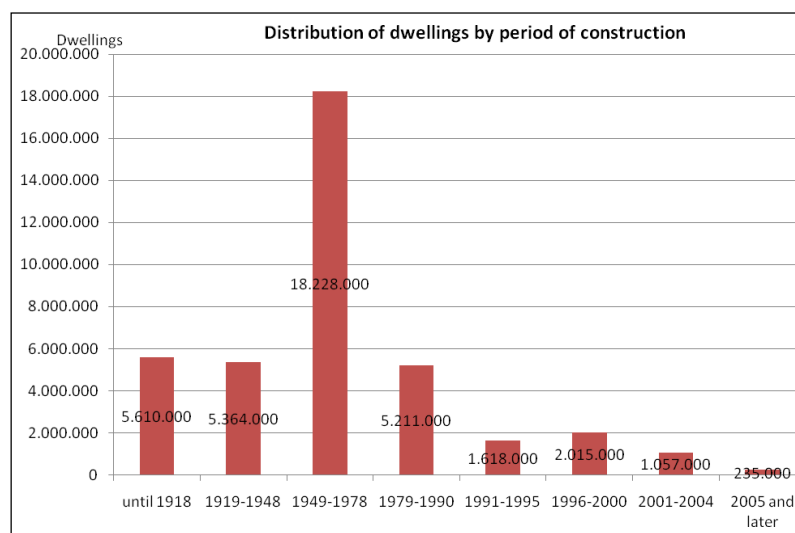
Source: Statistisches Bundesamt (2008)

Year of construction

Following statistics determined altogether about 39.3 million housing units in Germany.⁴ The majority (approx. 46.3%) was constructed between the years 1949 and 1978, as can be inferred from the following table:

Distribution of dwellings by period of construction									
	In total	until 1918	1919 1948	1949 1978	1979 1990	1991 1995	1996 2000	2001 2004	2005 and later
Germany	39.338.000	5.610.000	5.364.000	18.228.000	5.211.000	1.618.000	2.015.000	1.057.000	235.000

Source: Statistisches Bundesamt (2008)



Source: Statistisches Bundesamt (2008)

In the Federal States of the Baltic Sea Region⁵ there are approx. 16.8 % of all housing units in Germany, by which most of them were likewise constructed in the period mentioned above.

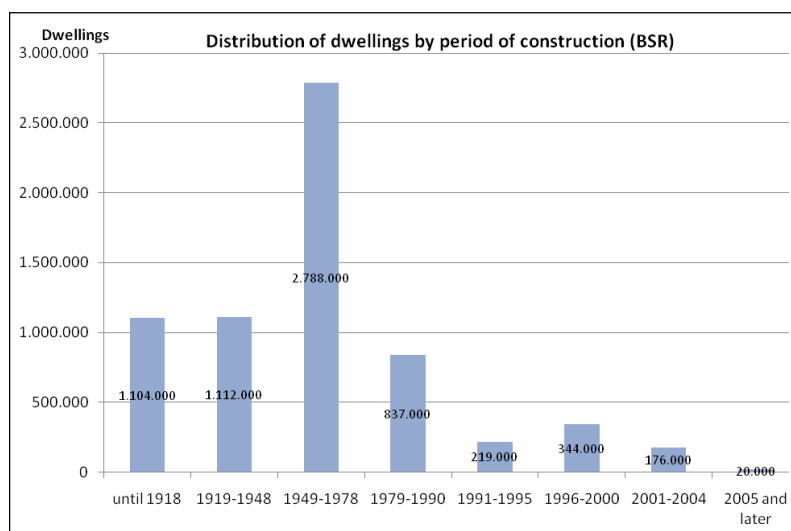
Distribution of dwellings by period of construction									
	In total	until 1918	1919	1949	1979	1991	1996	2001	2005 and later
			-	-	-	-	-	-	

⁴ Statistisches Bundesamt, Bautätigkeit und Wohnungen, p. 12.

⁵ See note 2.

			1948	1978	1990	1995	2000	2004	
BSR-States	6.619.000	1.104.000	1.112.000	2.788.000	837.000	219.000	344.000	176.000	20.000

Source: Statistisches Bundesamt (2008)



Source: Statistisches Bundesamt (2008)

Brandenburg has thereby after Berlin and Schleswig-Holstein the third biggest stock of dwellings within the BSR-Federal States.

Distribution of dwellings by period of construction									
	In total	until 1918	1919 1948	1949 1978	1979 1990	1991 1995	1996 2000	2001 2004	2005 and later
Brandenburg	1.271.000	199.000	277.000	365.000	175.000	58.000	136.000	55.000	5.000

Source: Statistisches Bundesamt (2008)

Private or public owner respectively hybrid forms such as associations

From about 39.338 million dwellings in Germany approx. 38.3% belong to property stock and approx. 53.7% are rented.⁶

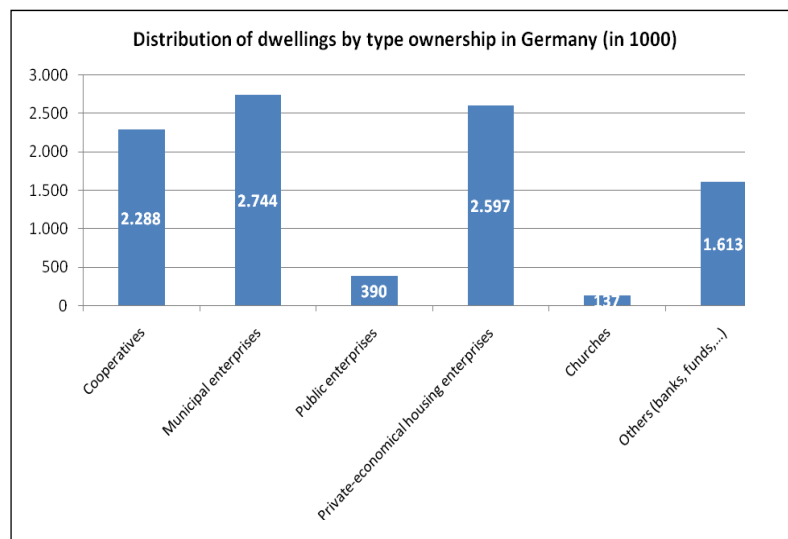
According to a report published in 2004 by the GdW (German Association of Housing and Real Estate Enterprises), about 10 million units of accommodation of the german housing stock are managed by professional-commercial offerers.⁷ About 80% of it belong thereby to the stock of cooperatives, municipal

⁶ Statistisches Bundesamt, Bautätigkeit und Wohnungen, p. 26.

⁷ According to informations of the Schader Stiftung, http://www.schader-stiftung.de/wohn_wandel/826.php (05.05.2009).

enterprises as well as private-economical housing enterprises in the form of capital companies. The remaining part is allotted to public housing enterprises in the possession of the State and Federal States or is in the possession of churches.

According to data by the GdW branch report about 16% of the dwellings offered by professional-commercial enterprises belong to organisations of different legal forms, for which the management of apartment real estate is a rather subordinate division, i.e. banks and insurance as well as real estate funds.



Source: GdW (2004)

The cooperatives form the largest group of housing enterprises within the professional-commercial offerers. The first cooperatives were founded at the end of the 19th century and followed the idea to help bourgeois and well-off working-class families by a kind of hire-purchase system to get a private house property⁸. The legal basis for cooperatives forms the Genossenschaftsgesetz (Act of cooperatives). After a statistics of the GdW approx. 1.900 cooperatives are existing in Germany while there are “only” about 700 municipal housing enterprises.⁹

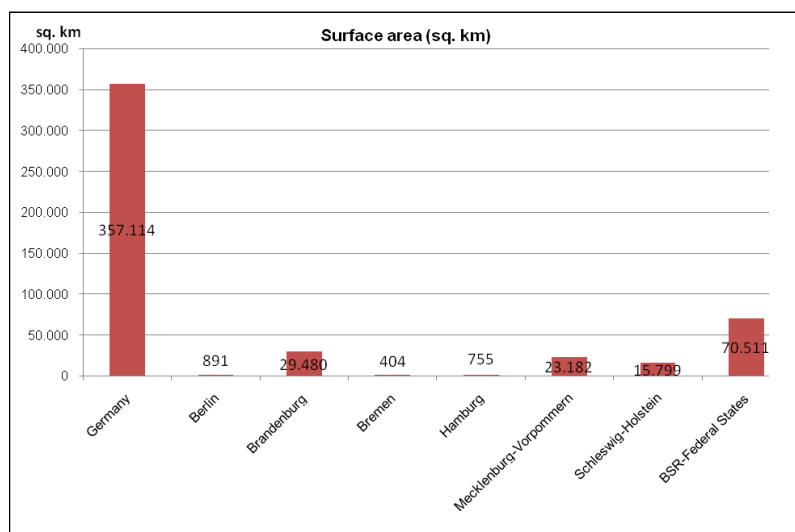
⁸ Renate Amann/Barbara von Neumann-Cosel (1995), Freie Scholle. Ein Name wird Programm, Berlin: Edition Arkadien, p. 8.

⁹ GdW (2008), GdW Jahresstatistik 2007 ,kompakt', <http://www.gdw.de/uploads/files/Koepp/GdW-Jahresstatistik%202007%20kompakt.pdf> (19.06.09).

3.1.3 What statements can be done about the residential structure, e.g. habitant per sq. km., living space per person, anticipated requirement of residential buildings in the next 5 years, predicted demographic trends for the country or the region?

Habitant per sq. km.¹⁰

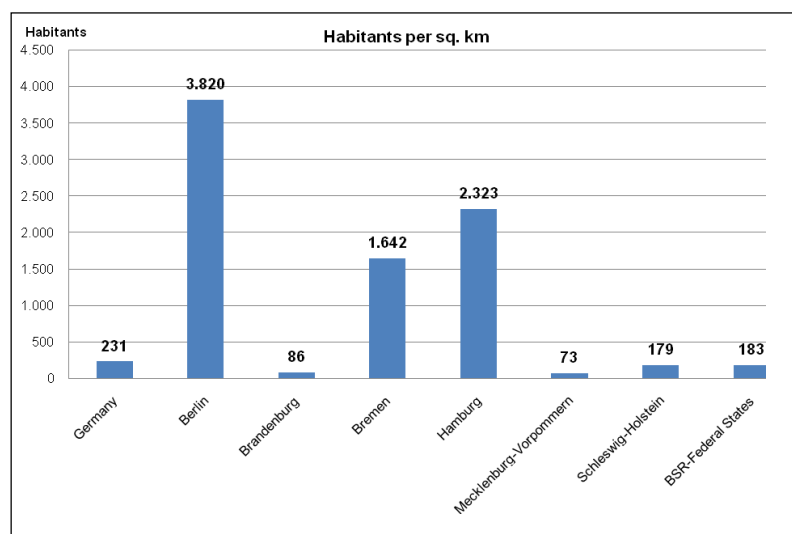
Germany has approximately 82.2180.000 inhabitants according to a surface of approx. 357.114 km². In the year 2006 about 12.903.000 inhabitants lived in the Federal States of the Baltic Sea Region with a surface of 70.511 km². In Brandenburg that covers a surface of approx. 29.480 km² lived about 2.536.000 inhabitants. Brandenburg has a population density of approx. 86 inhabitants per sq. km; in the all-German dimension it is 231 inhabitants per sq. km.¹¹



Source: Statistisches Bundesamt (2008)

¹⁰ Statistisches Bundesamt (2008), Statistisches Jahrbuch 2008 für die Bundesrepublik Deutschland. Statistical Yearbook 2008 for the Federal Republic of Germany, Wiesbaden.

¹¹ Statistisches Bundesamt (2007), Bevölkerung Deutschlands nach Bundesländern bis 2050. Ergebnisse der 11. koordinierten Bevölkerungsvorausberechnung nach Ländern, Wiesbaden.



Source: Statistisches Bundesamt (2008)

Living space per person

The average of the surface for each housing unit in the all-German dimension is approx. 89.9 m². In Brandenburg the average is approx. 81.8 m² for each housing unit. The statistical evaluations show that in Germany on average 2 persons are living in one housing unit. The same applies to Brandenburg. As a result the living space in Germany is approx. 42.9 m² per person, in Brandenburg only 39.6 m² per person.¹²

The one-person-household is furthest common in Germany (approx. 38.1%), followed by the 2-person-household (approx. 34.6%).¹³

Anticipated requirement of residential buildings in the next 5 years

The Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung, BBR) provides a forecast for the residential market and concludes that living space per person will increase to nearly 46 m², whereas the owner households with 50 m² will be favoured also in the future in opposite to the lodger households with 39 m².¹⁴

Based on the forecast of the development of the households in Germany it can be shown the development of the housing market. In doing so there will be differentiates between the new building of detached houses¹⁵ and multi-storey buildings.¹⁶

¹² Statistisches Bundesamt, *Bautätigkeit und Wohnungen*, p. 10.

¹³ Ibid., p. 158.

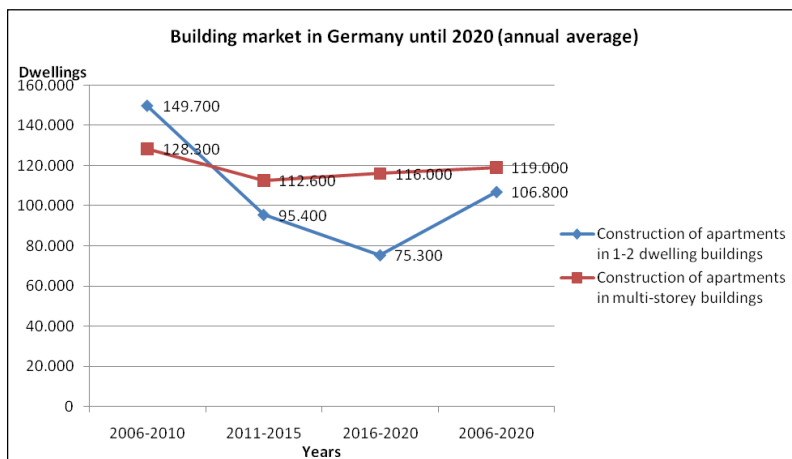
¹⁴ BBR, http://www.bbr.bund.de/cIn_015/nn_22518/SharedDocs/GlossarEntry/W/Wohnflaechen.html (19.06.09).

¹⁵ BBR, http://www.bbr.bund.de/cIn_015/nn_22518/SharedDocs/GlossarEntry/P/Prognose__nachfragedynamik__neubau__ezfh.html (19.06.09).

¹⁶ BBR, http://www.bbr.bund.de/cIn_015/nn_22518/SharedDocs/GlossarEntry/P/Prognose__nachfragedynamik__neubau__mfh.html (19.06.09).

Within the new building of detached houses the BBR assumes that it will proceed a stable level of approx. 3 housing units per 1,000 inhabitants up to the year 2020. Until 2017 the rate will decrease on 1.5 to 2 housing units per 1,000 inhabitants. The cause of this medium and long term decrease is the falling level of households acquiring residential property (people between 35 and 45 years old), which already reached the maximum in the past years.

The new building of housing units in multi-storey buildings will proceed with a quite stable level from approx. 1.5 units per 1,000 inhabitants. It is just easily declining until 2020. The reason for the medium and long term stable level is the still high rate of lodgers of the younger age groups and the migrant households. Although there is an easily rising percentage of residential property, it processes in only very slow development.



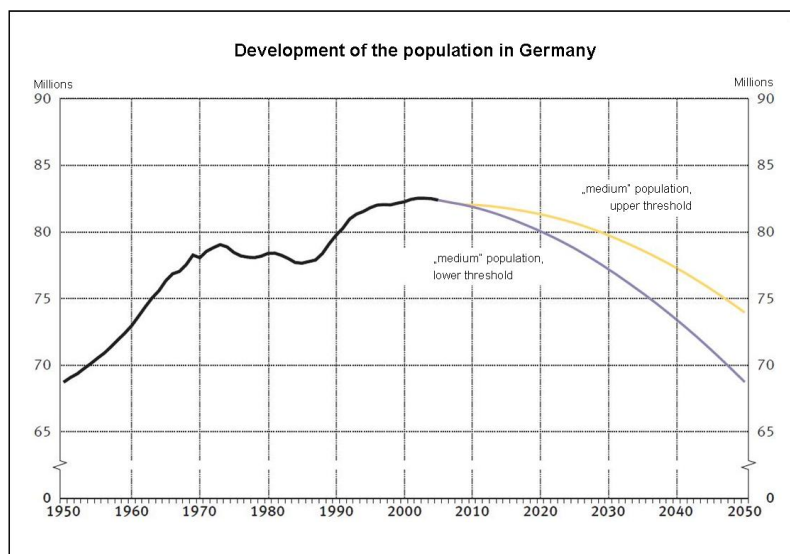
Source: BBR¹⁷

Predicted demographic trends for the country or the region

The forecasts regarding the population development assume a negative trend. Until 2050, according to the official estimations, the total population in Germany will decrease to 74 million inhabitants, at its maximum maybe to 69 million inhabitants. That means a decrease of around 10 to 17 percent.¹⁸ In Brandenburg the population will dwindle presumably until 2050 to about 1.790.000 inhabitants, i.e. a decrease around nearly 30 percent.

¹⁷ BBR,
http://www.bbr.bund.de/cIn_015/nn_22386/BBSR/DE/Fachthemen/Wohnungswesen/Wohnungsmarkt/Wohnungsmarktprognose/Neubaunachfrage/Neubaunachfrage.html (19.06.09).

¹⁸ Statistisches Bundesamt (2006), *Bevölkerung Deutschlands bis 2050. 11. koordinierte Bevölkerungsvorausberechnung. Presseexemplar*, Wiesbaden.

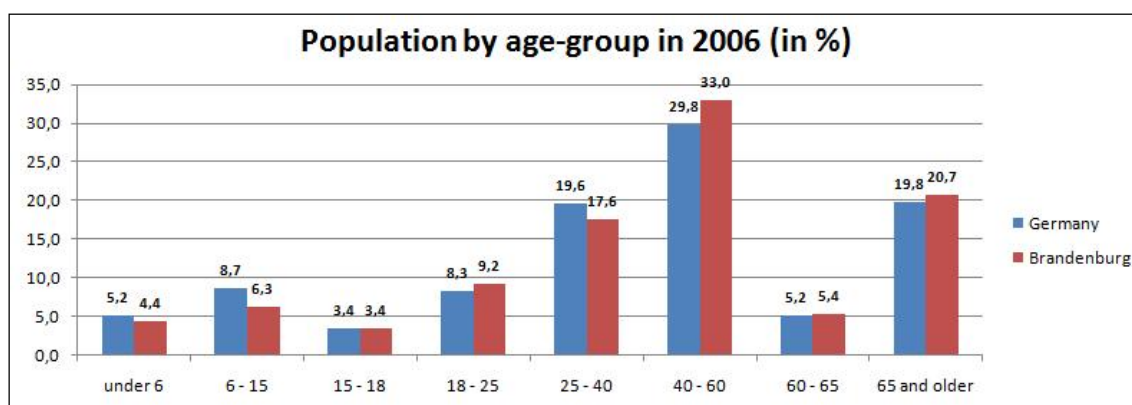


Source: Statistisches Bundesamt

3.1.4 What can be said about the structure of the households, e.g. age distribution, distribution of income, amount in % for rental costs of net household income, development of the living standard, gross domestic product?

Age distribution¹⁹

The largest group within the german population is aged between 40 and 60 years. The group ageing between 25 and 45 years takes the largest percentage of the private households.



Source: Statistisches Bundesamt (2008)

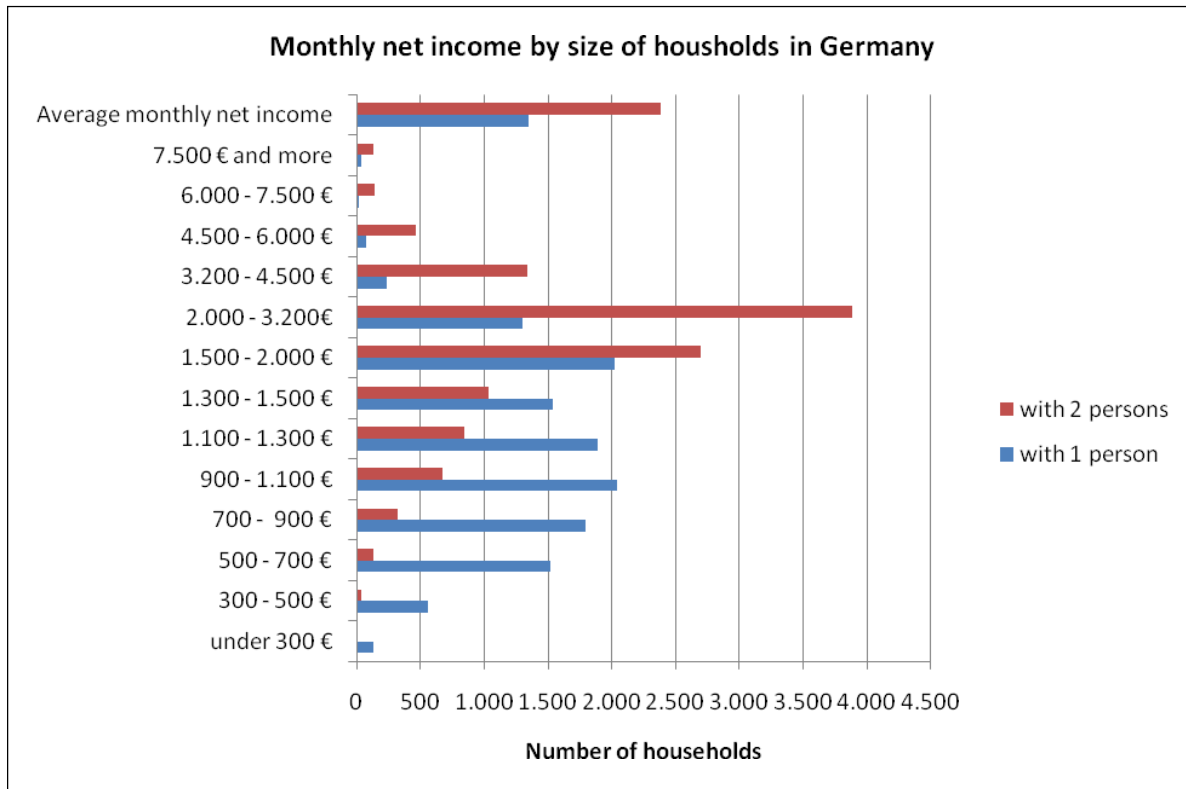
Distribution of income

¹⁹ Statistisches Bundesamt, Statistical Yearbook 2008, p. 45f.

The average net income per household in Germany in 2006 was approximately 2.170 € per month.

The one-person-household is most common in Germany with an average monthly net income of approx. 1.300 €, whereas the largest group represents the households with an income between 900 and 1.100 €.

The monthly income of a two-persons-household, the second largest group, averages about 2.400 €. In this category the most households have an amount at the disposal of between 2.000 and 3.200 €.²⁰



Source: Statistisches Bundesamt (2008)

Amount in % for rental costs of net household income

The average rental costs in 2006 amounted to approx. 22.8 % of net household income. The highest charge (26.3 %) was in the one-person-households.²¹

²⁰ Statistisches Bundesamt, *Bautätigkeit und Wohnungen*, p. 158f.

²¹ Statistisches Bundesamt, *Bautätigkeit und Wohnungen*, p. 184.

Average values of monthly costs in Potsdam				
	1999	2001	2003	2006
Monthly rent	349 €	382 €	378 €	391 €
Size of dwelling	58 m ²	59 m ²	59 m ²	58 m ²
Charges per sq. m	6.02 €	6.47 €	6.41 €	6.78 €
Net income per household	1,396 €	1,403 €	1,388 €	1,317 €
Amount for rental costs of net income	25 %	27 %	27 %	30 %

Source: Gewoba (2006)

Development of the living standard.

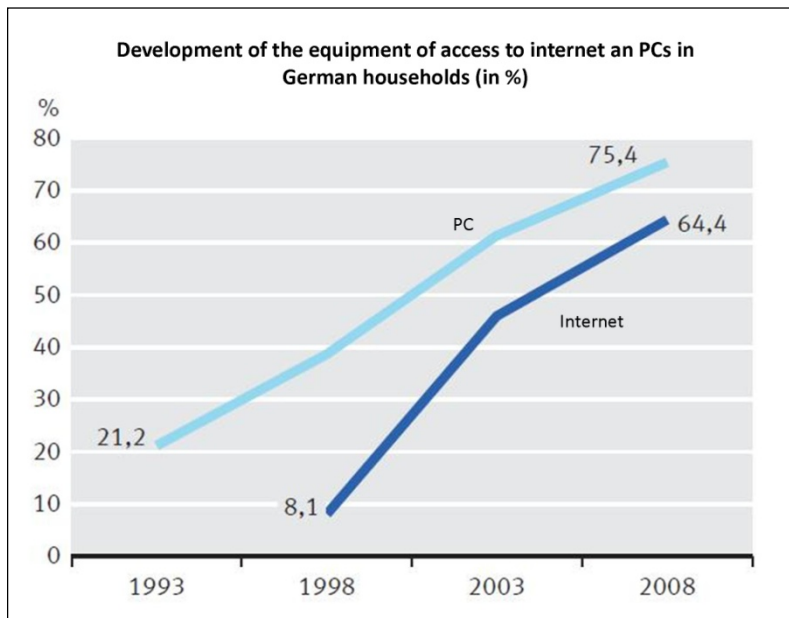
Several data indicate Germany benefits from an ascending living standard.

As shown in the chart below reflecting the development of the gross domestic product in Germany, the annual average per capita income (gross) increased in the last ten years continuously. Also the average monthly net income per household rose. In 1998 the income on average was about 1,782 €, in 2003 about 1,862 € and in 2006 about 2,168 €. ²²

²²

Kristina Kott (2005), „Einnahmen und Ausgaben privater Haushalte. Jahresergebnisse der Einkommens- und Verbrauchsstichprobe 2003“, in: *Wirtschaft und Statistik* 12, 1309-1323, p. 1310; Statistisches Bundesamt, Bautätigkeit und Wohnen, p. 159.

This development is reflected in the consumer behaviour of the population, for example in the equipment of the households with durable goods. In 2008 three of four households owned a personal computer (in 1993 there was one of five). Similarly was the development of the access to the internet. In 1998 approx. 8.1 % of the households had access to the internet, in 2008 it was already approx. 64.4 % of the households.²³



Source: Statistisches Bundesamt (2009)

In 2008 at least one car belongs to the majority of the households (approx. 77 %) and approx. 63 % of the households had a garage or a parking space.²⁴

According to a survey by the Gewoba, which is an municipal housing association in Potsdam and which belongs to the corporation association of Pro Potsdam, approx. 39 % of the respondent declared in 2006 that they find the living standard “quite good” (in 2003: approx. 43 %) . In comparison, approx. 7 % find the living standard “very bad” (2003: approx. 5 %).²⁵

But it is to observe that there is an adverse trend concerning the opinion of the development of the living standard. In 2003 approx. 35 % of the respondent declared that the living standard has „worsened a lot/a bit“, whereas in 2006 the percentage increased to approx. 42 %.²⁶

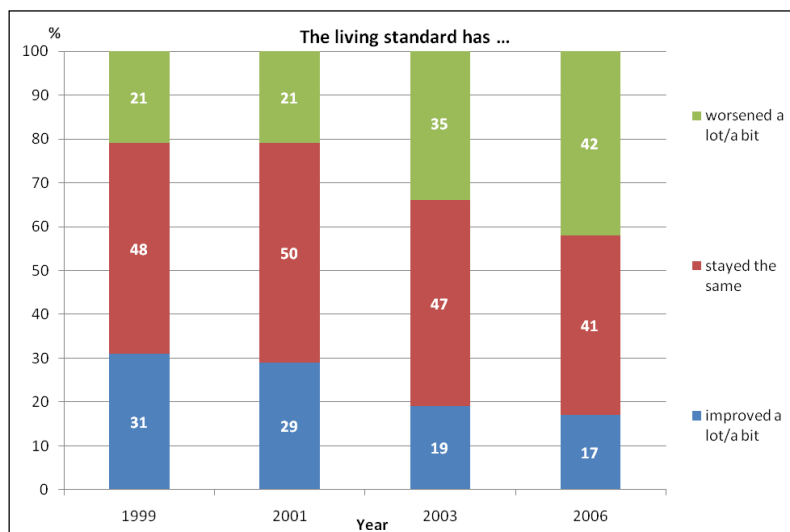
²³ Sylvia Behrends/Kristina Kott (2009), *Zuhause in Deutschland. Ausstattung und Wohnsituation privater Haushalte*, Wiesbaden, p. 11.

²⁴ Ibid., p. 30.

²⁵ Gewoba (2006), *Mieter-Monitor 2006. Ergebnisse einer repräsentativen Befragung der Gewoba-Mieter im Sommer 2006*, ed. by IFM Institut für Markt- und Medienforschung Berlin GmbH, 34.

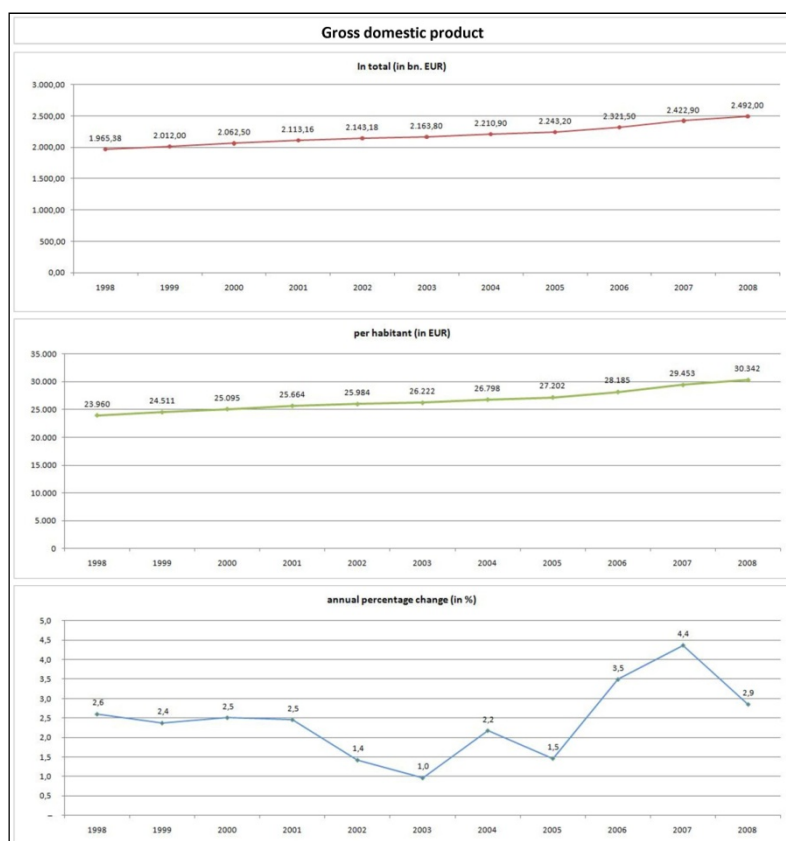
²⁶ Gewoba (2006), *Mietermonitor*, p. 35.

Demographic analysis of housing needs and target group of population – Germany PP3



Source: Gewoba (2006)

Gross domestic product



Source: Statistisches Bundesamt (2009)



Part-financed by the European Union
(European Regional Development Fund)

3.1.5 Are there any regional distinctions or similarities concerning the climate?

The climate charts above indicate that there are no significant differences within the German Federal States of the Baltic Sea Region in general. It can be pointed out that in 2008 the Federal State of Mecklenburg-Vorpommern had lower temperatures in annual average than Brandenburg.

3.1.6 Construction, maintenance and operation costs per m², m³? The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years. The dynamic of price development of living area per sq.m and the average salary in participating countries, Dynamics of expenses of average family for building maintenance, Dynamics of expenses of average family for building maintenance.

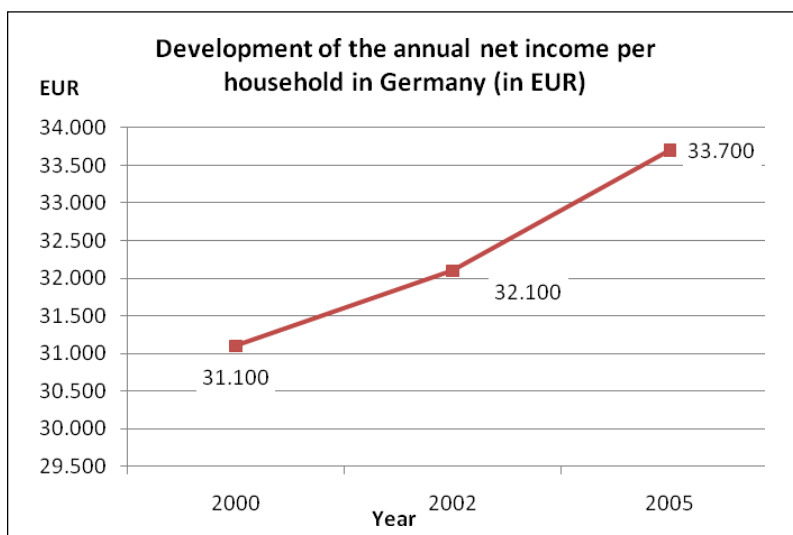
According to LBS Research (LBS – one of the biggest building societies in Germany) there are markable regional differences in construction costs. In 2005, you had to estimate costs of about 1.500 €/m² for single-family houses in Bavaria, in Saxony-Anhalt less than 1.000 €/m². For dwellings in multi-family houses you had to estimate costs of 1.197 €/m² on average in 2005.

Cost differences in new building

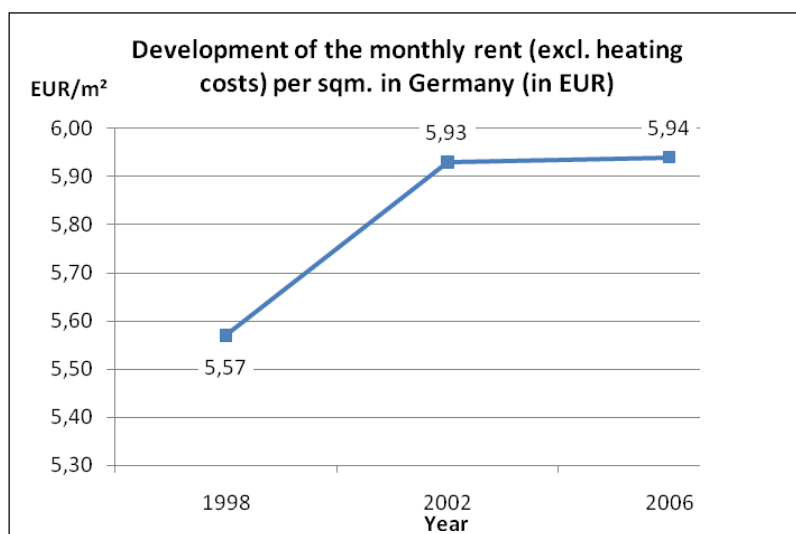
Construction costs für single-family houses 2005 (per square metre)

The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years: no data available.

The dynamic of price development of living area per sqm and the average salary in participating countries



Source: Statistisches Bundesamt (2002, 2006, 2008)



Source: Statistisches Bundesamt (2002, 2006, 2008)

Average values in Potsdam (charges per sq. m, net income per household)				
	1999	2001	2003	2006
Charges per sq. m	6.02 €	6.47 €	6.41 €	6.78 €
Net income per household	1,396 €	1,403€	1,388 €	1,317 €

Source: Gewoba (2006)

Dynamics of expenses of average family for building maintenance: no data available.

3.2 Sustainability aspects – Germany PP3

3.2.1 How is the energy saving/sustainable construction of residential buildings connected with any financial support?

The German financial institute “Kreditanstalt für Wiederaufbau” (KfW) supports with the programm “Energy-Efficient-Construction” the construction of so called “KfW Efficiency Houses” (“KfW-Effizienzhäuser”). Since april 2009 it differentiates between the “KfW Efficiency House 55” (KfW-Effizienzhaus 55) and the “KfW Efficiency House 70” (KfW-Effizienzhaus 70).²⁷

KfW Efficiency House 55 (EnEV₂₀₀₇, Energy Conservation Ordinance of the year 2007)

The annual primary energy consumption Q_p and the specific transmission heat loss H_T' must not be more than 55% of the values admissible for a new building in accordance with the EnEV₂₀₀₇ and the annual primary energy consumption must not be more than 40 kWh per m² of building floor area (A_N).

Passive houses are financed by this variant if the annual primary energy consumption stays below 40 kWh per m² of building floor area and the annual heating requirement Q_h is not more than 15 kWh per m² of living space.

KfW Efficiency House 70 (EnEV₂₀₀₇)

The annual primary energy consumption Q_p and the specific transmission heat loss H_T' must not be more than 70% of the values admissible for a new building in accordance with the EnEV₂₀₀₇ and the annual primary energy consumption must not be more than 60 kWh per m² of building floor area (A_N).

According to KfW the funds are provided up to 100% of the building costs but not more than 50.000 € per housing unit.

In October 2009 the Energy Conservation Ordinance will be even more sharpened. While the standard of an KfW Efficiency House 70 is about 30% better than the required energetic standard for new buildings since 2007, it will be the required standard for new buildings from October 2009 on. Therefore the support programmes by the KfW will be changed and adapted to the new EnEV.

²⁷ KfW, Energy Efficient Construction, http://www.kfw-foerderbank.de/EN_Home/Programmes_for_residential_buildings/Energy-Efficient_Construction.jsp (19.06.09).

3.2.2 Are there any existing capital allowances regarding sustainability building practice?

There are, according to the German Income Tax Act (*Einkommensteuergesetz*, EStG), following tax deductions:

- § 7 allowance for depreciation – owners
- § 7a increased allowances for deduction and write-offs of goodwill
- § 7b increased allowances for deduction for single-family houses, semidetached houses and owner-occupied flats
- § 7c increased allowances for deduction for building constructions to create new apartments
- § 7h increased allowances for deduction for buildings in formally designated redevelopment areas or urban development zones
- § 7i increased allowances for deduction for monuments
- § 7k increased allowances for deduction for council flats
- § 10e tax allowances for to human habitation self-used flat in its own house
- § 10f tax allowances for to human habitation used monuments and buildings in formally designated redevelopment areas or urban development zones.

3.3 Economical energy supply – Germany PP3

3.3.1 What is (how high) the energy consumption per m2 and what is the needed expense per m2?

According to a common report of the Federal Environment Agency (UmweltbundesamtUBA) and the Federal Statistical Office (Statistisches Bundesamt) the energy consumption of the private households for living increased by 3.5 % from 1995 to 2005.²⁸ After a statistics of the Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie, BMWi) the monthly expense for energy per household increased from 86 € in 2000 to 126 € in the 2008.²⁹

Energy consumption of the households						
	2000	2005	2006	2007	2007 to 2006	2007 to 2000
	kWh				Rate of change in %	
Energy consumption per household	20.262	18.146	18.025	17.530	- 2.8 %	- 13.5 %

Source: Statistisches Bundesamt

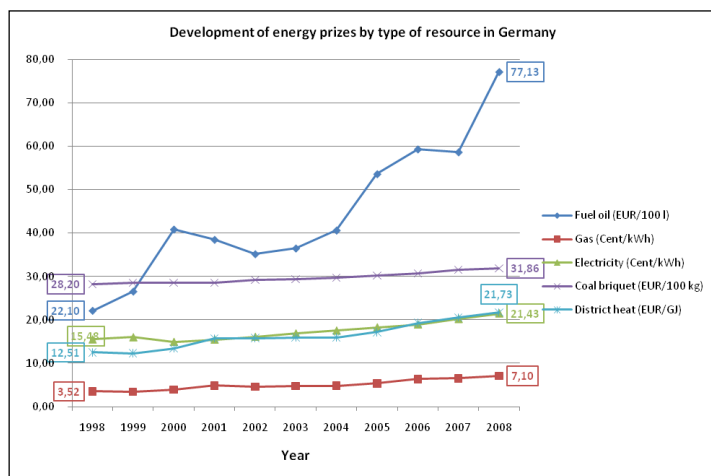
3.3.2 How was the development of energy costs for private household (incl. TAX) within the last few years?

A statistics of the BMWi shows how the energy prices rose in the last years.³⁰ If in 1998 a kWh of electricity cost 15.48 Cent, then in 2008 the amount was on average 21.43 Cent.

²⁸ Umweltbundesamt, Wie private Haushalte die Umwelt nutzen – höherer Energieverbrauch trotz Effizienzsteigerungen, <http://www.umweltbundesamt.de/uba-info-presse/hintergrund/private-haushalte.pdf> (19.06.09).

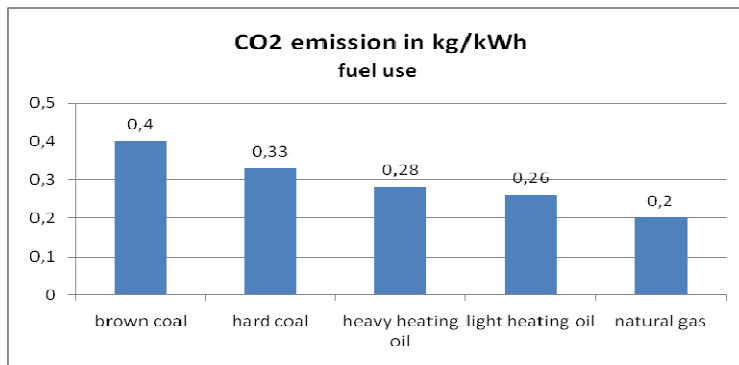
²⁹ Bundesministerium für Wirtschaft und Technologie, Energiekosten der privaten Haushalte, <http://www.bmwi.de/BMWi/Navigation/Energie/energiestatistiken,did=180924.html> (19.06.09).

³⁰ Bundesministerium für Wirtschaft und Technologie, Entwicklung von Energiepreisen und Preisindizes, <http://www.bmwi.de/BMWi/Navigation/Energie/energiestatistiken,did=180914.html> (19.06.09).

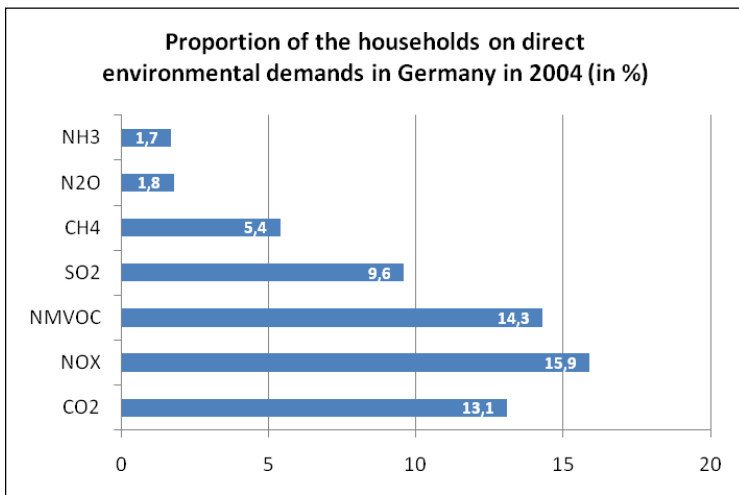


Source: BMWi (2009)

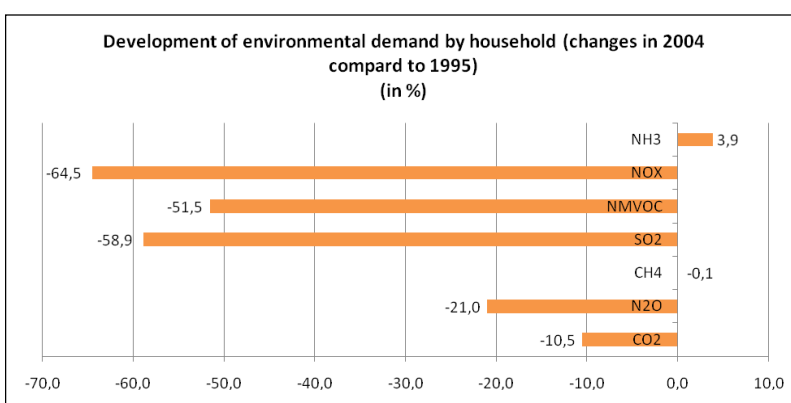
3.3.3 What is the rate of CO₂ –emission of the used energy resources of buildings? Dynamics of demand of energy resources per 1 sq. m. of living area (depending on fuel, materials, constructions; during building period and lifetime).



Source: Statistisches Bundesamt (2006)



Source: Statistisches Bundesamt (2006)³¹



Source: Statistisches Bundesamt (2006)

³¹ Statistisches Bundesamt (2006), Die Nutzung von Umweltressourcen durch die Konsumaktivitäten der privaten Haushalte. Ergebnisse der Umweltökonomischen Gesamtrechnungen 1995-2004, Wiesbaden.

Glossary:

CO ₂ :	Carbon dioxide	CH ₄ :	Methane
NO _x :	Nitrogen oxide	N ₂ O:	Nitrous oxide
NM VOC:	Non-methan volatile organic compounds	NH ₃ :	Ammonia
SO ₂ :	Sulphur dioxide		

3.4 Evaluation of current maintenance and operating costs – Germany PP3

3.4.1 What can be said about the operating costs?

The Operating Cost Ordinance (“Betriebskostenverordnung”, BetrKV) from 2003 forms the legal basis for listing and accounting of operating cost. According to this ordinance operating costs are the charges, which emerge to the owner by the ownership of the estate or by the appropriate use of the building, the auxiliary buildings, assets, mechanisms and of the estate.³² (See 3.6.3 for cost which can be listed)

Development of the operating cost							
Monthly average values in € per m ² living space for a 2-person-household							
Year	Operating cost (gross)	Heating/ Hot water	Net operating cost	Largest assets of the net operating cost			
				Real estate tax	Water/ Waste Water	Garbage and street cleaning	Caretaker/ Building cleaning
1995	2.21 €	0.82 €	1.39 €	0.15 €	0.45 €	0.25 €	0.28 €
2000	1.96 €	0.65 €	1.31 €	0.18 €	0.43 €	0.20 €	0.24 €
2005	2.08 €	0.69 €	1.38 €	0.21 €	0.47 €	0.17 €	0.22 €
2006	2.11 €	0.76 €	1.38 €	0.21 €	0.47 €	0.17 €	0.23 €
2007	2.24 €	0.77 €	1.47€	0.25 €	0.48 €	0.19 €	0.23 €

Source: BBU (2009)³³

³² Bundesregierung (2003), „Verordnung über die Aufstellung von Betriebskosten“, in: *Bundesgesetzblatt I*, 56, 2347-2349, p. 2347. See also <http://www.bgbl.de> and <http://www.juris.de>.

³³ BBU (2009), *Betriebskosten 2007. Auswertung der BBU-Betriebskostendatenbank. Abgerechnete Betriebskosten des Jahres 2007 im Unternehmensdurchschnitt der BBU-Mitgliedsunternehmen in Berlin und im Land Brandenburg*, Berlin.

3.4.2 What kind of performing benchmarks are available?

Immobench³⁴, for example, is an internet portal for the comparison of operating costs in Germany. It offers following analysis tools:

- benchmarks for operating costs (per sqm effective area)
- benchmarks for maintenance costs
- benchmarks for energy consumption

Immobench offers for the optimization of operating costs benchmarks to recognize, which costs in a stock differ from the average of a comparative stock.³⁵ The benchmarks are based on the so called “Geisling agreement” (*Geislinger Konvention*), which determines the data structure of residential buildings and operating costs.

3.4.3 Which costs can be listed in the bill of operating costs and which not?

According to the Operating Cost Ordinance (BetrKV) from 2003 belongs to operating costs:

- the real estate tax
- the costs of the water supply
- the costs of the drainage
- the costs of operating, cleaning and maintenance of machines to the supply of heat
- the costs of operating, cleaning and maintenance of machines to the supply of warm water
- the costs of connected installation of heat and warm water supply
- the costs of operating of elevators
- the costs of street cleaning and waste disposal
- the costs of the house cleaning
- the costs of the garden maintenance
- the costs of the lighting
- the costs of the chimney cleaning
- the costs of the property insurance and liability insurance
- the costs of the caretaker.

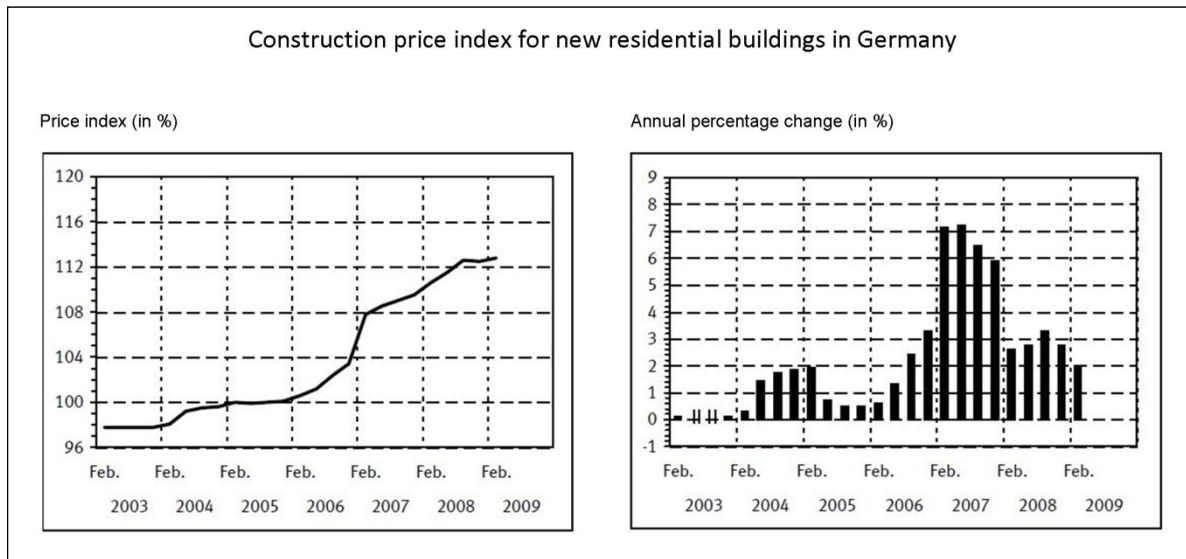
Among “operating costs” the administrative and maintenance cost are not ranked. They can not be divided among the tenants.

³⁴ <http://www.immobench.de>.

³⁵ Gondring/Wagner 2007, p. 122.

3.4.4 How was the development of maintenance and operating costs in the last few years?

According to the recent report of the Federal Statistical Office the construction price index for conventionally constructed new residential buildings (construction work performed at the building; including value-added tax) in Germany increased to 2.0% compared with February 2008. In November 2008, the price index increased 2.7% in comparison to the year before. Compared with November 2008, the price index for residential buildings rose up 0.3% in February 2009.³⁶



Source: Statistisches Bundesamt (2009)

3.4.5 What are the costs of maintenance and administration costs?

The maintenance and administration costs in Germany are based on the regulation of calculations in housing management ("Verordnung über die wohnungswirtschaftliche Berechnungen nach dem Zweiten Wohnungsbaugesetz"), which was amended in 2007. This regulates the calculation of profitability of living space. Since 1st January 2008 the costs for maintenance according to the Second Computation Ordinance ("II. BV") are:³⁷

- up to 7.87 € per m² living space every year for dwellings whose delivery date is less than 22 years ago
- up to 9.97 € per m² living space every year for dwelling whose delivery date is at least 22 years ago
- up to 12.74 € per m² living space every year for dwellings whose delivery date is at least 32 years ago

and the administration costs are:

³⁶ Statistisches Bundesamt (2009), Preise. Preisindizes für die Bauwirtschaft, Wiesbaden.

³⁷ GuG aktuell ,http://www.gug-aktuell.de/Aktuelle_Daten/Bewirtschaftungskosten_ab_01_0/bewirtschaftungskosten_ab_01_0.html (12.05.09).

- up to 254.79 € yearly per dwelling, private residential building, property home in every residential building
- up to 304.64 € yearly per owner property dwelling
- up to 33.23 € yearly for garage or similar parking places

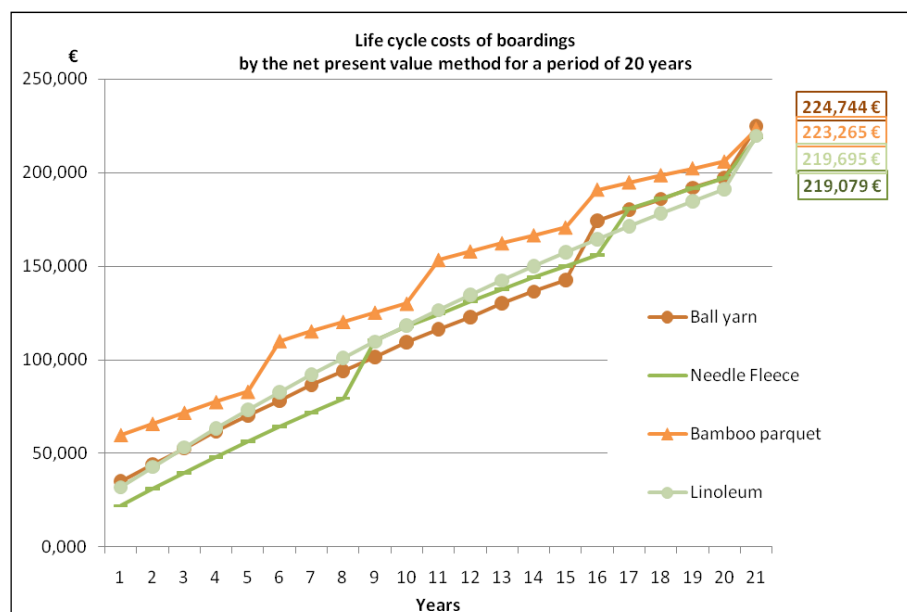
These are the values that you have to estimate in calculations of profitability for social or free-financed housing, when the Second Housing Act is to be applied. But the actual costs of the housing company can differ considerably.

3.4.6 What can be said about stability of value and life cycle costs? (development)

Life cycle costs are defined by the ISO 15686 as a total cost of a building or its parts throughout its life, including the costs of planning, design, acquisition, operations, maintenance and disposal, less any residual value. There is no standardised method to calculate the life cycle costs.³⁸

Life cycle costs and stability of value belong under the topic 'Economic Quality' to the criteria which are used to evaluate the sustainability of a building, as it is done by the German Association for Sustainable Building in a certification procedure.³⁹

Example for the calculation of life cycle costs:



Source: Own calculation

³⁸ Andrea Pelzeter (2007), „Lebenzykluskosten von Immobilien – Vergleich möglicher Berechnungsansätze“, in: Zeitschrift für Immobilienökonomie 2, 38-54, p. 39.

³⁹ <http://www.dgnb.de>



3.5 Housing development programmes of the participating countries – Germany PP3

3.5.1 What kind of financial support does exist for owners and lodgers/renters, respectively for construction of residential buildings?

for owners:

- federal means/funds, e.g. loans with favourable interests or risk fair interests, subsidies, tax allowances
- state means/funds, e.g. loans or subsidies
- subsidies from local authorities

for lodgers/renters:

- rent subsidies ("Wohngeld") for people/families with low income
- income-orientated support ("einkommensorientierte Förderung")

for construction of residential buildings:

- (see above – for owners)

(for more details also see 3.5.2)

3.5.2 Who is the target group for these supporting programs?

Federal funds, e.g. loans with favourable interests or risk fair interests, subsidies; tax allowances

Promotion statistics, Germany					
	Unit	2003	2004	2005	2006
Promotions	Number	26,486	19,648	16,879	16,103
Dwellings promoted	Number	44,491	36,799	32,698	35,307
Total cost of dwellings promoted	EUR mn	6,745	5,269	4,605	4,521

Source: Statistisches Bundesamt

In Germany we talk about social housing, if dwellings are promoted by the state. The dwellings are for social groups who are unable to cover their housing need on the free housing market. These appropriated dwellings are occupation and rent bound.



Federal funds – programmes of the KfW-bank:

The KfW is a public law institution with the function of a promotional bank. Its programmes support the acquiring or building of an owner-occupied home and the modernisation and/or rehabilitation or refurbishment of residential buildings by granting loans with favourable interest rates (below market conditions):

KfW Home Ownership⁴⁰

The construction or acquisition of owner-occupied houses or condominiums is financed.

The target group are natural persons acquiring an owner-occupied home.

KfW Energy-Efficient Construction⁴¹

The construction, production and first acquisition of “KfW Efficiency Houses” are financed; the required energy standard must be confirmed by an energy expert.

The target group is anyone investing in the construction of new residential buildings.

KfW Housing Modernisation Standard⁴²

Modernisation and rehabilitation of residential buildings (such as repair or replacement of defective building components) as well as Senior Housing Conversion (for measures designed to make your home or living environment more accessible) is financed.

As target group is considered anyone investing in the modernisation and rehabilitation or refurbishment of residential buildings (no nursing or other types of homes or hostels, holiday homes or weekend cottages).

KfW Energy-Efficient Rehabilitation⁴³

Rehabilitation or refurbishment measures aimed at reducing energy consumption are financed. A repayment grant is additionally given if the KfW Efficiency House standard is achieved.

The target group for loans is anyone investing in the rehabilitation or refurbishment of residential buildings. The target group for grants are owners and housing property communities respectively.

Funds by the Federal States, e.g. loans or subsidies:

Most of the Federal States of Germany support the acquisition and modernisation of residential buildings in form of loans or subsidies.

Examples for Brandenburg:

The “Investitionsbank des Landes Brandenburg” (ILB) is the main promotional bank of the Federal State of Brandenburg. By using funds from the State of Brandenburg, the Federal Government, the European Union and its own funds they can offer:

Loans at favourable interest rates:

Home Ownership: If there is a financial gap between the financial means given by the KfW, the equity capital and the costs, the ILB could give support in form of a loan in addition to the KfW programme.

⁴⁰ KfW, KfW Home Ownership, http://www.kfw-foerderbank.de/EN_Home/Programmes_for_residential_buildings/KfWHomeOwn.jsp (19.06.2009).

⁴¹ See note 32. For further details see answer to question 3.2.1.

⁴² KfW, Housing Modernisation, http://www.kfw-foerderbank.de/EN_Home/Programmes_for_residential_buildings/KfWHousing.jsp (19.06.2009).

⁴³ KfW, Energy-Efficient Rehabilitation, http://www.kfw-foerderbank.de/EN_Home/Programmes_for_residential_buildings/Energy-Efficient_Rehabilitation.jsp (19.06.2009).

Directive to promote the adaptation of residential buildings to all generations and its needs by modernisation and renovation ("Richtlinie zur Förderung der generationsgerechten Anpassung von Mietwohngebäuden durch Modernisierung und Instandsetzung - GenerationsgerechtModInstR"): The ILB gives an interest rate free loan for 15 years, but you have to pay a running charge of 0.5% per year. The yearly repayment comes to 4%. In return you are only allowed to increase the original rent by 1.53 Euro/square meter after the modernisation and not more than 10% every third year during the next 15 years. The maximum promotion amount comes to 40% of the costs or 440 Euro/square meter.

Directive for the promotion of self-used home ownership in city centers as a start-up financing for investors („Richtlinie zur Förderung von selbst genutztem Wohneigentum in Innenstädten - WohneigentumInnenstadtR"): The benefit recipient is not allowed to exceed defined income limits. In doing so, he could receive a grant or a loan. The amount depends on the recipient's income, the amount of people who live in its household, the planned measure and type of building.

Grants:

Directive for the promotion of a barrier-free and generation-fair access to the apartments in the residential buildings, e.g. installation of lifts/elevators („Richtlinie zur Förderung der Herstellung des barrierefreien und generationsgerechten Zugangs zu den Wohnungen in Mietwohngebäuden - AufzugsR"): The grant amounts 50% of the accepted costs or 6,000 Euro per dwelling. The rent must not be increased more than 1.00 Euro/square meter and not more than 10% every third year during the next 10 years.

Directive for the promotion of the disability-friendly adaption of rented apartments („Richtlinie zur Förderung der behindertengerechten Anpassung von Mietwohnungen - Wohnraumanpassungsrichtlinie"): The promotion amount comes to 80% of the accepted costs, but at its maximum between 8,000 and 25,000 Euro per dwelling (dependent on the structural measures). During a period of 15 years, the dwelling has to be rented to severely handicapped persons.

Directive for the promotion of self-used home ownership in city centers for owners („Richtlinie zur Förderung von selbst genutztem Wohneigentum in Innenstädten - WohneigentumInnenstadtR") (also see loans)

1. Promotion in new building and housing stock 2005 (federal state of Brandenburg)									
recipient of promotion	number of promotion	sponsored apartments							
		total		for					thereunder rented flats
				new building	housing stock total	thereof			
						moder-nisation	foundation of rights of occupancy	acquisition of living rooms	
		number	living area in 1,000 m²	tally / number					
private households	142	327	27	153	174	142	-	32	185
housing association	4	103	6	-	103	103	-	-	103
others	11	19	2	8	11	8	-	3	8
total	157	449	34	161	288	253	-	35	296
recipient of promotion	number of promotion	final costs from the sponsored apartmants							
		total		for					
				new building	housing stock total	thereof			
						moder-nisation	foundation of rights of occupancy	acquisition of living rooms	
	tally / number	100 EUR	EUR pro flat	1,000 EUR	EUR pro flat	1,000 EUR			
private households	142	34,338	105,01	23,627	15,4423	10,712	6,391	-	4,320
housing association	4	3,952	38,369	-		3,952	3,952	-	-
others	11	1,936	101,912	1,235	154,313	702	383	-	319
total	157	40,227	89,592	24,861	154,418	15,365	10,726	-	4,640

Source: Landesbetrieb für Datenverarbeitung und Statistik Land Brandenburg, Statistische Berichte, Förderung im sozialen Wohnungsbau im Land Brandenburg 2005

(Information in EUR)			
	commitment	commitment capacity	number of dwellings
residential construction	266	40,467,714	257
proxy	246	21,897,222	1,842
ILB ¹⁾ -products	20	18,570,492	730
construction and acquisition including modernisation inner-city living room, inclusive pilot project and KfW ²⁾	179	11,174,600	374
directive for the promotion of a barrier-free access	32	6,136,200	1,379
construction, modernisation and renovation of rented flats including KfW ²⁾	2	4,111,622	56
bond for housing loans	8	304,800	8
facilities to overcome height differences	10	118,150	10
cooperative stake	15	51,850	15
proxy	246	21,897,222	1,842
additional credits for rented flats	11	18,098,992	720
addition credits for home ownership	9	471,500	10
ILB ¹⁾ - products	20	18,570,492	730
ILB = promotional bank of the federal state of Brandenburg			
KfW= promotional bank of Germany			

Source: Investitionsbank des Landes Brandenburg, Geschäftsbericht 2007

Examples for Mecklenburg-Vorpommern:

The “Landesförderinstitut Mecklenburg-Vorpommern” (LFI) is the approval body of the State of Mecklenburg-Vorpommern. Within the federal state programme “Wohnraumförderung 2009” they support city rebuilding

processes by the following guidelines:

modernization and renovation of innercity old building quarters

modernization and renovation of self-used home-ownership by single parents or families with children

creation of living space in accordance with the requirement of elderly people with care service in the actual stocks

modernization and renovation of rental and cooperative flats

construction of rental flats in communities with unsecured demand for flats

Examples for Schleswig-Holstein:

The “Investitionsbank Schleswig-Holstein (IB)” is the state’s main development bank. They are partner for potential constructors and buyers, renovator and modernisator, for the housing industry and for credit institutes. The IB also offers funding possibilities for town redevelopment and town planning.

Subsidies from local authorities:

There is no demand against the local authority for local means. Every municipality decides on its own in dependence on the budgetary position if it provides the appropriate means.

Examples:

City planning promotion, subsidies in formally designated redevelopment areas

Supports for tenants:

Examples: Rent subsidies (“Wohngeld”):

This financial federal support is given for those, who are not able or just partly able to afford living. Rent subsidies are paid for economic protection of appropriate and family-fair living for tenants of housing space, owners of a private residential building or owners of an owner-occupied flat.

Qualification:

number of family members who belong to the household

amount of family income: defined amounts are not to be exceeded

amount of supportable rent or burden: Just a defined maximum amount of rent or burden is supportable. Expenses that are higher than those for appropriate living space are not considered. The maximum amounts orientate on the local rent level. Inappropriate rents are not subsidised.

Example: A family with two children lives in a flat where the rent/square meter conforms to the average rent/square meter of Germany. The maximum amount of support then comes to 556 Euro plus 43 Euro for heating costs.

Income-orientated support:

The promotion consists of a basic and an additional support. The basic support is given for the acquisition of occupancy rights and the fixing of maximum rents. By giving an additional support an income-orientated housing costs burden of the tenant and an appropriate saving of the fixed rental payments are achieved. The promotional commitment is made by agreement or approval, normally with the municipality.

Example: The PROPOTSDAM GmbH constructed a building with 127 flats. The basic support was given by the Federal State of Brandenburg in form of a building loan and an expenditure loan. The additional support was adopted by the municipality of Potsdam. The initial basic rent came to 6.14 €/sm. If the income



of the household exceeds the income limit (calculated on the regulations of the second housing law II. WoBauG) at not more than 20%, the additional support amounts to 1.54 €/sqm (not more than 40% -> 1.03 €/sqm). That means that the tenant pays 4.61 €/sm and the municipality pays 1.54 €/sm. In that special case the period of support comes to 20 years.

3.6 Management models , owner's structures – Germany PP3

3.6.1 How can the structure of ownership, i.e. the proportion of "classic" real estate manager and yield-oriented investors be described?

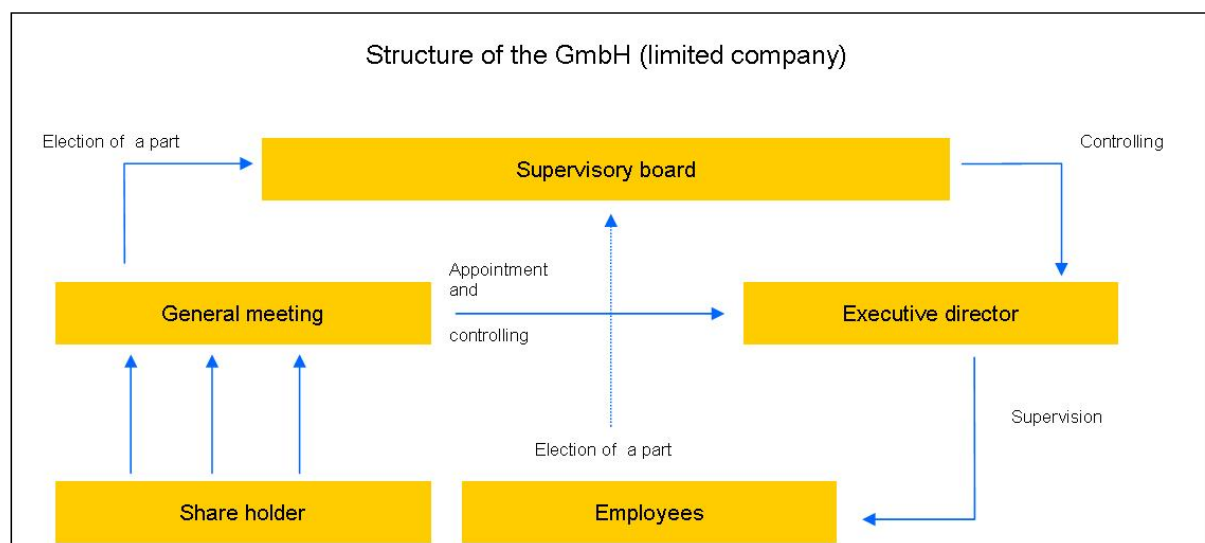
See answer to question 3.1.2.

3.6.2 What are the procedures to make a decision within owners' associations?

In Germany, we have different management models according to housing industry. Most of the dwellings belong to municipal enterprises mostly under the legal form of a limited company ("GmbH"). The second largest group is formed by private-economical housing enterprises which can occur under the legal forms of joint-stock companies ("AG"), limited commercial partnerships ("KG") and also limited companies. (This list is not extended to be exhaustive.) The third largest group are cooperatives. Among the mentioned management models you can also find private associations such as companies constituted under civil law ("GbR") or owner's cooperations ("WEG").

Limited Company

The executive director of a ltd. company represents the company and he is responsible for the leadership of the business activities, but the general assembly can force restrictions.

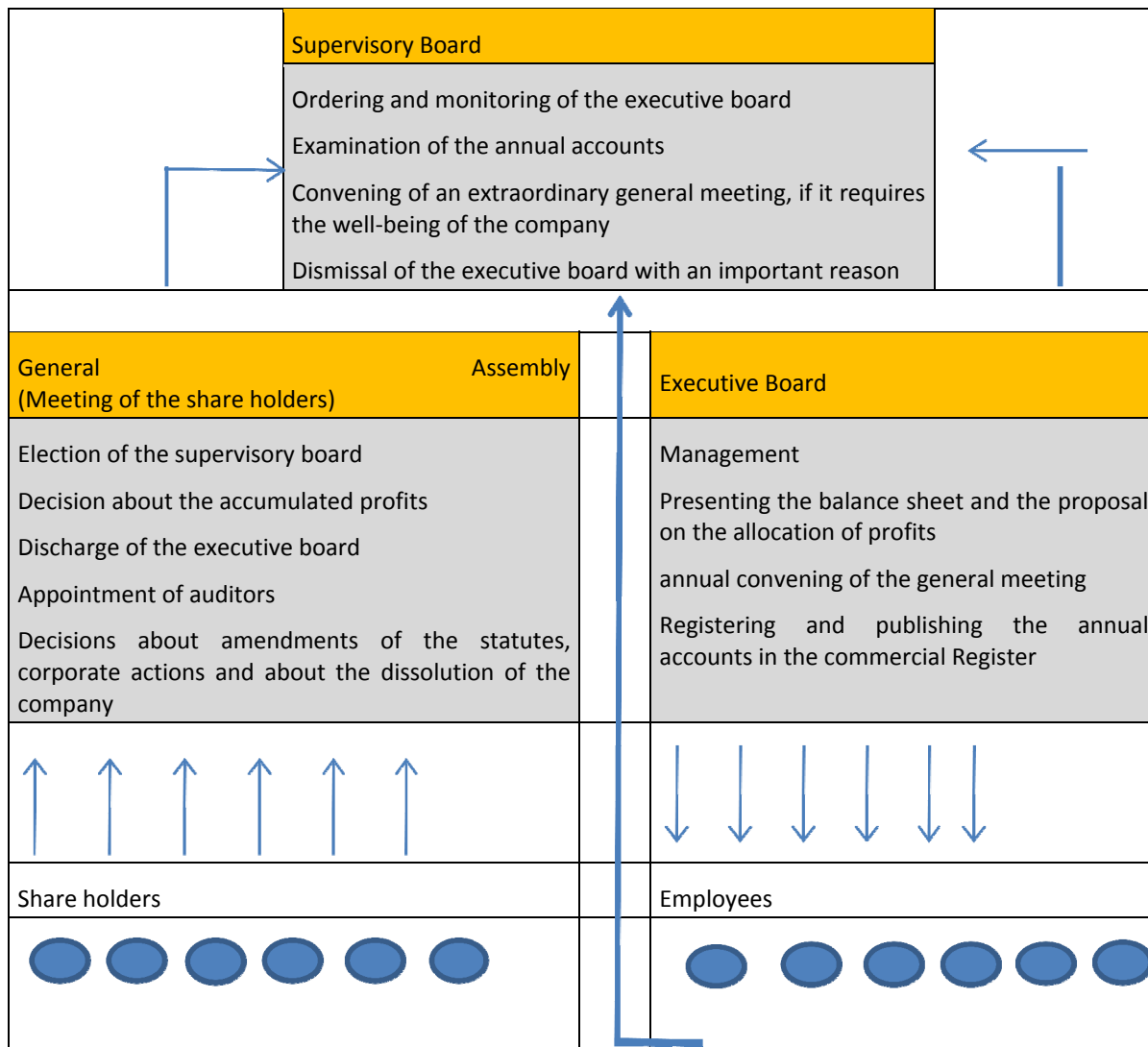


Source: Internet Akademie und Lehrbuchverlag (2009)⁴⁴

⁴⁴ <http://www.teialehrbuch.de/> (30.06.2009).

Joint-Stock Company

In a joint-stock company the executive board is responsible for the management. The general assembly is only allowed to decide on management activities on application. This shows that a joint-stock company is meant for having much more members compared with a limited company. Consequently, the stake-holders are confined to their equity participation.



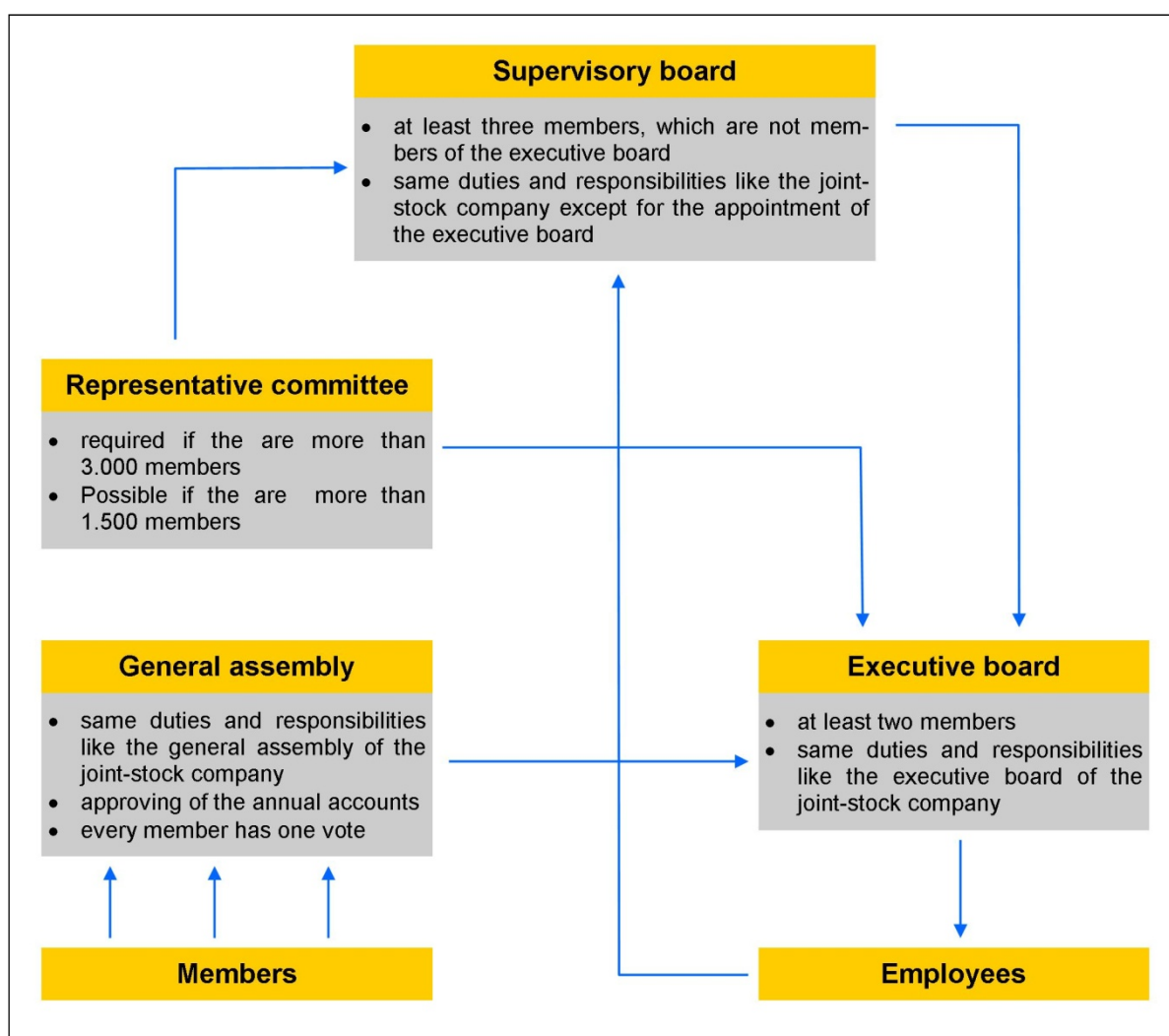
Source: Internet Akademie und Lehrbuchverlag (2009)

Limited Commercial Partnership:

In this management model only the personally liable partner is entitled and committed to do the management. Every personally liable partner is allowed to represent the company on its own. In cases of extraordinary business dealings one partner can disagree with another. Limited partners are disqualified from taking over the management or from representing the company.

Cooperatives:

Usually, cooperatives have three organs: the executive board, the supervisory board and the general assembly. They are represented by the executive board. If there is no executive board, representation is done by the supervisory board. Its function is also to control the management. Members of cooperatives can use their rights in the general assembly. It decides with the majority of the casted votes (simple majority vote) if law or constitution does not determine a larger majority. Every member has one vote, but the constitution can allowed multiple votes.



Source: Internet Akademie und Lehrbuchverlag (2009)

Company constituted under civil law

On principle, all partners take over the management together. But this could be changed by contract. Thinkable could be:

- majoritarian decision-making
- assignment of one or more partners under exclusion of the others
- the lonely authority to decide of one or more partners

It is assumed that the right to represent and the right to take over the management conform with each other. But it is possible to determine it in different ways in the company agreement.

Owner's cooperations:

The highest organ for decision making, its process and self-administration is the assembly of all owners of freehold flats. It is responsible for properly and current administration of the facility of the ownership of residential apartments. So it decides on the distribution of incurred costs such as the waste disposal, the formation of reserve funds for repairs or building activities. Everyone who acquires residential property obtain rights and obligations, according to the regulations by the residential property law ("Wohneigentumsgesetz") and by arrangements among the owners.⁴⁵ At least once a year the owners come together in the owners' assembly to make decisions. Every owner has one vote. An assembly has a quorum if more than half of the co-ownership shares are represented.⁴⁶

Other organs are the administrator and the administration advisory council. The vote of an administrator can not be excluded, the vote of an administration advisory council is facultative.

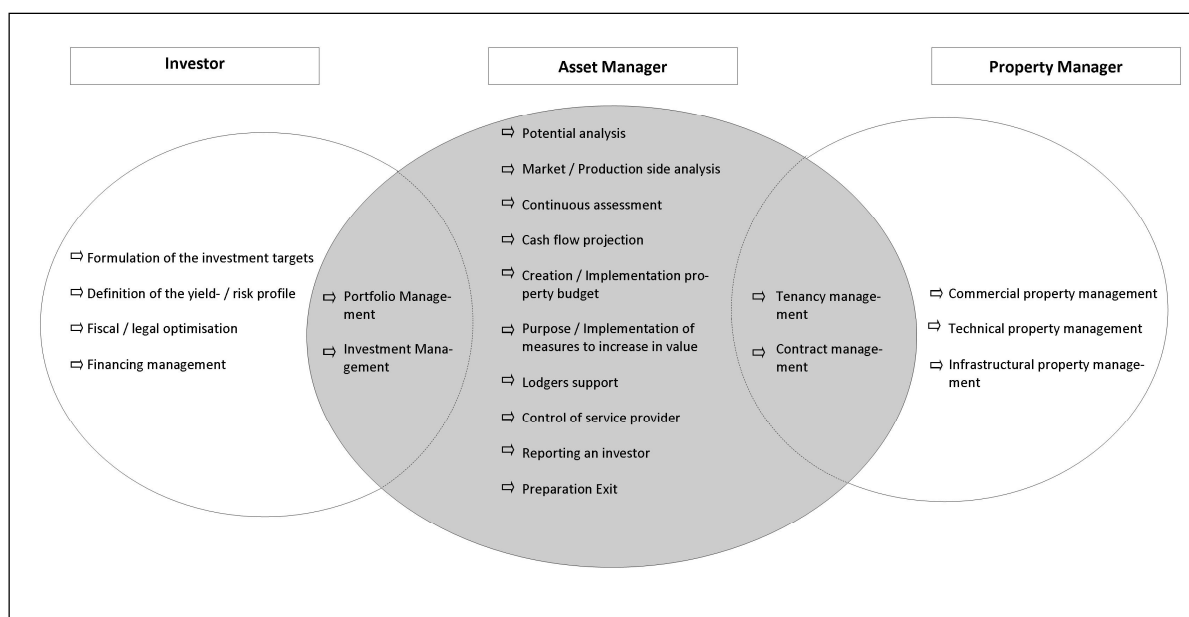
⁴⁵ R+V, Eigentümergemeinschaft – die eigene Wohnung verpflichtet, http://www.ruv.de/de/r_v_ratgeber/bauen_wohnen/geld_recht/4_eigentuemergemeinschaft.jsp (19.06.09).

⁴⁶ Bundestag (1951), Gesetz über das Wohnungseigentum und das Dauerwohnrecht (WoEigG), § 25.

3.7 Condition of real estate management – Germany PP3

3.7.1 Property Management, Asset Management und Facility Management – in which level these instruments are used for it?

The following chart gives an general overview about the distribution of the business activities on the level of investors, asset managers and property managers as usual in Germany.⁴⁷



Source: Gondring/Wagner (2007).

3.7.2 What are national distinctions in the tenancy law?

In Germany there are no national distinctions in the tenancy law. The legal basis for tenancy law are the regulations in the §§ 535ff of the German Civil Code ("Bürgerliches Gesetzbuch", BGB)⁴⁸, which became effective in its original version on 1st January 1900. These regulations according to the tenancy law rule for example:

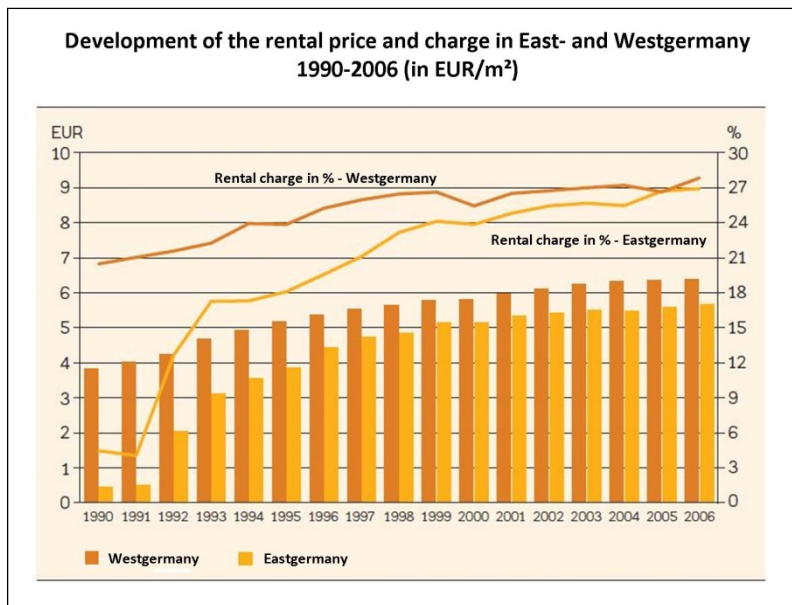
- content and main duties of the rental contract
- termination of the rental contract
- payment of the rent
- amount of rent and the possibilities to increase the rent (e.g. increase to the local comparable rent or after refurbishment).

⁴⁷ Gondring/Wagner 2007, p. 26.

⁴⁸ BGB, <http://www.gesetze-im-internet.de/bgb/> (19.06.2009).

A special interest group is the German Lodgers Association (“Deutscher Mieterbund”)⁴⁹. It gives legal advice and assistance in rental disputes.

3.7.3 How was the development of the rental prices in the last few years?



Source: Bundeszentrale für politische Bildung (2008)⁵⁰

⁴⁹ <http://www.mieterbund.de/>

⁵⁰ Bundeszentrale für politische Bildung (2008), Datenreport 2008. Ein Sozialbericht für die Bundesrepublik Deutschland, Bonn, p. 231.

3.8 Benefit analyses for owners and investors – Germany PP3

3.8.1 What are the models of calculation of profitability? Examples.

static methods:

- profit comparison calculation respectively cost comparison calculation
- profitability comparison calculation
- static amortization calculation

dynamic methods:

- net present value method/discounted cash flow method
- annuity method
- internal rate of return method
- complete financial plan

3.9 Financing and funding instruments and mechanism – Germany PP3

3.9.1 What are the financing instruments on local/ regional/ national/ EU level for housing development/ such as public private partnership (PPP) respectively financial supports? Supporting instruments for house owner and renter/lodgers (see above).

equity capital financing:

- self-financing
- stake-financing, e.g. in form of the formation of cooperatives or housing property communities

debt capital financing:

- bank loans/credits
- funding loans/credits
- subsidies
- building society saving loans

others:

- private public partnership
- property developer
- private assembly

3.9.2 How to make investment decisions and for which time period these decisions are planned and are validly?

PRO POTSDAM created a calculation based on the discounted cash flow method and the complete financial plan. The observation period comes to 15 years. If the result is positive the investment can be done. If the investment is planned to be put into action in the future it is necessary to calculate again because circumstances can change (e.g. interest rates, buildings costs, ...).

3.10 References – Germany PP3

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13.3 Details Lithuania

- Engineering and building technology standards in Lithuania
- Method of planning, permit and tendering procedures in Lithuania
- Economical and financial basis, industry and quality in Lithuania

1.1 Architectural and Urban Design – Lithuania PP8

1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?

About 32% of the persons live in detached houses and 61% in flats.

1.1.2 What can be generally said about the residential buildings (e.g. year of construction, private or public owner respectively hybrid forms such as associations)?

Dwellings by type by county and municipality

	All dwellings	Individual house	Part of the house	Separate apartment (flat)	Hostel	Hotel, etc.	Other living quarters
Total	1293029	422487	61123	791445	17281	139	554
Urban areas	874514	110662	36729	711571	15246	120	186
Rural areas	418515	311825	24394	79874	2035	19	368

- year of construction,

	<i>Total</i>	<i>Before 1919</i>	<i>1919–1945</i>	<i>1946–1960</i>	<i>1961–1970</i>	<i>1971–1980</i>	<i>1981–1990</i>	<i>1991–2001</i>
<i>In thousands</i>								
All buildings	511,3	31,4	106,4	97,3	78,1	87,6	74,2	36,3
Urban	163,6	7,3	26,2	36,2	25,7	25,1	23,5	19,6
Rural	347,7	24,1	80,2	61,1	52,4	62,5	50,7	16,7
<i>In per cent</i>								
All buildings	100	6,2	20,8	19,0	15,3	17,1	14,5	7,1
Urban	100	4,4	16,0	22,2	15,7	15,3	14,4	12,0
Rural	100	6,9	23,1	17,6	15,1	18,0	14,5	4,8

Item 1.1.4.

32,7% - individual houses, 4,7% - part of the house, 61,2% - separate apartment (flat) in the multi-storey houses.

Year of construction:

32,7% - before 1919

20,8% - 1919-1945

19% - 1946-1960

15,3% - 1961-1970

17,1% - 1971-1980

14,5% - 1981-1990

7,1% - 1991-2001

Number of newly constructed residential units in the last ten years is around 3600 per year

Public or private owner:

1991 - 42% private, 58% public

2008 - 97,2% private, 2,8% public

Minimal requirements for organisation of spaces in living house according governmental regulations are defined in table 2.

Table 2

Organization of spaces of residential house

Purpose of premises	Single house	Residential house		First floor of two-storey house	Flat for One person
		Common area	flat		
1. living room or separated part of area for daily communication	+		+	+	+ living room
2. bedroom or separated part of area for rest / sleep	+		+	+	
3. kitchen or separated part of area (niche) for food storage and preparation	+		+	+	+
4. dinning room or part of kitchen to have meals	+		+	+	

5. room for daily living needs * alternative: laundry and dryer for house community or part of it (for flats of one landing)	+	*	+	+	
6. lavatory	+		+	+	
7. bathroom *alternative: shower + lavatory	+		*	*	+
8. larder or built-in wardrobe	+		+	+	+
9. hall or corridor with closet for outerwear	+		+	+	+
10. room or part of room for garden instruments and small tools	+	+			
11. room or part of room for go-cart, bikes, wheelchairs, sport and game equipment *alternative: bikes depot can be fitted outside	+	+			
12. room for temporary storage of daily waste * alternative: could be made temporary storage for daily-waste on the plot of house	+	+			
13. room or a part of room for building services systems *alternative: technical rooms by needs	+	+			
14. boiler-room and fuel storage or thermal station of central (district) heat supply system	+	+			
15. entrance tambour	+	++			
16. landing		+			
17. common corridor (depends on the type of house)		+			

18. gallery (depends on the type of house)		+			
19. lobby with part of space for elevator		+			
20. elevator		+			

Notes:

+ compulsory requirement;

* alternative of compulsory requirement;

Parts of separable rooms (2 table 1–4 rows) should have window

1.1.3 What is the common architectural design of residential buildings (pictures, drawings, floor plan, view)?

The content of Architectural part of building project is described by building requirement STR1.05.06:2005 “Structure Design”. [1]

1.1.4 What are the common requirements for living spaces? (number of rooms, number of persons per household, sq m per person, height of different rooms, min area of the living room, information about usual living spaces)

Flat rate for 1 person - not less than 34 m² · Bath together with a toilet area – not less than 5m² · Any apartment, one room must not be less than 16m².

Number of rooms: 5-7 rooms

Number of persons per household: 3-4 persons

Sqm per person: 24,9 m²

Height of different room: 2,0 - 2,5 m

Min. area of living room: 14 m²

bathroom, kitchen, living rooms, storage room for wheelchairs and bicycle, wardrobe and closet

1.1.5 Are there any building envelope design limitations (e.g material, windows, etc.)?

Outer partitions to be designed according to STR2.05.01: 2005 “- Thermal technique of the building envelope” [2] and

STR2.01.09: 2005 “Energy Performance of Buildings; Certification of Energy Performance of Buildings” [3]

Indoor natural light settings associated with the minimum of window glass surface and room floor area ratio: tambour door, staircase, the house of the general-use corridors - 1:12; living rooms – 1:6; kitchen – 1:8; rooms in an inclined roof – 1:10.

1.1.6 Are there any specific standards (e.g. elevator, cellar, entrance, etc.)?

Elevator:	The newly built house, higher than 4 floors (homes for the elderly - 3, at home, for families with disabled persons - 2), shall be installed in elevators.
Cellar:	No.
Bell/ Intercom:	Almost in all residential buildings.
Required rooms:	Bathroom, kitchen, living rooms, storage room for wheelchairs and bicycle, wardrobe and closet.
Garage/parking space:	Requirements are in the STR 2.02.01:2004 "living Houses".[4]
Concierge service:	No.
Flat and slanted roof:	STR2.05.02: 2008 "Building constructions. Roofs" Roofs must be designed, built and used so as to meet the essential requirements of the 6 Regulations: "Essential requirements of the building".[5]
Bicycle comfort:	Storage room is needed, also possible is an outside located bike depot.

1.1.7 What are the definitions or guidelines for roof design?

STR2.05.02: 2008 "Building constructions. Roofs."[5]

Slope up to 7deg. – flat roof; Slope > 7deg. – pitched roof.

1.1.8 What are the functional guidelines (space efficiency, reusing ability, accessibility, and bicycle comfort)?

Comfort ability or space efficiency are expressed as minimal requirements for living spaces and accessibility for disabled people. It is described in STR2.02.01:2004 "Living Houses"[4], STR2.03.01:2001 "Buildings and Territories"[6].

1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?

Law of Construction; Regulations.

1.1.10 What kind of requirements is defined for barrier free construction? Name of the code?

Law on Construction;

STR1.07.01: 2002 "Construction Permit" [7]

STR1.09.06: 2007 "Construction Suspension. Liquidation of Consequences of. Unauthorized Construction"[8]

1.1.11 Which plans control the local urban and architectural design, what are the common criteria and where can they be found?

There are detailed plans, under which local authorities issue a summary of design conditions with all requirements, including the architecture.

1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept?

During the work of preparation of plot plan the solutions and concept of investor and architect are coordinated with community.

1.1.13 What criteria should be involved to describe the quality of the urban area of the site?

Territorial Planning Law Article 23 [9] provides for the preparation of detailed plans, the management of this binding site and mode of use:

- Territory (land) use and (or) the nature;
- Allowable height of buildings;
- Allowable building density of the parcel of land;
- Allowable building intensity plot;
- Construction zone, construction of range;
- The municipal or local engineering networks, the territory (land) supply of engineering techniques and communication corridors;
- Of the system of organization;
- Easement. Where the planned area is important for the protection of the landscape, the urban, architectural and heritage point of view;
- Urban and architectural;
- The natural and cultural heritage protection;
- The territory (land) greenery (percentage).

1.2 Structural Design – Lithuania PP8

1.2.1 What are the climatic conditions?

Storms, floods:	No storms.
Number of days of sun annually:	1700
Temperature development p.a.	6
Annual rainfall:	650 mm
Annual snow depth:	94cm or 154kg/m ²
Number of heating days:	225

1.2.2 What types of roof structure are used in residential houses?

Pitched roofs of steel and wood, flat roofs usually made of reinforced concrete constructions.

1.2.3 What types of load bearing structure are used in residential houses?

Load bearing wall constructions: masonry (bricks, blocks, panels); storey partitions, foundations: reinforced concrete.

Load bearing framework constructions: reinforced concrete.

1.2.4 Is there any national code to calculate load structures?

STR2.05.04:2003 “Actions and Loads” [10]

STR2.05.05:2005 “Design of Concrete and Reinforced Concrete Structures”[11]

STR2.05.06:2005 “Design of Aluminum Structures”[12]

STR2.05.07:2005 “Design of Timber Structures”[13]

STR2.05.08:2005 “Design of Steel Structures”[14]

STR2.05

1.2.5 How highly-developed are the industrial prefabricated materials?

Quite high.

1.2.6 How is the proportion between handcraft building method and industrialised building?

Multi-family houses currently being built from monolithic reinforced concrete structures, in the decoration using less manual work.

1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?

Minimum construction costs.

1.3 Energy standards – Lithuania PP8

1.3.1 Is there any national code for Energy efficiency of buildings?

STR 2.01.01(6):1999 “Essential requirements of the building. Energy saving and heat retention”[15]

STR 2.01.09:2005 „Energy Performance of Buildings;. Certification of Energy Performance of Buildings”[3]

STR 2.05.01:2005 “Thermal technique of the building envelope”[2]

1.3.2 What is average specific heat consumption of residential buildings in kWh/m²a?

Regulation STR 2.09.04:2008 “ Thermal Output of Building Heating System. Heat Demand in Heating ”[16]

Total energy consumption in dwellings per month, 2008: > 35 kWh/m² - 22%; ~ 25 kWh/m² - 56%; ~ 15 kWh/m² - 17%; ~ 8 kWh/m² - 5%(it satisfies the requirements of existing standards for new buildings)

1.3.3 Is there any national code for thermal insulation of buildings?

STR 2.05.01:2005 “Thermal technique of the building envelope”[2]

STR 2.01.09:2005 „Energy Performance of Buildings;. Certification of Energy Performance of Buildings”[3]

1.3.4 What method is implemented to calculate energy demand?

According to STR 2.09.04:2008 “Thermal Output of Building Heating System. Heat Demand in Heating”[16]:
Method based on prEN 15217:2005 [17] and prEN 15203:2005 [18] requirements

1.4 Building materials – Lithuania PP8

1.4.1 What kind of building materials are used for: roof structure, load bearing structure, foundation, external wall, internal wall, floor, ceiling, façade, windows, thermal insulation?

Roof structure:	Multi-story houses - reinforced concrete;
Load bearing structure:	reinforced concrete;
Foundation:	reinforced concrete;
External wall:	different types of masonry walls (bricks, blocks, panels);
Internal wall:	different types of masonry walls (bricks, blocks, panels);
Floor:	reinforced concrete, suspended ceiling;
Ceiling:	plastering, metal, glass, ceramic;
Windows:	plastic or wooden windows;
Thermal insulation:	mineral or glass wool.

1.4.2 What are the reasons of the material usage?

Usually – according to laws of market economy.

1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?

First tightening of requirements for outer partitions was made in year 1993. Later – in 1996, 1999, 2005 and 2008, also appeared new regulations for integrated energy saving. Building envelope (walls, roof) design solutions and U – value for it: In 1993 - $\sim 0,35 \text{ W/(m}^2\text{K)}$; 1999 – $\sim 0,25 \text{ W/(m}^2\text{K)}$; 2008 – $0,16 - 0,2 \text{ W/(m}^2\text{K)}$.

1.4.4 Is there any ecological declaration of building materials?

HN 36:2002 “Banned and restricted substances ” [19] HN 35:2002 “Maximum permissible concentration of chemicals polluting air in residential areas ” [20] Minister for the Environment 2006 12 29 Order No. DI-637 “About confirmation of rules for cleaning-up of building waste” [21]

For ecological building materials special codes we do not have.

1.4.5 What criteria are involved in this declaration?

Health risks, potentials to accumulate or to abolish the ozone layer, Potentials for acidification and over fertilization, Risks for the local and global environment.

1.4.6 Are there any declarations or codes for waste materials?

Management, VZ, 1998, no. 61-1726 [22]; Government of the Republic of Lithuania 2002 04 12 Resolution No. 519 "On the state of strategic waste management plan" VZ, 2002, no. 40 * 499 [23]; Minister for the Environment 2006 12 29 Order No. DI-637 “About confirmation of rules for cleaning-up of building waste” VZ, 2007, no. 10-403 [24]: Construction waste management regulations set of construction waste generation and management of planning, accounting, and management of the construction site, building the mobile crushing equipment on site, construction of untreated waste consumption, construction waste recovery and disposal.

1.5 Building physics – Lithuania PP8

1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?

STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“ [3] There are used parameters from EN15217:2005 [25] and EN15203:2005 [26] in this code. STR 2.01.03:2003 “Declared and Project Values of Units of Thermal Technical Construction Materials and Products” [27]. They meet the LST EN ISO 10456 [28] provisions. Regulation 3, 4 and 5 annexes of the thermal values correspond with LST EN 12524 [29]

1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?

HN 42:2004 “Microclimate in dwelling and public buildings” [30]

HN 69:2003 “Thermal comfort and sufficient thermal environment in work rooms. Requirements for parameters of normal values and measuring” [31]

1.5.3 What requirements are defined for acoustic comfort? Name of the code?

STR 2.01.01(5):1999 Essential requirements of the building. Protection against noise [32]

STR 2.01.07:2003 „Protection of the Internal and External Environment of Buildings from Noise“ [33]

STR 2.01.08:2003 “Control of noise sent to surroundings by open-air equipment” [34]

1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?

STR 2.02.01:2004 “Living Houses” [4]. STR 2.02.01:2004 p.192 - residential buildings should be located so, that comply with the building facilities and children's playground for visual comfort requirements do not impede the natural indoor lighting, meet the requirements of natural indoor lighting (see also the reply to 1.1.5a)

1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?

STR 2.02.01:2004 “Living Houses” [4]

STR 2.01.01(3):1999 “Essential requirements of the building. Hygiene, health, protection of environment” [35]

1.5.6 What requirements are defined for the building envelope? Name of the code?

STR 2.09.02:2005 “Heating, ventilation and air conditioning” [36], STR 2.09.04:2008 “Thermal Output of Building Heating System. Heat Demand in Heating” [16], STR 2.05.02:2008. “Structures of Buildings. Roofs” [5]

STR 2.01.01(3):1999 “Essential requirements of the buildings” [35]

1.5.7 What requirements are defined for fire prevention? Name of the code?

STR 2.01.01(2):1999 „Essential requirements of the building. Fire safety“ [37]

STR 2.01.04:2004 „Fire safety. Main requirements“ [38]

STR 2.01.06:2003 “Lightning safety of structures. Active safety against lightning” [39]

1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?

STR 2.01.01(1):2005 „Essential requirements of the building. Mechanical endurance and stability“ [40]

STR 1.04.02: 2004 „Engineering Geological (Geotechnical) Investigations“[41]

1.5.9 What criterions are involved to determine Energy Efficiency of building?

Final energy demand, U-value, R-value, risk of moisture condensation, heat loss through outer walls, outer storey partitions, roofs, heat loss through partitions contacting soil, heat loss through windows, entrance doors, through thermal bridges.

1.6 Technical facilities and services – Lithuania PP8

1.6.1 What kind of heating energy sources are used in residential houses?

The heating energy sources used in 1997 and 2008 are: natural gas 68,5% - 77%; fuel oil 27,3% - 4,1% ;wood, bio fuels, geothermal resources 1,2% - 17,7%;other fuels 3% - 1,2%

1.6.2 What kind of heating system is used in residential houses? Central heating, district heating etc.?What kind of heating generators are used?

In residential houses the kind of used heating energy sources:

district heating – 78,5%;

different heating – 21,3%;

no heating – 0,2%

heating generators:

closed solid fuel stove

gas-fired heat generators

1.6.3 What kind of cooling system is used in residential houses?

STR 2.09.02:2005. Usually not used at residential houses [36]

1.6.4 What type of ventilation system is used in residential houses?

mechanical

natural

with heat recovery

1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)

STR 2.09.02:2005 "Heating, ventilation and air conditioning"[36]. Regulation STR 1.12.05:2002 "The use and maintenance of mandatory requirements and implementation arrangements for residential hoses"[42]

1.6.6 What requirements are defined for water supply and domestic sewage?

STR 2.02.04:2004 "Water charge, preparation of water. Main provisions"[43]

STR 2.02.04:2004 "Sewer cleaners. Main provisions"[44]

STR 2.07.01:2003. "Water-Supply and Waste Water Treatment. Building Services. Outdoor Engineering Networks"[45]

1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.

Lithuanian building code (RSN 26-90[46]) depending on the category of cities and towns in the residential houses with water supply, waste remover and bathroom, with a local hot-water species 1 capita water consumption rate of the day for the 160 to 230 liters.

1.6.8 What requirements are defined for security? Bulger security in doors, in windows?

STR 2.01.01(4):1999 Essential requirements of the building. Usage safety.[47]

1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels to heat, cool or ventilate buildings? (percentages of total energy demand)

Yes, and the comparative weight increases:

1997 – 1,2%,

1998 – 2,0%,

2001 – 4%,

2003 – 7,2%,

2005 – 12%,

2008 – 17,7% (in the number of solar and wind energy is ~3.3%)

1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?

There are no renewable heat sources used in energy supply systems of residential buildings.

1.6.11 How popular is the usage of renewable heat sources in residential houses?

No data for residential buildings.

1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.

No data. Increase in the number of heat users from 2001 to 2009 amounted to 31.5%.

1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?

STR 2.09.02:2005 Regulation, Chapter VIII of the "Energy Saving", where there is guidance on: [36]

The use of disposal of air, if it is economically appropriate;

Equipments, ducts and pipe insulation;

Fans power categories;

Systems management and automation, etc

1.7 Quality of process and integration of sustainable aspects – Lithuania PP8

1.7.1 If there exist “Energy Performing Certificates” for houses in your country which standards signifies these certificates? Show example.

STR 2.01.09:2005 „Energy Performance of Buildings; Certification of Energy Performance of Buildings“[3] - p.15 - Building (building in part) the energy performance assessment and / or certification made building (part of the building) total energy calculation method. Calculation methods (in total 25 pages) basis is prEN 15217:2005 „Energy performance of buildings. Methods for expressing energy performance and for energy certification of buildings“[48]

1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?

There are no regulations referred to Green Building Certificates.

1.7.3 Which standards signify a “low energy house”, “passive house”, “zero energy building”?

There are no specified regulations referred to these terms.

1.7.4 Following up procedure of the performance of the building energy system

No, because the method is based on the Regulation tables values sizes, not the actual values sizes needed for the calculations. Overall, this is not a certification it is calculations of energy efficiency of design solutions

1.8 Definition of quality standards – Lithuania PP8

1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?

There is no project part like that in building project documentation.

1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

There are not any codes.

1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?

No codes defining sustainability for building process. Quality assurance of execution is regulated by Construction Law and under code STR 1.09.05:2002 “Engineering Supervision of Construction of a Structure”[3]

1.9 References – Lithuania PP8

- [1] STR1.05.06:2005 "Structure Design"
- [2] STR2.05.01: 2005 " - Thermal technique of the building envelope"
- [3] STR2.01.09: 2005 "Energy Performance of Buildings; Certification of Energy Performance of Buildings"
- [4] STR2.02.01:2004 "living Houses"
- [5] STR2.05.02: 2008 "Building constructions. Roofs"
- [6] STR2.03.01:2001 "Buildings and Territories"
- [7] STR1.07.01: 2002 "Construction Permit"
- [8] STR1.09.06: 2007 "Construction Suspension. Liquidation of Consequences of Unauthorized Construction"
- [9] Territorial Planning Law Article 23
- [10] STR2.05.04:2003 "Actions and Loads"
- [11] STR2.05.05:2005 "Design of Concrete and Reinforced Concrete Structures"
- [12] STR2.05.06:2005 "Design of Aluminum Structures"
- [13] STR2.05.07:2005 "Design of Timber Structures"
- [14] STR2.05.08:2005 "Design of Steel Structures"
- [15] STR 2.01.01(6):1999 "Essential requirements of the building. Energy saving and heat retention"
- [16] STR2.09.04:2008 "Thermal Output of Building Heating System. Heat Demand in Heating"
- [17] prEN 15217:2005
- [18] prEN 15203:2005
- [19] HN 36:2002 "Banned and restricted substances " [19]
- [20] HN 35:2002 "Maximum permissible concentration of chemicals polluting air in residential areas "
- [21] Minister for the Environment 2006 12 29 Order No. DI-637 "About confirmation of rules for cleaning-up of building waste"
- [22] Management, VZ, 1998, no. 61-1726
- [23] Government of the Republic of Lithuania 2002 04 12 Resolution No. 519 "On the state of strategic waste management plan" VZ, 2002, no. 40 * 499^
- [24] Minister for the Environment 2006 12 29 Order No. DI-637 "About confirmation of rules for cleaning-up of building waste" VZ, 2007, no. 10-403
- [25] EN15217:2005
- [26] EN15203:2005
- [27] STR 2.01.03:2003 "Declared and Project Values of Units of Thermal Technical Construction Materials and Products"

- [28] EN ISO 10456
- [29] LST EN 12524
- [30] HN42:2004 "Microclimate in dwelling and public buildings"
- [31] HN69:2003 "Thermal comfort and sufficient thermal environment in work rooms. Requirements for parameters of normal values and measuring"
- [32] STR2.01.01(5):1999 Essential requirements of the building. Protection against noise
- [33] STR2.01.07:2003 „Protection of the Internal and External Environment of Buildings from Noise“
- [34] STR2.01.08:2003 "Control of noise sent to surroundings by open-air equipment"
- [35] STR2.01.01(3):1999 "Essential requirements of the building. Hygiene, health, protection of environment"
- [36] STR 2.09.02:2005 "Heating, ventilation and air conditioning"
- [37] STR 2.01.01(2):1999 „Essential requirements of the building. Fire safety“
- [38] STR 2.01.04:2004 „Fire safety. Main requirements“
- [39] STR 2.01.06:2003 "Lightning safety of structures. Active safety against lightning"
- [40] STR 2.01.01(1):2005 „Essential requirements of the building. Mechanical endurance and stability“
- [41] STR 1.04.02: 2004 „Engineering Geological (Geotechnical) Investigations“
- [42] STR 1.12.05:2002 "The use and maintenance of mandatory requirements and implementation arrangements for residential hoses"
- [43] STR 2.02.04:2004 "Water charge, preparation of water. Main provisions"
- [44] STR 2.02.04:2004 "Sewer cleaners. Main provisions"
- [45] STR 2.07.01:2003. "Water-Supply and Waste Water Treatment. Building Services. Outdoor Engineering Networks"
- [46] RSN 26-90
- [47] STR 2.01.01(4):1999 Essential requirements of the building. Usage safety.
- [48] prEN 15217:2005 „Energy performance of buildings. Methods for expressing energy performance and for energy certification of buildings“



2.1 Currently applied planning methods – Lithuania PP9

2.1.1 Describe the currently applied planning methods in your country in short words.

There are mainly three level approaches in Lithuania, related to the planning.

Ministry of the Environment of the Republic of Lithuania is currently responsible for the legal acts and norms related to the territorial and urban planning processes as well as construction works within the country. On a more local level – municipalities are responsible for the development to be in accordance to the laws and norms set by the government, municipalities set some more specific regulations for their areas. The third level would be inhabitants, developers, investors, architects and etc., to comply and conform to the regulations set by the State government and municipalities.

2.1.2 What local or national planning laws do exist?

1. Comprehensive Plan of the Territory of the Republic of Lithuania (Žin., 2002, No. 110-4852) [1]. With important goals to form and main directions of the regional policy as well as to define the main guidelines and planning preconditions for the national special and county level comprehensive and special plans.
2. Republic of Lithuania Law on Territorial planning (Žin., 1995, No. 107-2391; 2005, No. 152-5532) [2] regulates territorial planning in the Republic of Lithuania, the interrelationship between natural and legal entities and public authorities involved in this process. It defines the priorities and the relationship between the detailed, special and comprehensive plans.
3. Republic of Lithuania Law on Construction [3] which establishes the essential requirements for all construction works;
4. 91 Normative Technical Construction Documents (NTCD) [4] which support the Law on Construction by establishing specific rules for different types of construction works.

2.1.3 What kind of energy and sustainable needs are required according to the planning law?

The necessary energy characteristics when designing and constructing the buildings are described in Normative Technical Construction Documents: STR 2.01.01(6):2008 Esminis statinio reikalavimas. Energijos taupymas ir šilumos išsaugojimas (Essential requirement for the building structure. Energy saving and heat preservation) [5], STR 2.05.01:2005 Pastatų atitvarų šiluminė technika (Heat technology for the partitionings of the building structures) [6], STR 2.05.02:2008 Statinių konstrukcijos. Stogai (Roof constructions. Roofs) [7], STR 2.01.03:2003 Statybinių medžiagų ir gaminių šiluminių – techninių dydžių, deklaruojamos ir projektinės vertės (Declared and designed denominations for the technical and heat values of the construction materials and products) [8].

Minimum energy performance requirements are mandatory:

- 1) for new buildings;
- 2) existing buildings that are subject to reconstruction or major renovation and a total useful floor area of which is over 1000 square meters and the price of works done during reconstruction or major renovation in order to upgrade their energy performance makes up to 25 per cent of the value of the building, excluding the

value of the plot of land on which the building is situated. The requirements of this subparagraph shall apply in as much as this is technically, functionally and economically feasible.

Energy performance certification of buildings are mandatory:

when constructing, selling or renting out buildings. The builder (client) or owner of a building shall, at the request of a buyer or tenant, produce an energy performance certificate of a building the validity of which must not exceed 10 years. The provisions of this subparagraph shall apply also when selling or renting out parts of buildings (apartments, premises designed for separate use and having any other purpose); in this case an energy performance certificate of a part of the building may be based on a certificate of the whole building with a common heating system or a certificate of another representative apartment in the same multi-apartment residential house.

2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)

Participants of the Territorial planning:

- Master and detailed plans may be drawn up by the specialists who have been issued a licence for general territorial planning in the manner laid down by the Government, also by legal entities, provided that such activity is prescribed by their charters and the works are carried out by the specified specialists;
- Specialists with qualifications in architecture, civil engineering, water management, land management, forest management, geography or other spheres shall be entitled to prepare (only in their respective professional sphere) special planning documents. The specialists shall need licences only in cases provided for in appropriate laws;
- Old town regeneration projects, also cultural monuments and properties protection projects and schemes may be drafted by specialists whose performance has been evaluated in the manner set forth in the Law on the Immovable Cultural Properties.

Participants of the construction works

- Builder (client) is a natural or legal person of Lithuania or a foreign state that invests funds into construction and performs at the same time functions of a builder (client) (or transfers such functions to any other natural or legal person);
- Investigator is a natural person, a legal person, any other foreign organisation to whom the laws and other legal acts, regulating an appropriate field of investigations, grant the right to exercise such investigations;
- Designer of a construction works is a natural person, a legal person, any other foreign organisation who has the right established by the Law, to carry out design work of a construction works;
- Contractor of construction of a construction works (hereinafter referred to as the “contractor”) is a natural person, a legal person, any other foreign organisation who has the right to engage in construction, established by the Law;
- Technical supervisor of construction of a construction works is an architect or a building engineer who, representing the builder (client), heads engineering supervision of construction of a concrete construction works, performs functions assigned to the head of general engineering supervision of construction of a construction works (general construction operations), co-ordinates special supervision of construction of a construction works, activities of heads thereof, and, within his competence, is responsible for the standard quality of the built construction works;
- Supplier is a natural person, a legal person, any other foreign organisation who is a producer (his representative) of construction products, a distributor, an importer, a service organiser, etc;

- Manager of design of a construction works when a builder (client) selects design management as a way of organisation of design; and
- Manager of construction of a construction works when a builder (client) chooses management of construction of a construction works as a way of organisation of construction.

2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)

See question 2.1.4.

2.2 Building permit rules – Lithuania PP9

2.2.1 Describe the building permit procedure in short words. How long is it valid?

A permit for construction of a construction works is a mandatory document (with exceptions for construction of simple construction works¹ and simple repairs of a construction works² issued by the county's administration (for construction works of a national significance in the area administrated by several municipalities) or by the director of the administration of a municipality. In order to obtain a permit to construct, the developer must submit the application of an established form (annex 1); documents confirming the right of the ownership for the plot of land; an agreement of co-owners of the joint ownership of a construction work; design documentation for the construction works; a certificate of cadastral measurements and legal registration of construction works; and etc. After the application is received, Permanent Construction Commission checks whether the documentation meets the requirements (regulations) for the improvement of a construction plot laid down in physical planning documents as well as requirements from the package of the construction conditions and the legal acts specified in the regulations of the Permanent Construction Commission. Consequently, the Commission gives a recommendation whether to issue the developer a construction permit or no. The construction permit contains the technical data and the purpose of each construction work established by technical construction documents, it may be issued (under the request) for all construction works designed in a single construction documentation as well as one construction work designed in a single construction documentation. The construction permit is valid for 10 years.

¹ The list of simple construction works shall be approved by an institution authorised by the Government; and

² The cases when a construction permit to carry out simple repairs of a construction works in the protected territory is required shall be established by an institution authorised by the Government

STR 1.07.01:2002
Annex 1 (mandatory)

Builder: name, surname of natural person, name of legal entity

Builder: address of natural person, legal entity identification number, registered office address, tel. No.

Addressee (to whom application is submitted)

APPLICATION FOR CONSTRUCTION PERMIT

date

Issuance of a construction permit is requested:

Construction project _____
exact name of structure and its appurtenances (where these are many, list of structures and

appurtenances with main indicators is enclosed with application)

Construction type _____

new construction, reconstruction, overhaul or simple repairs by altering or not

altering

the purpose), elimination of accident threat for or maintenance of immovable cultural heritage

Main indicators _____
number of floors, gross area m² or overall dimensions, usable (main) area,

construction space, capacity (volume); size (length of works), purpose, etc. of appurtenances

Construction address _____

Land plot cadastral No _____, registration date _____.

Design No _____, year of preparation _____.

Design developed by _____, Certificate No _____, date of expiry _____.

company

Project Manager _____, Certificate No _____, date of expiry _____.

name, surname

Expert review of design by _____, Certificate No _____, date of expiry _____.

company

Expert Review Manager _____, Certificate No _____, date of expiry _____.

name, surname

Contractor _____,

company, identification number, address; self-dependent construction

Company Qualification Certificate No _____, date of expiry _____.

Contract Manager _____, Certificate No _____, date of expiry _____.

[9]

Engineering Supervisor _____, *name, surname* Certificate No _____, date of expiry _____
 *
 Project Implementation Supervision Manager _____, *name, surname* Certificate No _____, date of expiry _____
 *
 _____, *name, surname*

The following documents shall be submitted with the application:

1. Land plot title deed, lease title or document of any other right of use, _____ p.
(except for structures listed in the Regulation "The Set of Design Conditions for a Structure" [9.21])
2. Consents of co-owners of the land plot and structures, _____ p.
(to be submitted where co-owners exist)
3. Agreements with owners of adjacent land plots on temporary use of their land, _____ p.
(to be submitted where adjacent land plots will be used during construction)
4. Design documentation of the structure, 2 copies _____ p./vol.
5. Conclusions of expert review of design documentation, _____ p.
(to be submitted where expert review is mandatory)
6. Documents of approval of design documentation, _____ p.
(to be submitted for structures of exceptional significance and entered in the programme of Government authorities)
7. Decision on environmental impact assessment of proposed project, _____ p.
(to be submitted where environmental impact assessment is mandatory)
8. File of cadastral measurements of structure (copy thereof) and certificate of registration in the Real Estate Registry, _____ p.
(to be submitted where structure is subjected to reconstruction or overhaul)
9. Document of appointment of Engineering Supervisor and copy of his Qualification Certificate, _____ p.
(to be submitted where engineering supervision of structure is mandatory)
10. Government approval, _____ p.
(to be submitted for construction or reconstruction of structure in coastal zone or on the Curonian Spit)
11. Minutes of meeting of association of owners of apartment house or of owners of premises on results of public hearing of the design, _____ p.
(to be submitted where for alteration of purpose of premises of apartment house or reconstruction of common use facilities, or installation of independent heating system of apartment)
12. Conditions for disconnection from the district heating system, issued by the operator of the heating networks, _____ p.
(to be submitted in applying for permit for disconnection from district heating system)
13. Permit for use of water body, _____ p.
(to be submitted for construction of waterworks)

Job title of applicant *signature* *name, surname*

Application received by _____

job titles *signature* *name, surname*

[9]

2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)

Construction permit is usually issued to the builder (client) or the construction manager holding the authority of the builder. A construction permit contains the data on the structure, as specified in the Annex 2. To obtain the construction permit, the Builder must submit to the Municipality Administration entity the documents as follows: a standard application form (Annex 1 hereto); documents confirming the title to the land plot or the other rights to hold and use such plot, as well as the consent of co-owners of the land plot if such land plot belongs to them by the right of co-ownership; an agreement with the owner of the adjacent land plot on the temporary use of the plot during construction operations and easements in using the completed structure, on compensations for the use of the land plot and damage (if any) in cases when, according to the set of design conditions for the structure, utility networks or traffic routes are to be built outside the boundaries of the land plot owned by the Builder or when a part of such land plot is to be used to set up the construction site; **the** design documentation of the structure (the composition thereof necessary to obtain a construction permit is defined in a construction technical regulation) and a storage medium of the design documentation of the structure (a computer or a scanned version of the design documentation of the structure); conclusions of an expert review of the design documentation of the structure (where mandatory); a document of approval of the design documentation of the structure (where such approval is mandatory); the decision of the competent authority on the admissibility of the proposed project on the selected site in terms of environmental impact assessment (where mandatory) in accordance with the Law on Environmental Impact Assessment of Proposed Projects; a document on the appointment of the engineering supervision manager (where engineering supervision is mandatory) and a copy of his/her qualification certificate ; the file of cadastral measurements (a copy thereof) and the certificate of registration of the structure (apartment, premises) in the Real Estate Registry and the title thereto, or an extract from the central database of the Real Estate Registry (if the structure is subjected to reconstruction or overhaul). Such certificate shall not be required for structures that cannot be individual real estate cadastre objects and where the cadastral measurements and legal registration thereof are missing;

STR1.07.01:2002
Annex 2 (mandatory)

name of public administration entity that issued permit
CONSTRUCTION PERMIT NO _____
Structure Unique No _____

place

date

Builder _____
Name, surname, identification number of natural person; name, identification number of legal entity;

address, telephone No

Type of construction works _____
construction, reconstruction, overhaul or simple repairs, maintenance of immovable cultural heritage

Construction project _____
exact name and purpose of structure and its appurtenances

Technical indicators of structure:

1. general:
 - gross area _____ m²,
 - usable floor area (main floor area of non-dwelling structures) _____ m²,
 - volume _____ m³,
 - number of floors (excluding loft) _____ units, loft available/unavailable;
2. dwelling house:
 - living area _____ m²,
 - number of apartment _____ units;
3. non-dwelling structure:
 - number of places _____ units, or capacity _____,
 - annual production turnout _____;
4. works (utility networks):
 - total length _____ m,
 - diameter _____;
5. material of main structural elements (structural solution):
 - foundation _____
 - walls _____
 - floors _____
 - roofs _____.

Construction address _____
Land plot cadastral No _____, registration date _____.
Design No _____, year of preparation _____.
Design developed by _____, Certificate No _____, date of expiry _____.
company

[10]

Project Manager _____, Certificate No _____, date of expiry _____.
name, surname

Expert Review Manager _____, Certificate No _____, date of expiry _____.

Minutes of discussion of the design at Standing Construction Committee, No _____ date _____.

Contractor _____.
company, identification number, address, tel. No

Contract Manager _____, Certificate No _____, date of expiry _____.
name, surname

Engineering Supervisor _____, Certificate No _____, date of expiry _____.
name, surname

Project Implementation Supervision Manager _____, Certificate No _____, date of expiry _____.
name, surname

The Builder shall:

1. Strictly abide by the requirements of the design documentation (including any amendments thereto agreed in accordance with the established procedure) and of standard construction documents (permissible deviations from the requirements of standard construction documents and measures of their compensation are specified in this permit).
2. Within 3 days notify the authority that has issued the permit, of any change of the Builder, Contractor, Engineering Supervisor or Project Implementation Supervision Manager.
3. Not perform any construction works after the expiry or suspension of the permit.

Permit issued by:

job title *seal* *signature* *name, surname*

Permit received by:

name, surname *signature* *date*

2.2.3 What kind of national or local building permit rules do exist?

Normative Technical Construction Document: STR 1.07.01:2002 Statybos leidimas (Construction permit)[11]

2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?

See 2.2.2

In Lithuania the right to be a builder (client or developer) in the Republic of Lithuania shall be enjoyed by natural and legal persons of Lithuania and foreign countries when the developer owns or holds and uses a plot of land; has a prepared, in a prescribed manner and approved construction package of documents for construction operations as well as pertaining maintenance of a construction works; the builder has the construction permit issued in the prescribed manner.

2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)

See 2.2.2

2.2.6 How does the inspection system work and who checks the documents?

See 2.2.2

2.2.7 How much time has the administration to finish the procedure and is there any law to force this?

Upon the receipt of the Builder's request, the Municipality Administration entity shall verify whether all necessary documents have been submitted; if all the necessary documents have been submitted, the application must be registered no later than within 3 working days; if not all necessary documents have been submitted, written notice of the missing documents shall be issued to the Builder no later than within 3 working days; upon receipt of all missing documents, the application shall be registered and written notice thereof shall be issued to the Builder no later than within 3 working days. Upon the registration of the application, all of the documents will be given over to the Standing Construction Committee which shall review the same and establish whether: the design documentation of the structure meets the requirements (regulation) for the improvement of the building plot laid down in the physical planning documents, and the requirements of the set of design conditions, as well as the requirements of legislation specified in the regulations of the Standing Construction Committee; the scope and composition of the design documentation comply with the scope and composition set for this purpose; the expert review of the design (where mandatory) and conclusions thereof are favourable; the designer of the structure, the manager of the design documentation (a part thereof) of the structure, the contractor who carried out the expert review of the design documentation and the manager of the expert review of the design documentation (a part thereof) hold documents confirming their right to perform the jobs listed; the engineering geological (geotechnical) investigations of the building plot of a structure of exceptional significance, as well as the geological investigations of the building plot a dwelling house designed in a civic region have been registered in accordance with the procedure prescribed by Resolution No 584 of the Government of the Republic of Lithuania of 26 April 2002 [12];

Committee shall execute the results of the expert review of the design documentation of a structure by a report and shall pass a decision instructing the Municipality Administration entity to issue or withhold a construction permit requested by the Builder. The decision of the Committee on the issuance or withholding of a construction permit requested by the Builder shall be binding on the Municipality Administration entity.

The decision on the issuance of a construction permit may be passed only if all members of the Standing Construction Committee obligated to take part in the meeting approve the issuance of the construction permit. Where at least one member of the Committee disapproves of the issuance of a construction permit, a decision shall be passed to withhold the construction permit requested by the Builder. This decision by the Committee shall be reasoned and may be appealed against in accordance with the procedure laid down in the Law on Administrative Proceedings. Upon appealing against the decision of the Standing Construction Committee on the withholding of a construction permit requested by the Builder, the defendants in such proceedings shall be entities, representatives of which, that are included in the Standing Construction Committee, have disapproved of the issuance of a construction permit.

Where a construction permit is issued by the County Governor Administration, within 10 days from receipt of the Builder's application the Municipality Administration entity shall turn over to the County Governor Administration the report of the Standing Construction Committee approved in accordance with the procedure prescribed by the regulations of this Committee. The Municipality Administration entity shall issue a construction permit no later than within 10 days (in case of a construction permit for a structure of exceptional significance, within 15 days) from the submittal of the documents, and the County Governor Administration shall issue a construction permit no later than within 7 days from receipt of the report from the Standing Construction Committee.

2.2.8 What does a building permit cost?

It is free of charge.

2.3 Tendering rules and laws – Lithuania PP9

2.3.1 Describe the tendering procedure in short words.

Tendering process, where the finances from municipality, state, EU structural funds are used, have to comply with the Republic of Lithuania Law on Public Procurement (2005 12 22 Nr. X-471, Vilnius) [13]. If the private and legal persons are not using the mentioned before funds the tendering of construction works may be done on a direct agreement with a contractor.

2.3.2 What kind of national or local tendering rules and laws do exist?

Republic of Lithuania Law on Public Procurement (2005 12 22 Nr. X-471, Vilnius) [13]

2.3.3 What types of tendering procedure are there? (public building, private building,...)

According to Republic of Lithuania Law on Public Procurement: public institutions (for public building construction works) organise the tendering procedure. There are several types of tendering procedure, such as: open, limited, competitive dialog, to be announced negotiation or not to be announced negotiation.

2.3.4 What are the limits for the national tendering process? (in relation to EU)

In 2004 the Law on Construction was amended and equalised the conditions for Lithuanian and EU member states natural (architects and construction engineers) and legal persons, intending to engage in the business of the construction. Normative Technical Construction Documentation is a shifting process which depends upon EU appropriate organisations acting, science and construction progress and changes, as well as the other range of activities involved in this field, such as environmental protection, immovable cultural heritage, protected areas, hygiene, fire protection, energy performance safety, etc.

2.3.5 Are there any time limits for the tendering procedure?

Time limits of construction works are determined by the tendering procedure and signing the contractor agreement.

2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

There are no separate codes or requirements. When preparing the documentation for the tendering procedure, it is obligatory to conform with Normative Technical Construction Documents.

2.4 Construction process – Lithuania PP9

2.4.1 Are there any rules to comply during the construction?

Essential Requirements for a Construction Works

construction works (a part thereof) must be designed and built from such construction products the characteristics of which would satisfy the essential requirements for a construction works for an economically reasonable working life, such as:

- 1) mechanical resistance and stability, i.e. the loadings that are liable to act on a construction works during its construction and use will not lead to any of the following: collapse of the whole or part of the work, major deformations to an inadmissible degree, damage to other parts of the works or to fittings or installed equipment; damage by an event which may be avoided or limited without major difficulties and expenses (explosion, blow, overload, mistakes made by individuals);
- 2) safety in case of fire, i.e. in the event of an outbreak of fire the load-bearing capacity of the construction can be assumed for a specific period of time; the generation and spread of fire and smoke within the construction works are limited, the spread of the fire to neighbouring construction works is limited; people inside the works can safely leave it or they can be saved in other ways; fire alarm and extinguishing systems are operable; the safety of rescue teams (firemen) is taken into consideration;
- 3) hygiene, health and the environment, i.e. it will not be a threat to the hygiene or health of the occupants or neighbours, in particular as a result of any of the following: the giving-off of toxic gas, the presence of dangerous particles or gases in the air, the emission of dangerous radiation, pollution or poisoning of the water or soil, faulty elimination of waste water, smoke, solid or liquid wastes, the presence of damp in structures of the construction works or on surfaces within the construction works;
- 4) safety in use, i.e. that it does not present unacceptable risks of accidents in service or in operation such as slipping, falling, collision, burns, electrocution, injury from explosion;
- 5) protection against noise, i.e. noise perceived by the occupants or people nearby is kept down to a level that will not threaten their health and will allow them to sleep, rest and work in satisfactory conditions;
- 6) energy economy and heat retention, i.e. the amount of thermal energy required in use shall not exceed the required amount, having regard to the climatic conditions of the location and the occupants (i.e. calculated in accordance with the requirements of hygiene norms and the purpose of a building or its spaces).

Essential Architectural Requirements for a Construction Works :

- 1) it will satisfy the essential requirements for a construction works;
- 2) it harmonises with the landscape;
- 3) it will satisfy the urban development requirements for architecture and improvement of a construction plot established in the set of design conditions issued by the director of the administration of a municipality;
- 4) it is fit for the intended use of a construction works;
- 5) it will satisfy the requirements for engineering systems and technological engineering systems of a construction works.

Protection of the Environment, Landscape, Immovable Cultural Heritage Properties and other Types of Protection (Safety), Protection of Interests of the Third Parties:

- 1) the environmental protection and the assessment of an impact of planned economic activities on the environment;
- 2) protection of protected areas, landscape, immovable cultural heritage properties and their territories;
- 3) fire safety;
- 4) health protection and public health care;
- 5) labour protection and public health safety;
- 6) nuclear safety and technical safety of energy units, equipment;
- 7) surveillance of potentially dangerous equipment;
- 8) maintenance of a construction works.

2.4.2 Is there an obligatory checking from the authorities?

According to the Republic of Lithuania Law on construction, the State regulation and supervision of the construction is exercised by the public administration entities, such as:

On the county level – county's administration. It must inspect if unauthorised construction is not carried out; if during the construction the solutions of a design documentation, the requirements of laws, normative technical construction documents are not violated if construction and demolition of a construction works do not violate: the laws and other legal acts regulating the land ownership, holding or use on other grounds; physical planning documents (when they are necessary); grounded interests of third parties; a set of design conditions for a construction works; if heads of the main spheres of the technical activities of the construction satisfy the qualification requirements of attestation established by the Law on construction and an institution authorised by the Government; if technical supervision of construction operations and supervision of the implementation of a design documentation of a construction works are carried out (when they are mandatory) and if the contractor (when self-dependent construction is carried out) meets the requirements entered in the construction operations book by the heads of such supervisions; if documents related to carrying out of construction operations meet the requirements set by normative technical construction documents; if the load-bearing structures of a construction works are built and assembled from construction products which have conformity documents.

On the national level - the State Territorial Planning and Construction Inspectorate under the institution authorised by the Government will carry out the following State supervision of construction: methodically directs the service of the county governor's administration which carries out State supervision of construction, inspects if such supervision is in compliance with this Law and other legal acts regulating construction, and submits findings of the inspection to the county governor; inspects the activities of entities of the main fields of technical activities of construction and participants of construction of any construction works built in the Republic of Lithuania, publicly announces findings of the inspection and recommendations to eliminate established violations and shortcomings (if any); inspects whether design documentation of construction works and expert examinations carried out by expert examination enterprises are in compliance with normative technical construction documents; terminates the validity of a construction permit unlawfully issued by the county's administration from the day of submission of an application (request) to the court for the revocation of such permit until the day of adoption of court's decision.

2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?

Manager of construction of a construction works is a natural or legal person any other foreign organisation acting as the agent of the principal – the builder (client). Who manages construction of a construction works, organises construction operations and works related to other main fields of technical construction activities which are carried out by natural person, a legal person, any other foreign organisation hired by him and enjoying such a right.

2.4.4 Is there obligatory construction supervision?

Technical supervision of construction is mandatory for all construction works (except simple construction works). Such requirement does not apply when carrying out simple repairs of a construction works. And the procedure of carrying out technical supervision of construction shall be established by an institution authorised by the Government.

(See 2.4.2 as well)

2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?

See 2.4.2

2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?

The construction works which have been built are accepted as fit for use by the commission authorised by the Government (annex 3). Therefore cadastral measurements for the construction work (which has been accepted as fit for use) have to be carried out in accordance with the procedure laid down by the Law of the Cadastre of Immovable Property and other legal acts. After the establishment of the cadastral measurements a construction works which has been accepted as fit for use shall be registered in the Republic of Lithuania Register of Immovable Property in accordance with the Law on the Register of Immovable Property.

STR 1.11.01:2002
Annex 6 (recommended)

(main targeted purpose, unique No, name and address of single- or two-family house, garden house, simple structure)

REPORT ON ACCEPTANCE AS SERVICEABLE

_____ (location) _____ (Report date)

The Commission, appointed by _____
(authority, document)

consisting of:

- Physical Planning and Construction Public Supervision Department
(name, surname) (Division) of the County Governor Administration
(job title) (Chairman of the Commission)
- State Fire Supervision Inspectorate
(name, surname) (job title)
- State Energy Inspectorate (participates where the structure contains power, gas and heating equipment)
(name, surname) (job title)
- Regional Environmental Protection Department (participates where special design conditions for the structure are issued)
(name, surname) (job title)
- State Public Health Service (participates where the structure contains water supply and sewer equipment not connected to centralised networks)
(name, surname) (job title)
- Associations of garden, single- and two-family houses
(name, surname) (job title);

with the participation of the Builder _____
(name, surname, identification number, address)

Contractor _____
(job title, name, surname)

Engineering Supervisor _____
(name, surname, Qualification Certificate No, date of expiry)

has reviewed the design documentation of the structure and the cadastral measurements submitted by the Builder, inspected the structure and established that:

1. Main structural elements:

foundation _____ walls _____
(material, structural solution)

floors _____ roof _____

2. Main technical indicators:

Description	Units of measure	Design	Cadastral measurements
gross area	m ²		
usable floor area	m ²		
volume	m ³		
number of floors (excluding semi-basement and loft)	units		
number of apartments of dwelling house	units		
actual cost of construction (in accordance with Builder's statement)	LTL thou.		

[14]

3. Auxiliary works, their size in accordance with cadastral measurements _____

4. Additional indicators of a newly constructed dwelling house (number of apartments with):

- 4.1. piped water _____, units;
 4.2. sewer _____, units;
 4.3. hot water _____, units;
 4.4. bathroom (shower) _____, units;
 4.5. central heating _____, units.

The Commission accepts _____

(exact name of the structure)

and the auxiliary works listed as serviceable.

Chairman of the Commission _____
 (signature) (name, surname)

Members of the Commission _____

Participants

STR 1.11.01:2002
Annex 6¹

REPORT
on acceptance as serviceable of structure (part thereof) with main targeted purpose altered
without reconstruction and overhaul

<i>location</i>	<i>Report date</i>
-----------------	--------------------

The Commission, appointed by _____
authority, document

consisting of:

<i>name, surname</i>	– Physical Planning and Construction Public Supervision Department of the County Governor Administration _____ <i>(Chairman of the Commission),</i> <i>job title</i>
<i>name, surname</i>	– State Fire Supervision Inspectorate _____ <i>job title of the representative</i>
<i>name,</i>	– State Energy Inspectorate _____ <i>surname</i>

	State Public Health Service
<i>name, surname</i>	_____
	<i>job title of the representative</i>

	Regional Environmental Protection Department
<i>name, surname</i>	_____
	<i>job title of the representative</i>

	<i>name, surname</i>

with the participation of the Owner (Manager) of the structure (a part thereof) _____

name, surname, job title

has inspected the structure (a part thereof) _____
name, main targeted purpose, address and unique No of the structure (a part thereof)

reviewed the cadastral data file and documents (application, design proposals, etc.) of alteration of the purpose thereof, and resolved that:

The structure (a part thereof), specified in this Report, inspected by the Commission, is serviceable for the following main targeted purpose _____

group of structures (premises) listed in the classification of structures by the purpose

Chairman of the Commission _____
name, surname, signature

Members of the Commission _____
name, surname, signature

[14]

2.5 Conditions and habits of operating/ facility management – Lithuania PP9

2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?

Normative Technical Construction Document : STR 1.12.05 :2002 Statinio naudojimo paskirtis ir gyvavimo trukmė (Working life of construction works and purpose) [15]. Working life varies, depending upon materials and purpose of construction works. The table below shows working life of a multifamily building depending upon construction materials:

Materials:	Years:
Bricks	100
Prefabricated panels	100
Monolith	120
Timber	60
Timber fronted with bricks	70
Wooden with frames	40
Wooden with frames fronted with bricks	50

2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).

At the moment multi-family buildings in Lithuania are being built in major cities, such as Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys and resort towns as Palanga, Druskininkai, Birštonas, Šventoji.

The prices per sq. meter vary between 720 up to 1740 Euros.



2.6 Commercial parameters, housing industry key data, urban infrastructure and housing situation – Lithuania PP9

2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?

There are no rules to support a decisive (ecological) construction process economically.

2.7 References – Lithuania PP9

- [1] Žin., 2002, No. 110-4852: Comprehensive Plan of the Territory of the Republic of Lithuania
- [2] Žin., 1995, No. 107-2391; 2005, No. 152-5532: Republic of Lithuania Law on Territorial planning
- [3] Law on Construction
- [4] NTCD : Normative Technical Construction Documents
- [5] STR 2.01.01(6):2008 Esminis statinio reikalavimas. Energijos taupymas ir šilumos išsaugojimas (Essential requirement for the building structure. Energy saving and heat preservation)
- [6] STR 2.05.01:2005 Pastatų atitvarų šiluminė technika (Heat technology for the partitionings of the building structures)
- [7] STR 2.05.02:2008 Statinių konstrukcijos. Stogai (Roof constructions. Roofs)
- [8] STR 2.01.03:2003 Statybinių medžiagų ir gaminių šiluminių – techninių dydžių, deklaruojamos ir projektinės vertės (Declared and designed denominations for the technical and heat values of the construction materials and products)
- [9] Application for construction permit
- [10] Construction permit
- [11] STR 1.07.01:2002 Statybos leidimas (Construction permit)
- [12] Resolution No 584 of the Government of the Republic of Lithuania of 26 April 2002
- [13] Republic of Lithuania Law on Public Procurement (2005 12 22 Nr. X-471, Vilnius)
- [14] construction works which have been built are accepted as fit for use by the commission authorised by the government
- [15] STR 1.12.05 :2002 Statinio naudojimo paskirtis ir gyvavimo trukmė (Working life of construction works and purpose)



3.1 Demographic analysis of housing needs and the target group of population – Lithuania PP10

3.1.1 How is the private-home ownership rate?

Stock of dwellings at the end of the year by administrative territory, type of ownership and year

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Private and public owners hip	75 581.3	76 302.5	78 277.4	79 687.5	79 502.1	79 390.2	79 532.7	79 416.0	80 214.0	80 856.9	81 416.8	82 120.2	83 351.3
Private owners hip	69 344.8	70 378.8	75 722.9	77 085.1	76 944.7	76 867.6	77 063.8	77 014.1	77 883.3	78 555.1	79 087.1	79 735.3	80 984.9
Public owners hip	6 236.5	5 923.7	2 554.5	2 602.4	2 557.4	2 522.6	2 468.9	2 401.9	2 330.7	2 301.8	2 329.7	2 384.9	2 366.4

Unit: Thous. square metres

In %:

Private ownership = 97,2 %

Public ownership = 2,8 %

3.1.2 What can be generally said about the residential buildings, e.g. - multi-storey buildings vs. detached houses, year of construction, private or public owner respectively hybrid forms such as associations?

Dwellings by type by county and municipality

	All dwellings	Individual house	Part of the house	Separate apartment (flat)	Hostel	Hotel, etc.	Other living quarters
Total	1.293.029	422.487	61.123	791.445	17.281	139	554
Urban areas	874.514	110.662	36.729	711.571	15.246	120	186
Rural areas	418.515	311.825	24.394	79.874	2.035	19	368

Residential buildings completed by Classification of types of construction (CC), statistical indicator and year

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Residential buildings									
Useful floor area of dwellings completed, thous. m ²	506.6	385.3	460.1	491.4	699.1	651.6	770.8	953.2	1.164.0
Average useful floor area per dwelling completed, m ²	113.5	101.8	100.9	106.2	102.7	109.8	105.7	102.6	98.4
Dwellings completed	4.463	3.785	4.562	4.628	6.804	5.933	7.292	9.286	11.829
Useful floor area of buildings completed, thousand m ²	507.7	392.6	464.3	492.4	699.1	651.6	771.8	959.5	1.166.7
Buildings completed	1.991	1.844	2.066	2.158	2.936	2.724	2.821	3.304	4.027
One and two dwelling buildings									
Useful floor area of dwellings completed, thous. m ²	321.0	255.8	277.8	311.7	442.7	416.8	462.0	548.9	672.4
Average useful floor area per dwelling completed, m ²	168.6	142.3	139.0	148.9	153.5	155.4	166.2	167.0	167.1
Dwellings completed	1.904	1.798	1.999	2.093	2.884	2.683	2.780	3.286	4.023
Useful floor area of buildings completed, thousand m ²	321.0	255.8	277.8	311.7	442.7	416.8	462.0	548.9	672.4
Buildings completed	1.885	1.772	1.971	2.071	2.839	2.630	2.715	3.153	3.856
Three and more dwelling buildings									
Useful floor area of dwellings completed, thous. m ²	185.6	129.5	182.3	179.7	256.4	234.8	308.8	404.3	491.6
Average useful floor area per dwelling completed, m ²	72.5	65.2	71.1	70.9	65.4	72.2	68.5	67.4	63.0
Dwellings completed	2.559	1.987	2.563	2.535	3.920	3.250	4.512	6.000	7.806
Useful floor area of buildings completed, thousand m ²	185.6	129.5	182.3	179.7	256.4	234.8	308.8	404.3	491.6
Buildings completed	105	69	93	86	97	94	103	149	169
Residences for communities									
Useful floor area of dwellings completed, thous. m ²	..	..	..	..	0.0	0.0	..	..	..
Average useful floor area per dwelling completed, m ²	..	..	..	..	0.0	0.0	..	..	..
Dwellings completed	..	..	..	..	0	0	..	..	..
Useful floor area of buildings completed, thousand m ²	1.1	7.3	4.2	1.0	0.0	0.0	1.0	6.3	2.7

Buildings completed	1	3	2	1	0	0	3	2	2
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Year of construction

	Total	Before 1919	1919 1945	1946 1960	1961 1970	1971 1980	1981 1990	1991 2001	–
In thousands									
All buildings	511,3	31,4	106,4	97,3	78,1	87,6	74,2	36,3	
Urban	163,6	7,3	26,2	36,2	25,7	25,1	23,5	19,6	
Rural	347,7	24,1	80,2	61,1	52,4	62,5	50,7	16,7	
In per cent									
All buildings	100	6,2	20,8	19,0	15,3	17,1	14,5	7,1	
Urban	100	4,4	16,0	22,2	15,7	15,3	14,4	12,0	
Rural	100	6,9	23,1	17,6	15,1	18,0	14,5	4,8	

Administration and Maintenance of Housing (Multi-apartment Houses) in Lithuania:

The Civil Code stipulates that the share of common property owned by an owner of a flat or other premises in a multi-apartment house is equal to the proportion between the useful area owned by him/her and the entire useful area of the building. The obligation of owners to cover the expenses for maintaining and preserving the house, to pay taxes, levies and other payments and to make regular payments in order to accumulate funds for refurbishment of the house is proportional to their share in the common partial property, as defined in the Civil Code (Civil Code, 2005).

The Civil Code (2005) stipulates three forms of administration for common partial property of homeowners:

- a multi-apartment homeowners' association (17 %);
- contract on joint activities among homeowners (3 %); or
- an administrator of common property appointed by the municipality (80 %). [1]

3.1.3 What statements can be done about the residential structure, e.g. habitant per sq. km., living space per person, anticipated requirement of residential buildings in the next 5 years, predicted demographic trends for the country or the region?

habitant per sq. Km: 51, [2]

Stock of dwellings at the end of the year by urban / rural breakdown, district by administrative territory, place of residence, statistical indicator and year

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Urban and rural areas													
Stock of dwellings, thous. m ²	75 581.3	76 302.5	78 277.4	79 687.5	79 502.1	79 390.2	79 532.7	79 416.0	80 214.0	80 856.9	81 416.8	82 120.2	83 351.3
Useful floor space per capita, m ²	20.4	20.6	21.1	21.5	22.8	22.8	23.0	23.0	23.4	23.8	24.1	24.4	24.9
Urban areas													
Stock of dwellings, thous. m ²	47 060.8	47 702.5	49 520.3	50 808.2	50 575.3	50 198.6	50 406.3	50 147.1	50 790.1	51 334.4	51 797.8	52 257.6	53 220.7
Useful floor space per capita, m ²	18.6	18.9	19.6	20.1	21.7	21.6	21.8	21.8	22.3	22.6	22.9	23.2	23.8
Rural areas													
Stock of dwellings, thous. m ²	28 520.5	28 600.0	28 757.1	28 879.3	28 926.8	29 191.6	29 126.4	29 268.9	29 423.9	29 522.5	29 619.0	29 862.6	30 130.6
Useful floor space per capita, m ²	24.3	24.3	24.4	24.5	25.1	25.4	25.4	25.5	25.7	26.0	26.3	26.8	27.2

Demografic situation

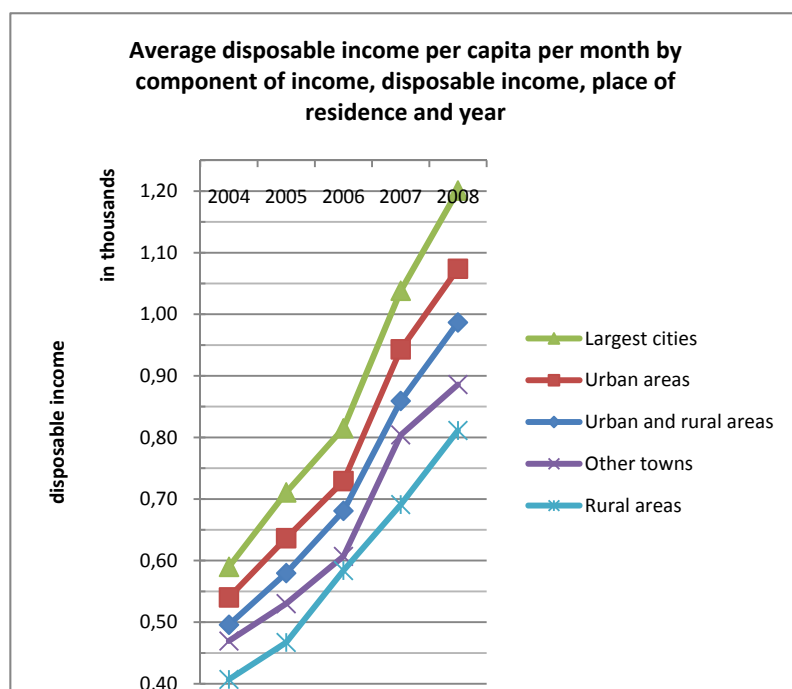
	2007		2008	
	January– November	<i>November</i>	January– November	<i>November</i>
Live births	29750	2638	32147	2599
Deaths	41558	3825	39988	3297
Natural increase / decrease	-11808	-1187	-7841	-698
Marridges	21692	1233	22863	1122
Divorces	10323	1070	9430	947

International migration

Immigration	7967	581	8625	694
Emigration	12892	913	15400	1345
Net migration	-4925	-332	-6775	-651

3.1.4 What can be said about the structure of the households, e.g. age distribution, distribution of income, amount in % for rental costs of net household income, development of the living standard, gross domestic product?

Distribution of income



Average disposable income per capita per month by component of income, disposable income, place of residence and year Unit LTL

	2004	2005	2006	2007	2008
Disposable income					
Income in cash and kind					
Urban and rural areas	495.8	579.7	680.8	859.3	986.8
Urban areas	540.2	636.3	729.2	943.0	1 073.9
Largest cities	589.9	710.8	814.9	1 038.2	1 201.0
Other towns	469.4	530.1	606.9	804.1	885.8
Rural areas	407.0	467.0	583.9	691.0	811.2

Exchange rate is 1 Euro=3,46 Litas (LTL)

Average consumption expenditure per capita per month by place of residence (Consumption expenditure)

Negatives values under item Income from agriculture indicate that expenses related to agricultural production exceeded income.

At-risk-of-poverty by composition of householdPer cent

	At-risk-of-poverty rate
--	-------------------------

	2005	2006	2007
Household type			
Households without children	17.6	19.2	20.2
Single person	31.6	38.0	49.5
2 adults, both <65 years, without children	17.1	13.7	10.6
2 adults, at least one 65+ years, without children	9.4	11.9	13.4
Other households without children	9.1	9.5	6.6
Households with children	22.6	20.5	18.5
1 adult with at least one child	48.4	44.2	41.5
2 adults with 1 child	15.2	16.1	14.0
2 adults with 2 children	18.0	15.4	12.7
2 adults with 3+ children	44.4	41.5	38.2
Other households with children	14.4	13.1	14.4

	At-risk-of-poverty gap		
	2005	2006	2007
All persons	28.4	29.1	25.7
Place of residence			
Urban areas	23.3	19.4	22.2
largest cities	21.4	20.0	16.5
other towns	23.4	19.4	25.7
Rural areas	33.0	33.9	28.0
Age groups			
0–17	30.1	31.4	29.6
18–24	26.8	28.8	27.1
25–49	32.7	31.8	31.1
50–64	32.9	31.4	28.5
65 and older	12.8	13.1	15.1

At-risk-of-poverty gap by place of residence and age group Per cent

Average consumption expenditure per capita per month by place of residence, consumption expenditure, Classification of Individual Consumption by Purpose (COICOP) and year [2]

	2004	2005	2006	2007	2008
Urban and rural areas					
Consumption expenditure in cash and kind					
001 Consumption expenditure	512.3	578.1	651.5	748.8	793.9
01 Food and non-alcoholic beverages	198.8	211.8	219.9	248.1	276.2
021 Alcoholic beverages	11.6	14.0	16.5	18.7	20.9
022 Tobacco	7.8	8.3	8.1	8.6	10.3
03 Clothing and footwear	41.9	49.7	57.1	69.0	67.5
04 Housing, water, electricity, gas and other fuels	62.5	69.6	77.9	89.5	100.2
05 Furnishings, household equipment and routine maintenance of the house	21.4	26.2	35.8	43.3	39.9
06 Health	26.8	29.8	32.7	36.1	39.1
07 Transport	45.2	51.0	67.3	77.5	77.9
08 Communication	25.6	29.1	32.3	37.0	36.7
09 Recreation and culture	22.7	26.9	34.0	41.1	37.8
10 Education	4.6	6.8	6.1	5.7	4.4
11 Restaurants and hotels	20.8	28.7	31.6	38.9	43.7
12 Miscellaneous goods and services	22.7	26.3	32.2	35.1	39.5
Consumption expenditure in cash					
001 Consumption expenditure	442.9	512.5	586.1	685.1	734.3
01 Food and non-alcoholic beverages	141.0	158.1	168.0	198.9	229.7
021 Alcoholic beverages	11.6	14.0	16.5	18.7	20.9
022 Tobacco	7.8	8.3	8.1	8.6	10.3
03 Clothing and footwear	41.9	49.7	57.1	69.0	67.5
04 Housing, water, electricity, gas and other fuels	61.3	69.0	77.1	88.8	99.5
05 Furnishings, household equipment and routine maintenance of the house	21.4	26.2	35.8	43.3	39.9
06 Health	20.0	22.2	24.8	27.3	31.1
07 Transport	44.3	50.0	65.9	75.8	76.5
08 Communication	24.8	28.3	31.0	35.8	35.8

09 Recreation and culture	22.7	26.9	34.0	41.1	37.8
10 Education	4.5	6.7	5.9	5.4	4.2
11 Restaurants and hotels	19.2	26.9	29.7	37.3	41.7
12 Miscellaneous goods and services	22.4	26.2	32.2	35.1	39.4
Urban areas					
Consumption expenditure in cash and kind					
001 Consumption expenditure	559.3	644.3	711.1	837.5	847.2
01 Food and non-alcoholic beverages	189.9	207.5	214.9	247.0	276.2
021 Alcoholic beverages	12.7	15.9	18.1	20.8	22.2
022 Tobacco	8.2	8.6	8.6	8.8	9.7
03 Clothing and footwear	48.3	58.6	64.4	80.0	73.5
04 Housing, water, electricity, gas and other fuels	75.2	84.1	92.3	105.0	114.6
05 Furnishings, household equipment and routine maintenance of the house	24.1	30.2	41.0	50.8	39.6
06 Health	29.2	33.1	34.7	37.9	42.9
07 Transport	52.4	58.0	73.2	92.3	81.3
08 Communication	30.9	35.1	37.4	43.7	40.7
09 Recreation and culture	28.6	33.8	41.8	51.7	45.1
10 Education	6.0	9.1	7.3	7.6	5.3
11 Restaurants and hotels	26.4	37.8	39.6	49.9	52.5
12 Miscellaneous goods and services	27.4	32.5	37.8	42.0	43.6
Consumption expenditure in cash					
001 Consumption expenditure	514.0	602.7	666.0	793.7	804.1
01 Food and non-alcoholic beverages	157.4	179.0	184.4	218.6	246.6
021 Alcoholic beverages	12.7	15.9	18.1	20.8	22.2
022 Tobacco	8.2	8.6	8.6	8.8	9.7
03 Clothing and footwear	48.3	58.6	64.4	80.0	73.5
04 Housing, water, electricity, gas and other fuels	73.5	83.3	91.1	104.0	113.5
05 Furnishings, household equipment and routine maintenance of the house	24.1	30.2	41.0	50.8	39.6
06 Health	22.0	25.1	26.7	29.5	34.6
07 Transport	51.2	56.6	71.2	89.8	79.8

08 Communication	29.7	34.0	35.6	42.0	39.6
09 Recreation and culture	28.6	33.8	41.8	51.7	45.1
10 Education	6.0	8.9	7.2	7.0	5.0
11 Restaurants and hotels	25.4	36.4	38.2	48.8	51.3
12 Miscellaneous goods and services	27.0	32.4	37.8	41.9	43.6

Largest cities

Consumption expenditure in cash and kind

001 Consumption expenditure	613.0	709.9	783.3	902.7	931.2
01 Food and non-alcoholic beverages	191.9	211.5	218.6	250.6	288.2
021 Alcoholic beverages	14.2	18.4	20.0	23.0	25.2
022 Tobacco	9.1	9.6	9.5	9.5	10.4
03 Clothing and footwear	53.0	65.5	71.6	84.3	82.3
04 Housing, water, electricity, gas and other fuels	82.2	91.3	101.5	111.3	127.8
05 Furnishings, household equipment and routine maintenance of the house	26.6	32.2	43.2	56.3	40.9
06 Health	31.9	35.2	36.8	37.0	45.9
07 Transport	63.7	66.5	85.1	103.2	91.5
08 Communication	34.7	39.8	41.9	48.7	45.3
09 Recreation and culture	34.2	39.9	51.3	60.7	51.6
10 Education	7.2	11.8	8.4	8.1	5.0
11 Restaurants and hotels	32.7	49.6	50.5	63.4	66.5
12 Miscellaneous goods and services	31.5	38.5	44.8	46.4	50.4

Consumption expenditure in cash

001 Consumption expenditure	574.4	673.5	743.0	863.0	893.3
01 Food and non-alcoholic beverages	167.1	188.6	194.3	227.5	263.5
021 Alcoholic beverages	14.2	18.4	20.0	23.0	25.2
022 Tobacco	9.1	9.6	9.5	9.5	10.4
03 Clothing and footwear	53.0	65.5	71.6	84.3	82.3
04 Housing, water, electricity, gas and other fuels	81.1	90.9	100.6	110.5	127.0
05 Furnishings, household equipment and routine maintenance of the house	26.6	32.2	43.2	56.3	40.9
06 Health	24.1	27.4	28.9	29.8	37.8

07 Transport	62.0	64.6	82.4	99.3	89.6
08 Communication	33.0	38.4	39.4	46.3	44.0
09 Recreation and culture	34.2	39.9	51.3	60.7	51.6
10 Education	7.2	11.6	8.2	7.2	4.9
11 Restaurants and hotels	31.7	47.9	48.8	62.1	65.6
12 Miscellaneous goods and services	31.0	38.4	44.8	46.3	50.4

Other towns**Consumption expenditure in cash and kind**

001 Consumption expenditure	482.9	550.8	607.9	742.3	723.1
01 Food and non-alcoholic beverages	187.0	201.9	209.7	241.7	258.4
021 Alcoholic beverages	10.6	12.4	15.4	17.6	17.7
022 Tobacco	6.8	7.1	7.2	7.7	8.7
03 Clothing and footwear	41.6	48.7	54.1	73.6	60.5
04 Housing, water, electricity, gas and other fuels	65.2	73.9	79.2	95.8	94.9
05 Furnishings, household equipment and routine maintenance of the house	20.4	27.4	37.9	42.8	37.6
06 Health	25.4	30.1	31.8	39.2	38.4
07 Transport	36.2	45.9	56.3	76.4	66.2
08 Communication	25.5	28.5	30.8	36.4	33.8
09 Recreation and culture	20.6	25.1	28.1	38.6	35.6
10 Education	4.4	5.3	5.8	6.8	5.8
11 Restaurants and hotels	17.5	20.9	23.9	30.3	31.9
12 Miscellaneous goods and services	21.6	23.8	27.8	35.6	33.5

Consumption expenditure in cash

001 Consumption expenditure	428.1	501.9	556.0	692.4	672.3
01 Food and non-alcoholic beverages	143.6	165.2	170.3	205.6	221.5
021 Alcoholic beverages	10.6	12.4	15.4	17.6	17.7
022 Tobacco	6.8	7.1	7.2	7.7	8.7
03 Clothing and footwear	41.6	48.7	54.1	73.6	60.5
04 Housing, water, electricity, gas and other fuels	62.7	72.5	77.6	94.4	93.6
05 Furnishings, household equipment and routine maintenance of the house	20.4	27.4	37.9	42.8	37.6

06 Health	19.0	21.7	23.6	29.0	29.8
07 Transport	35.8	45.2	55.3	75.8	65.3
08 Communication	24.9	27.8	30.2	35.8	33.2
09 Recreation and culture	20.6	25.1	28.1	38.6	35.6
10 Education	4.3	5.1	5.7	6.7	5.2
11 Restaurants and hotels	16.5	20.0	23.0	29.4	30.2
12 Miscellaneous goods and services	21.2	23.7	27.7	35.5	33.4

Rural areas

Consumption expenditure in cash and kind

001 Consumption expenditure	418.4	446.3	532.5	570.5	686.4
01 Food and non-alcoholic beverages	216.7	220.4	229.8	250.2	276.2
021 Alcoholic beverages	9.3	10.2	13.4	14.6	18.3
022 Tobacco	7.1	7.6	7.2	8.3	11.5
03 Clothing and footwear	29.0	31.9	42.5	47.0	55.3
04 Housing, water, electricity, gas and other fuels	37.0	40.6	49.0	58.5	71.3
05 Furnishings, household equipment and routine maintenance of the house	16.1	18.3	25.5	28.1	40.4
06 Health	21.8	23.1	28.7	32.3	31.3
07 Transport	30.8	37.1	55.7	47.8	70.9
08 Communication	15.2	17.1	22.2	23.6	28.6
09 Recreation and culture	10.9	13.2	18.4	19.9	23.0
10 Education	1.7	2.2	3.5	2.1	2.7
11 Restaurants and hotels	9.4	10.6	15.6	16.9	25.7
12 Miscellaneous goods and services	13.4	14.0	21.0	21.4	31.1

Consumption expenditure in cash

001 Consumption expenditure	300.8	332.6	426.5	467.1	593.5
01 Food and non-alcoholic beverages	108.2	116.4	135.1	159.3	195.7
021 Alcoholic beverages	9.3	10.2	13.4	14.6	18.3
022 Tobacco	7.1	7.6	7.2	8.3	11.5
03 Clothing and footwear	29.0	31.9	42.5	47.0	55.3
04 Housing, water, electricity, gas and other fuels	36.9	40.5	48.9	58.4	71.2
05Furnishings, household equipment and routine	16.1	18.3	25.5	28.1	40.4

maintenance of the house

06 Health	15.9	16.6	21.1	22.9	24.1
07 Transport	30.6	36.8	55.2	47.6	69.9
08 Communication	15.0	16.9	21.9	23.4	28.2
09 Recreation and culture	10.9	13.2	18.4	19.9	23.0
10 Education	1.6	2.2	3.5	2.0	2.5
11 Restaurants and hotels	6.9	7.9	12.7	14.3	22.3
12 Miscellaneous goods and services	13.3	14.0	21.0	21.3	31.1

Unit : LTL (Lithuanian Litas)

3.1.5 Are there any regional distinctions or similarities concerning the climate?

There are some regional distinctions for the snow and wind effects: under the snow-load values in Lithuania are two districts – in snow load I-st district characteristic values of ground snow load is equal to 1.2 kN/m², II district - 1.6 kN/m²; according to the wind load values in Lithuania are 3 of wind speed areas - in the I-st area of wind-speed the basic reference value is 24 m / s, II-the district - 28 m / s, the III-- 32 m / s.

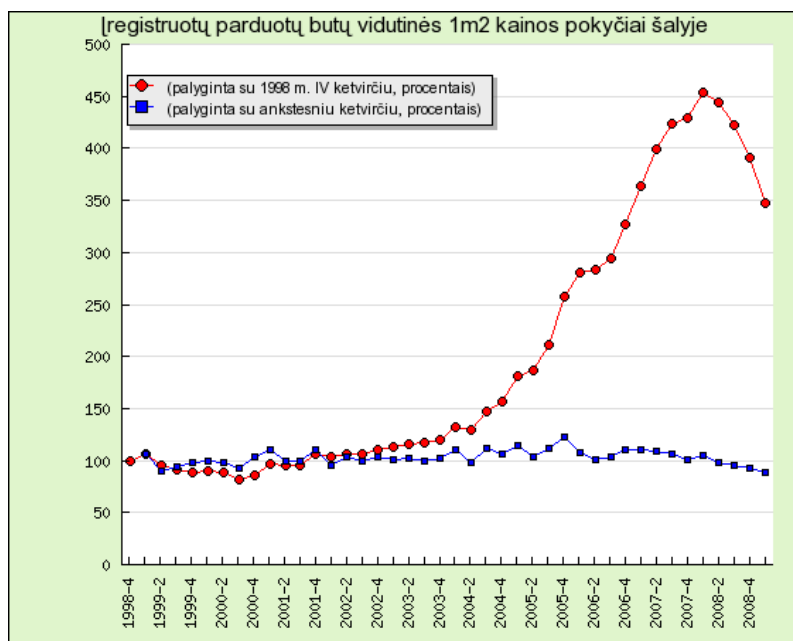
3.1.6 Construction, maintenance and operation costs per m², m³? The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years. The dynamic of price development of living area per sqm and the average salary in participating countries, Dynamics of expenses of average family for building maintenance, Dynamics of expenses of average family for building maintenance.

The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years.

Investments of customers buying the housing:



The dynamic of price development of living area per sq.m (registered sold flats cost dynamic per sq.m):



Registered sold flats cost dynamic in Lithuania per sq.m (comparing with 1998 y. IV quarter, %):

		Egzisted stock			New stock			Total		
year	quarter	houses	flats	Total housing	houses	flats	Total housing	houses	flats	Total housing
1998	4	100	100	100	100	100	100	100	100	100
1999	1	96.6	107.4	105.5	118	111.6	100.6	100.6	106.9	105.5
1999	2	100.8	96.3	90.2	93.4	156.5	84.3	99.2	96.3	89.9
1999	3	93.7	91.7	85.9	90.7	133.7	71	92.7	91.2	85.7
1999	4	95	89.6	84	132.4	121.1	108.1	102.2	89.7	84.9
2000	1	102.1	90.6	87.8	96.5	118.2	80.4	101	90.3	87.3
2000	2	101	89.1	81.4	111.4	113.5	88.2	102.2	88.8	81.6
2000	3	91.7	83	77.3	122.1	113.9	93.7	97.5	82.8	77.9
2000	4	92.9	85.1	80.7	149.3	134	139.8	105.5	86.9	83.7
2001	1	106.7	93.9	94.4	120.8	127.9	156.3	110.6	97.3	97.5
2001	2	99.1	94.1	88.4	145.6	115.9	146.3	110.7	96.6	91.3
2001	3	132.1	93.8	98.4	190.6	115.5	185.7	144.6	95.8	102.7
2001	4	142.5	103	112.2	187.9	107.4	209.4	157.1	106.8	117.7

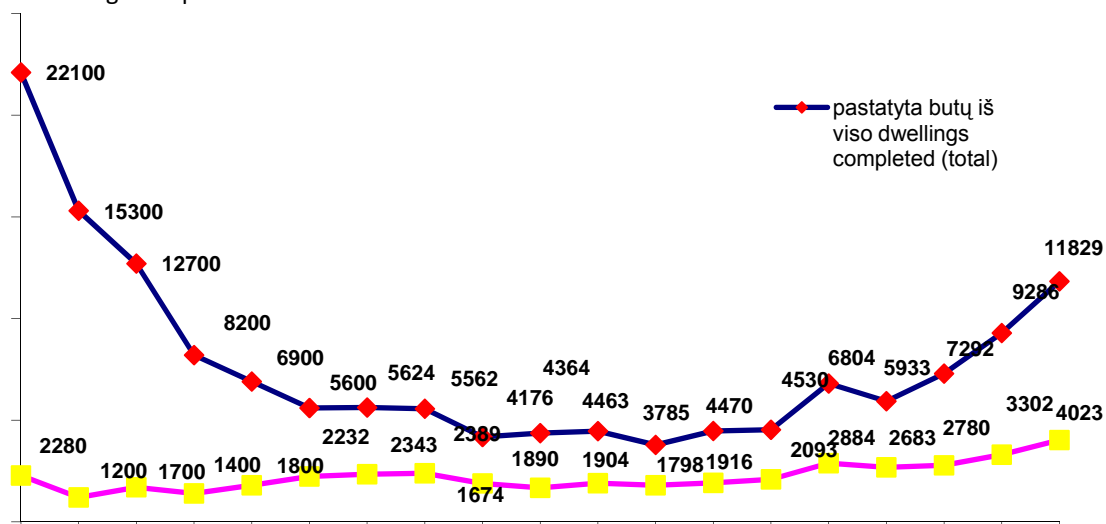
2002	1	125.1	101.7	104.3	184.6	108.1	168.8	143.2	103.5	107.5
2002	2	132.8	104.2	103.7	210.3	115.1	188.5	155.1	106.9	108.7
2002	3	132.9	103.7	107.9	220.6	107.1	207.9	158.2	106.7	113.8
2002	4	150.9	106.6	110.6	222.6	131.9	226.9	172.3	111.8	118
2003	1	138.9	107.5	127.7	208.9	127	337.3	157.5	113.2	137.9
2003	2	147.5	109.9	119.4	237.6	122.3	273.6	173.3	116.4	129.3
2003	3	153	109.8	120.8	257.1	136.4	311.7	178.4	117	132.1
2003	4	153	113	118.7	262.1	139	282.5	182.9	120.1	129.5
2004	1	152.7	123.2	124.3	246.4	131.5	273	183.3	132.6	136.1
2004	2	164.2	125.8	124	222.8	127.8	230.2	180	130.6	130.4
2004	3	160.9	133.9	131.1	299.9	153.1	355	192.6	147.1	148.5
2004	4	160	143.8	145.8	368.8	158.5	384.7	223.3	157.3	166.2
2005	1	213.5	159.2	169.9	392.4	158.5	454.8	270	181.2	200.2
2005	2	222.3	177.3	179.5	341.8	177.8	389.4	252.5	187.3	193.7
2005	3	253.2	195.9	195.3	372.3	171.6	422.3	290	211	215.2
2005	4	300.1	230.9	237.9	462.9	206.6	562.8	355.6	257.9	272.9
2006	1	318.9	260.4	263.5	480.9	211.8	550	377.4	280.6	290.9
2006	2	308.4	257.3	245.5	559.9	225.8	605.5	380.9	284.4	283.3
2006	3	353	272	268.8	595.7	240.1	638	416.4	294.4	301.8
2006	4	430.5	298.1	307.0	743.3	266.8	741.9	531.0	327.8	351.4
2007	1	420.6	331.9	343.6	664.5	271.3	738.3	524.6	364.9	388.2
2007	2	451.8	374.1	366.9	699.3	274.5	765.3	534.2	399.7	407.8
2007	3	462.9	398.7	381.2	721.7	315.2	790.1	543.6	424.3	418.0
2007	4	492.2	415.2	395.3	763.3	275.2	733.6	589.3	429.0	424.6
2008	1	499.9	421.7	403.8	831.2	301.1	875.4	608.6	453.2	458.3
2008	2	490.0	411.0	388.3	772.5	316.5	863.3	574.2	444.7	438.4
2008	3	489.16	386.4	372.4	807.6	323.6	850.9	595.0	423.2	423.8
2008	4	451.8	361.5	347.3	902.3	270.7	805.3	613.4	391.3	403.5
2009	1	347.6	318.3	304.3	641.9	271.3	689.1	449.9	347.5	344.8

Registered sold flats cost dynamic in Lithuania per sq.m (comparing with last quarter, %):

		Egzisted stock			New stock			Total		
year	quarter	houses	flats	Total housing	houses	flats	Total housing	houses	flats	Total housing
1998	4									
1999	1	96.6	107.4	105.5	118	111.6	100.6	100.6	106.9	105.5
1999	2	104.4	89.7	85.4	79.1	140.2	83.8	98.7	90.1	85.2
1999	3	92.9	95.3	95.3	97.1	85.4	84.3	93.4	94.7	95.3
1999	4	101.4	97.7	97.7	146	90.6	152.1	110.2	98.3	99.1
2000	1	107.4	101.1	104.6	72.9	97.6	74.4	98.8	100.7	102.8
2000	2	98.9	98.4	92.7	115.4	96.1	109.7	101.2	98.3	93.5
2000	3	90.8	93.2	95	109.6	100.4	106.3	95.4	93.3	95.4
2000	4	101.3	102.5	104.4	122.3	117.6	149.2	108.2	104.9	107.5
2001	1	114.9	110.4	116.9	80.9	95.5	111.8	104.9	111.9	116.4
2001	2	92.9	100.2	93.6	120.6	90.6	93.6	100.1	99.3	93.7
2001	3	133.3	99.7	111.4	130.9	99.6	126.9	130.6	99.2	112.5
2001	4	107.9	109.8	114	98.6	93	112.7	108.7	111.4	114.6
2002	1	87.8	98.7	93	98.2	100.6	80.6	91.1	96.9	91.4
2002	2	106.1	102.5	99.4	113.9	106.4	111.7	108.3	103.3	101
2002	3	100.1	99.5	104.1	104.9	93.1	110.3	102	99.8	104.7
2002	4	113.5	102.8	102.5	100.9	123.1	109.1	108.9	104.8	103.7
2003	1	92	100.8	115.5	93.9	96.3	148.6	91.4	101.3	116.9
2003	2	106.2	102.3	93.5	113.7	96.3	81.1	110	102.8	93.8
2003	3	103.7	99.9	101.2	108.2	111.5	113.9	102.9	100.6	102.2
2003	4	100	102.9	98.3	101.9	101.9	90.6	102.5	102.7	98
2004	1	99.8	109.1	104.7	94	94.6	96.6	100.2	110.4	105.1
2004	2	107.5	102.1	99.7	90.4	97.2	84.3	98.2	98.5	95.8
2004	3	98	106.5	105.8	134.6	119.8	154.2	107	112.6	113.8
2004	4	99.4	107.4	111.2	123	103.5	108.4	115.9	106.9	112
2005	1	133.5	110.7	116.5	106.4	100	118.2	120.9	115.2	120.4
2005	2	104.1	111.4	105.6	87.1	112.2	85.6	93.5	103.4	96.7

2005	3	113.9	110.5	108.8	108.9	96.5	108.5	114.8	112.6	111.1
2005	4	118.5	117.9	121.8	124.3	120.4	133.3	122.6	122.2	126.8
2006	1	106.3	112.8	110.8	103.9	102.5	97.7	106.1	108.8	106.6
2006	2	96.7	98.8	93.2	116.4	106.6	110.1	100.9	101.3	97.4
2006	3	114.5	105.7	109.5	106.4	106.3	105.4	109.3	103.5	106.5
2006	4	121.9	109.6	114.2	124.8	111.1	116.3	127.5	111.3	116.4
2007	1	97.7	111.4	111.9	89.4	101.7	99.5	98.8	111.3	110.5
2007	2	107.4	112.7	106.8	105.2	101.2	103.7	101.8	109.5	105.1
2007	3	102.5	106.6	103.9	103.2	114.8	103.2	101.8	106.2	102.5
2007	4	106.3	104.1	103.7	105.8	87.3	92.8	108.4	101.1	101.6
2008	1	101.6	101.6	102.1	108.9	109.4	119.3	103.3	105.6	107.9
2008	2	98.0	97.4	96.2	92.9	105.1	98.6	94.3	98.1	95.7
2008	3	99.8	94.0	95.9	104.6	102.2	98.6	103.6	95.2	96.7
2008	4	92.4	93.6	93.3	111.7	83.7	94.6	103.1	92.4	95.2
2009	1	76.9	88.0	87.6	71.1	100.2	85.6	73.3	88.8	85.4

Number of dwellings completed.



	2004	2005	2006	2007	2008	2008				2009
						I Q	II Q	III Q	IV Q	I Q
Average gross monthly earnings of employees in the whole economy, LTL ¹	1149,3	1276,2	1495,7	1802,4	2174,0*	2151,3	2236,8	2319,9	2319,1	2193,1
Average net monthly earnings of employees in the whole economy, LTL ¹	835,5	916,7	1092,9	1351,9	1667,2*	1650,6	1713,1	1773,7	1773,1	1702,1

3.2 Sustainability aspects – Lithuania PP10

3.2.1 How is the energy saving/sustainable construction of residential buildings connected with any financial support?

For new construction in Lithuania there are no financial support.

Only for modernization (maintenance) of the buildings and for wind power (as an alternative source of energy).

3.2.2 Are there any existing capital allowances regarding sustainability building practice?

Lithuania has developed only the Sustainable Development Strategy.

No pure sustainable construction yet.

3.3 Economical energy supply – Lithuania PP10

3.3.1 What is (how high) the energy consumption per m2 and what is the needed expense per m2?

In Lithuania where are 4 categories of houses (depends on their conditions, and the energy consumption depends on the conditions of dwelling houses):

- New construction, high quality buildings (4,6 % of total dwelling stock) - 8 kWh/m2 per month. Average heating price $8 \times 0,25 = 2,00$ Lt/m2
- Dwellings (17,3 % of total dwelling stock) which consumption of energy is low 15 kWh/m2 per month. Average heating price $15 \times 0,25 = 3,75$ Lt/m2
- Dwellings (before modernization) with high consumption of heating (55,7 % of total dwelling stock) - 25 kWh/m2 per month. Average heating price $25 \times 0,25 = 6,25$ Lt/m2
- Old construction, dwelling with poor heating insulation (22,4 % of total dwelling stock)-35kWh/m2 per month. Average heating price $35 \times 0,25 = 8,75$ Lt/m2

The average heating price during 2008/2009 heating season for residents with taxes 25,0 ct/kWh (see dynamic of prices in 3.5.2).

- General expenses of residents in electricity sector is 28,0% and it was 0,640 milliard Lt in 2008
- General expenses of residents in gas sector 5% - it was 0,223 milliard Lt in 2008
- General expenses of residents in heating sector 72,4 % - 2 milliards Lt in 2008

3.3.2 How was the development of energy costs for private household (incl. TAX) within the last few years?

The dynamic of cost of central heating (2000-2008)

	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008
Average price	ct/kWh	11,15	11,49	11,65	11,51	11,35	11,25	11,97	138,2	17,72
Average net cost	ct/kWh	12,16	11,33	11,23	10,81	10,74	10,73	12,18	150,7	20,94

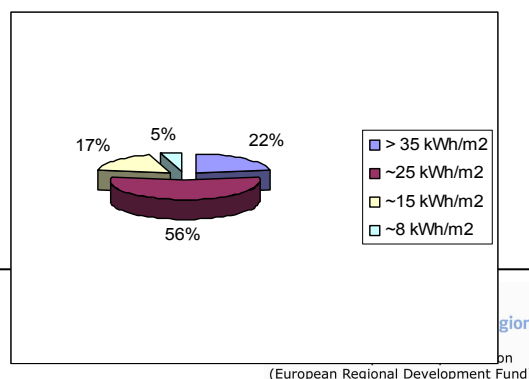
ct-Lithuanian currency cent , Exchange rate is 1 Euro=3,46 Litass (LTL)

Average heating cost in 2008 y. was 177,72 Lt/MWh, but heating net cost 209,40 Lt/MWh.

3.3.3 What is the rate of CO2 –emission of the used energy resources of buildings? Dynamics of demand of energy resources per 1 sq. m. of living area (depending on fuel, materials, constructions; during building period and lifetime).

General structure of emission of used energy resources:

- CO2 – 56,7 %
- SO2 – 19%
- NOx – 20 %
- particulated – 3,5%



- other – 0,8 %.

CO2 emission in dwellings in %

3.4 Evaluation of current maintenance and operating costs – Lithuania PP10

3.4.1 What can be said about the operating costs?

The operating costs (rates and tariffs) in Lithuania are following:

- Average Exploitation expenses 0,33 Lt/m²
- Administration costs - maximum rate 0,15 Lt/m² (depends on the buildings and facilities inside: lifts, and etc)
- Cleaning expenses of common areas in dwellings (depends how many times per week, 1 time about 0,15 Lt/m²)
- The supervision of heating and hot water supply system (depends on conditions of the building, in the buildings of 3 type (see 3.5.1 - Dwellings (before modernization) with high consumption of heating (55,7 % of total dwelling stock)) the cost about 0,24 Lt/m²
- The rent of containers for rubbish (depends on the building)
- Electricity expenses of common areas in dwellings (depends on consumption)
- The removal (exportation) of rubbish 0.35 Lt/m²)

NOTE: All costs provided are approximate (of Vilnius city-capital of Lithuania), because depends on building conditions, facilities inside, year of construction and number of floors, on municipality, specific tariffs and etc.

3.4.2 What kind of performing benchmarks are available?

In Lithuania the specific benchmarks do not exist.

3.4.3 Which costs can be listed in the bill of operating costs and which not?

The costs of operating on the bills are following:

- Exploitation expenses
- Administration costs
- Cleaning expenses of common areas in dwellings
- The supervision of heating and hot water supply system
- The rent of containers for rubbish
- Electricity expenses of common areas in dwellings
- The removal (exportation) of rubbish

Could be other expenses, depends on the building, year of construction and etc.

3.4.4 How was the development of maintenance and operating costs in the last few years?

See 3.1.7 Chapter.

3.4.5 What are the costs of maintenance and administration costs?

Maintenance costs depends on the year the building was built, the administration costs the same (see 3.4.1).

3.4.6 What can be said about stability of value and life cycle costs? (development)

No data available.



3.5 Housing development programmes of the participating countries – Lithuania PP10

3.5.1 What kind of financial support does exist for owners and lodgers/renters, respectively for construction of residential buildings?

Support only for social housing or modernization of buildings. Not for new construction.

3.5.2 Who is the target group for these supporting programs?

Social supported groups, as pensioners, low income persons and etc.

The Law on Cash Social Assistance for Low-income families (single residents) exists in Lithuania.

3.6 Management models , owner's structures – Lithuania PP10

3.6.1 How can the structure of ownership, i.e. the proportion of “classic” real estate manager and yield-oriented investors be described?

Private ownership 97,2 %;

Public ownership 2,8 %. The Civil Code (2005) stipulates three forms of administration for common partial property of homeowners (see 3.1.2). See also the answer to the question 3.1.2.

3.6.2 What are the procedures to make a decision within owners' associations?

There is a law in Lithuania:

“The Law On Multi-family Apartment Home Owners' Associations” [3]. To accept the decision in the meeting of tenants have to participate more than 50 %+1, and the decision accepted if the ½ of participants voting positively.

3.7 Condition of real estate management – Lithuania PP10

3.7.1 What are national distinctions in the tenancy law?

The Land Tenancy Law and exist in Lithuania and rules tenancy of social housing.

3.7.2 How was the development of the rental prices in the last few years?

The rental prices of residential flats depends on:

- town,
- location in town (district),
- on room number,
- type of building and etc.

No exact statistics.

Average values of monthly rental costs in Vilnius (but not in the centre of town) in 2004 was ~350 € (3 rooms (about 64 m²), in 2008 was from 231,70 € to 637,20 €.

3.8 Benefit analyses for owners and investors – Lithuania PP10

3.8.1 What are the models of calculation of profitability? Examples.

There is no exact data.

Static methods: profit comparison calculation respectively cost comparison calculation; profitability comparison calculation; static amortization calculation.

Dynamic methods: net present value method/discounted cash flow method; annuity method; internal rate of return method; complete financial plan.

3.9 Financing and funding instruments and mechanism– Lithuania PP10

3.9.1 What are the financing instruments on local/ regional/ national/ EU level for housing development/ such as public private partnership (PPP) respectively financial supports? Supporting instruments for house owner and renter/lodgers (see above).

Support only for social housing or modernization of buildings. Not for new construction. Social supported groups, as pensioners, low income persons and etc. The Law on Cash Social Assistance for Low-income families (single residents) exists in Lithuania.

Before 2009 April, it was a high financial state support for the modernization of the buildings, up to 50% (depend of implemented means, which helps to save energy in the building). After new regulations, it is only up to 15 %.

3.9.2 How to make investment decisions and for which time period these decisions are planed and are validly?

To prepare all documents it takes about 2 years (starting from detailed plans+2 years).

In Construction Law [4] of Lithuania mentioned, that the permit for construction (from the date of receiving the permit) valid 10 years.

3.10 References – Lithuania PP10

- [1] Percents given by Housing and Urban Development Agency, 2008
- [2] Statistics Lithuania, 2009, Internet access: <http://db1.stat.gov.lt/statbank/default.asp?w=1024>
- [3] The Law On Multi-family Apartment Home Owners' Associations
- [4] Construction Law Lithuania



13.4 Details Poland

- Engineering and building technology standards in Poland
- Method of planning, permit and tendering procedures in Poland
- Economical and financial basis, industry and quality in Poland

1.1 Architectural and Urban Design – Poland PP5

1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?

In cities mainly blocks of flats and detached houses in the country. A significant amount of existing builds in cities is comprised of concrete panel buildings built in the 70's and the 80's. New blocks are usually built in the improved traditional method of constructing or as a combination of a concrete skeleton with a brick filling. From the early 90's we can observe a great increase in the number of detached houses built in suburban terrains.

1.1.2 What can be generally said about the residential buildings (e.g. year of construction, private or public owner respectively hybrid forms such as associations)?

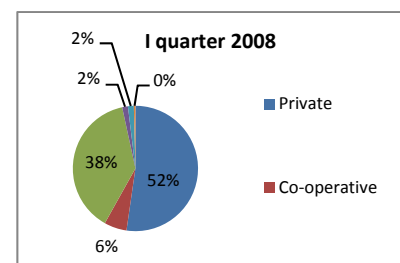
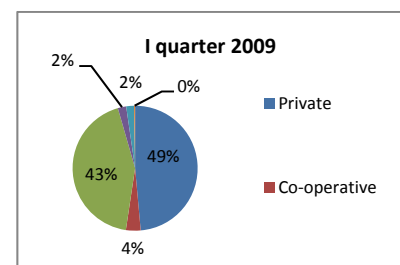
Multi-storey buildings, especially those built in the 70s and the 80s, are the typical view of Polish cities. Through the last years there is tendency to insulate those buildings in order to improve their energy efficiency. Those old buildings typically have five or more floors.

Majority of new buildings (those built after somewhere about 1990) have three or four storeys (up to four storeys buildings there is not any obligation to install a lift).

An ordinary detached house consists of a cellar, 1-2 floors and almost always an attic. Year of construction: from 90s up to the present. An improved traditional method of constructing in which the load-bearing structure are walls made from bricks, blocks or hollow bricks with weights and dimensions making their assembly by hand possible.

Construction according to clients [1]:

	I quarter 2008	I quarter 2009
	in %	in %
Private	52,3	48,6
Co-operative	5,8	3,8
For sale or rent	38,5	43,1
Municipal	1,5	2,2
Public building society	1,5	2,0
Company	0,4	0,3



Explanation:

co-operative construction – realised by housing co-operatives, designated for the members of these co-operatives;

company construction – realised by workplaces of the public or private sector (excluding construction of natural persons conducting economic activity, included in private construction), designated for meeting the residential needs of the employees of these enterprises;

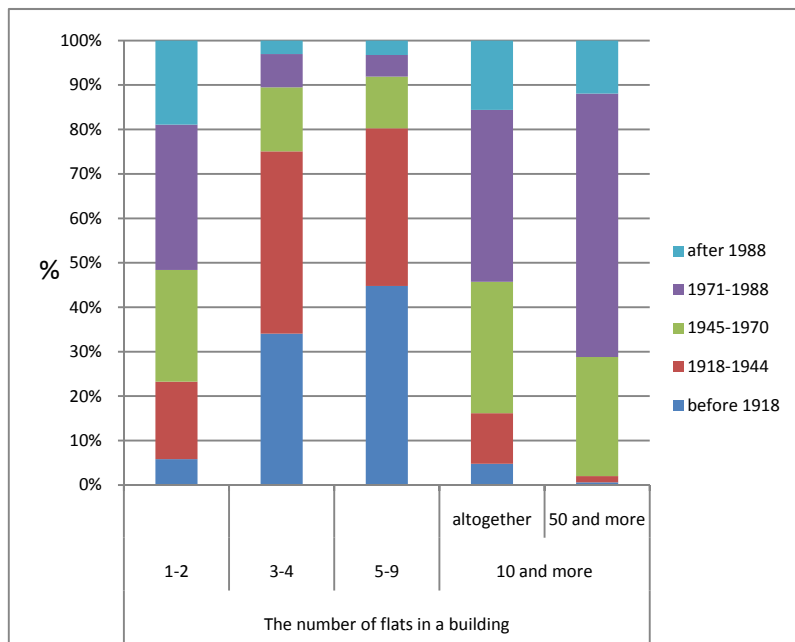
municipal construction – primarily with a social or intervention character, realised entirely with municipality funds for the residential needs of low income households;

public building society – realised by public building societies (operating on a non-profit basis), utilising credit from the National Housing Fund;

construction designated for sale or rent – realised in order to earn a profit by various investors (e.g., development companies, municipalities), excluding construction of natural persons conducting economic activity, included in private construction. This form of construction also includes construction of public building societies, realised in order to earn a profit (from rent or the commercial sale of dwellings), designated in full for building rental housing.

Residential buildings in cities by the number of flats and the year of construction[1]							
Situation in 2002 year:							
	Total	The number of flats in a building					Average number of flats in a building
		1-2	3-4	5-9	10 and more		
					altogether	50 and more	
Total in thousands	1780,6	1449,0	82,5	89,4	159,7	34,6	4,60
percentage data by the year of construction							
before 1918	9,9	5,8	33,6	44,2	4,2	0,6	4,89
1918-1944	18,6	17,3	40,5	35,0	10,0	1,4	2,75

1945-1970	23,9	25,0	14,2	11,5	26,0	26,7	4,88
1971-1988	30,1	32,5	7,4	4,8	34,0	59,1	6,00
after 1988	16,8	18,8	3,0	3,2	13,7	11,9	3,58



1.1.3 What is the common architectural design of residential buildings (pictures, drawings, floor plan, view)?

example nr 1



source: <http://commons.wikimedia.org/>

example nr 2

This kind of panel buildings are common in Polish cities. Through the last years many of them have been insulated and given new elevations.

There is noticeable majority of loggias instead balconies.

Most often used material: prefabricated concrete walls and slabs.

As you can see, slanted roofs were not popular.

An example of panel building form the 70s



source: www.mmtrojmiasto.pl

Examples of new buildings:

picture nr 1



source: www.archipelag.pl

picture nr 2



source: www.archipelag.pl

without thermal insulation.

Before the 90s shapes and the look of buildings was relative the same or very similar. From the 90s this situation has been significantly changing. Designers have started to use more glass in their projects (i.e. very popular glass balustrades), more complicated building bodies like in examples on the left.

Of course in tandem with the development of shapes and materials there is also visible improvement in woodwork technology (new air-tight wooden windows or PVC windows).

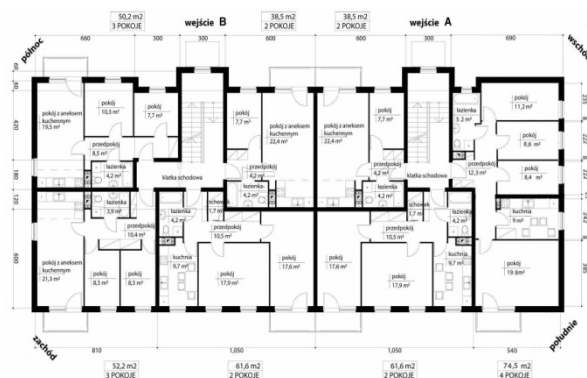
picture nr 3

source: www.tyszkiewicz.pl

picture nr 4

source: www.strzelczyk.pl

floor plan



In contrast to buildings from prior decades, nowadays designers use balconies slightly more often than loggias. Many of them are made using reinforced concrete slabs Filigran.

We can observe that new builds generally have lower heights. In some cases it is a result of the obligation to install lifts in buildings with 5 or more storeys.

What makes the presented floor plan so “typical” is size of apartments.

According to Polish Central Statistical Office, usual number of rooms in an apartment in year 2007 (last available data) is between 3,50-4,06 depending on the region.

common housing estate nr 1 – slanted roofs in multi-storey buildings



source: <http://static.panoramio.com/photos/original/14505096.jpg>

common housing estate nr 2-3

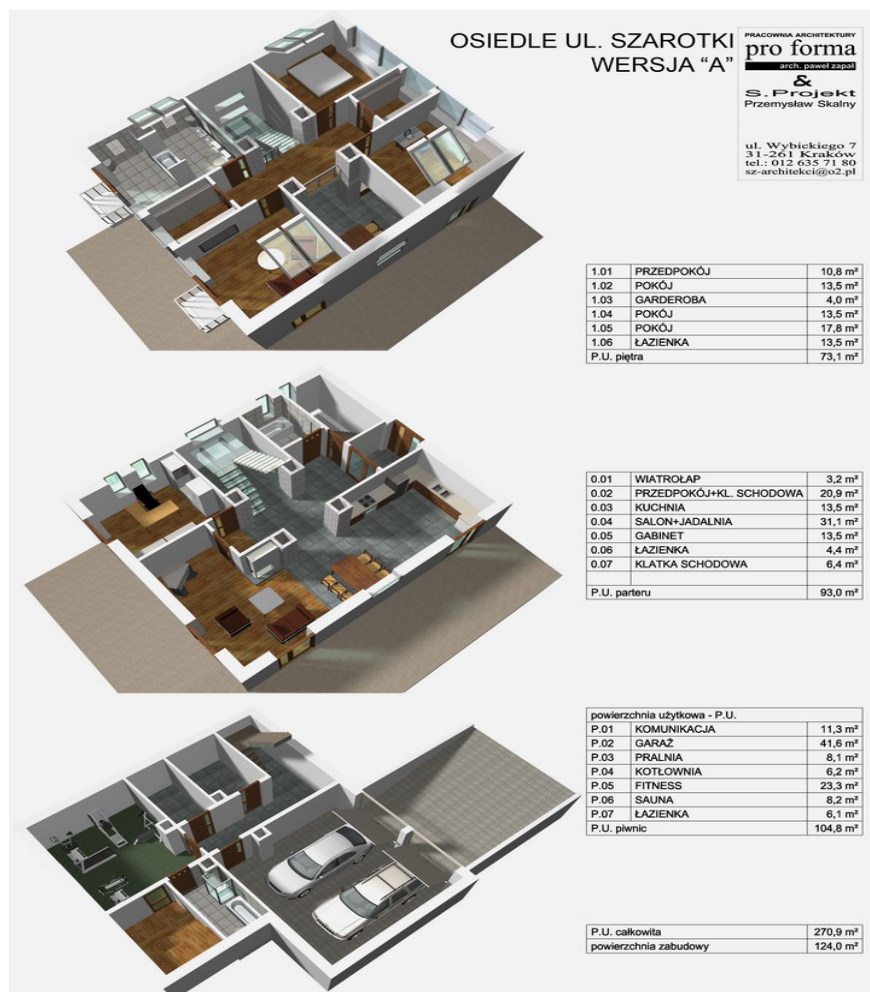


source: http://www.dziennik.pl/files/archive/00122/FR_osiedle_Gemini_n_122951l.jpg

source: www.luksusowedzialki.pl

Detached houses:

visualization 1



source: www.eko-invest.pl

visualization 2



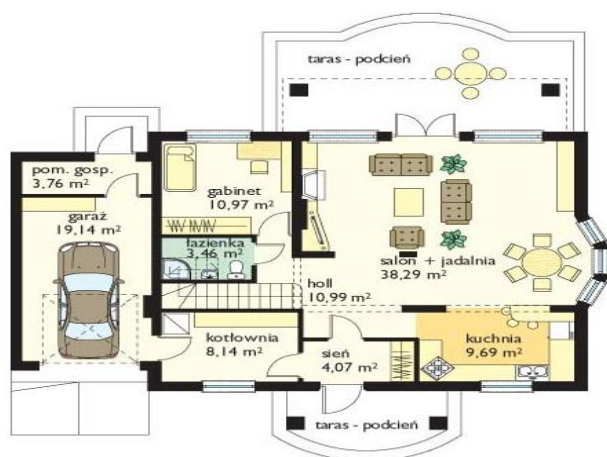
source: www.szerbud.pl

visualization 3



source: www.katalogprojektow.pl

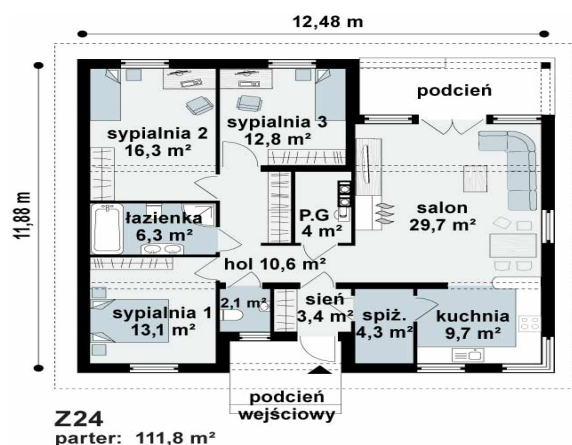
floor plan nr 1



source: www.projekty-domow.bls.pl

There cannot be said nothing general about detached one-family houses except that almost every building has a basement and an attic. Average living area of such buildings is 100-180m², but there are not any more specific data.

floor plan nr 2



source: www.z500.pl

1.1.4 What are the common requirements for living spaces? (number of rooms, number of persons per household, sq m per person, height of different rooms, min area of the living room, information about usual living spaces)

data from Central Statistical Office [1]

Average number of rooms in an apartment:	3,70
Average area of one apartment:	69,8m ²
Average area per one person:	23,8m ²
Average number of dwellers in one apartment:	2,93

The height of rooms should meet requirements defined in the following table:

Type of the room	Minimum height (m)
Rooms in residential building	2,5 *)
Rooms in the attic in one-family building	2,2 *)

*) Alongside slanted ceilings it is average height calculated between the smallest and the largest height of the room, but not smaller than 1,9m. The space which height is less than 1,9 is not included.

More information is given in answer 1.1.8.

1.1.5 Are there any building envelope design limitations (e.g material, windows, etc.)?

The maximum admissible surface of windows is the direct limitation. The condition is introduced in the following decree:

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. [2]

The content of condition:

Surface of windows.

In residential building and collective residence the area A_0 ,

expressed in m^2 , of windows, glass and transparent barriers, with the coefficient of warmth penetration not smaller than $1,5 W / (m^2 \cdot K)$, counted according to their modular dimensions, can not be greater than the value A_{0max} counted according to the following example:

$$A_{0max} = 0,15 A_z + 0,03 A_w$$

where:

A_z - is the sum of areas of horizontal crop of all above-ground storeys (in external contour of building) in 5m wide strip along

external walls,

A_w – is the sum of areas of the rest horizontal crop of all storeys after subtraction of A_z

Indirect limitations:

moreover, in the same decree exist indirect limitations of the shape of building connected with the maximum value of coefficient EP which depends from the ratio A/V_e , where:

A - is the sum of areas of all barriers of building which separate heated section the building from external air, ground and adjoining unheated rooms, calculated on external contour,

V_e - is the cubature of heated section of building, diminished by arcades, balconies, loggias, galleries etc., calculated on external contour.

More information about EP are in the answer 1.5.6.

1.1.6 Are there any specific standards (e.g. elevator, cellar, entrance, etc.)?

slanted roofs predominate over flat roofs in the low-rise buildings and flat roofs are characteristic for high-rise buildings

thereby attics are common in low-rise buildings

elevator – an obligation to install an elevator in the 5-storey (or more) buildings

intercom – installed in almost every building

required rooms – nothing distinctive: kitchen, bathroom, toilet, living room, bedroom, child's rooms

cellars are very common both in blocks of flats and detached houses

garage/parking space – in the new builds one car parking space/garage is a standard

concierge-service is rather rare

1.1.7 What are the definitions or guidelines for roof design?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: [2]

Distance measured horizontally from the closest edge of window placed on the roof to border of building parcel can not be smaller than 4 m.

Moreover there exist indirect guidelines resulting from fire protection requirements:

minimal fire resistance class of roof construction is R15-R30 (in dependence from the height of building)

the roof of building having the larger surface than 1000 m² should be not fire spreadable, and its load-bearing structure made from non-inflammable materials. In case, when inside or on load-bearing structure is placed a flammable thermal insulation, class of the fire resistance of this section she should be not lower than E 15.

1.1.8 What are the functional guidelines (space efficiency, reusing ability, accessibility, and bicycle comfort)?

Terms FSI and SOI are not defined in Polish Construction Law or any other legislative which is in force in Poland. Main regulations related to building location on a plot are:

- minimal distance from the edge of a building to the border of a plot is 4m if adjoining wall has any windows
- minimal distance from the edge of a building to the border of a plot is 3m if adjoining wall has not any windows

Although there may be other obligations described in Local Development Plan (see answer 1.1.11).

The only guidelines about space efficiency are located in

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: [2]

§ 72. 1. The height of rooms should meet requirements defined in the following table:

Type of the room	Minimum height (m)
Rooms in residential building	2,5 *)
Rooms in the attic in one-family building	2,2 *)

*) Alongside slanted ceilings it is average height calculated between the smallest and the largest height of the room, but not smaller than 1,9 m. The space which height is less than 1,9 is not included.

§ 77. 2. Sanitary room should be at least 2,5 m high.

§ 77. 3. It is allowed to decrease the height of sanitary room to 2,2 m, in case when it is equipped in the mechanical ventilation.

§ 80. 1. The cubature of bathroom with gravitational ventilation should be at least:

8 m³ - when there is a gas device in this room

6,5 m³ - when the room is equipped with central warm water or uses an electric device to water heating, or uses a gas device which is located outside this room.

§ 80. 2. It is allowed to decrease the cubature of bathroom (but not more than to 5,5m³) if it is equipped with mechanical ventilation.

§ 94. 1. In multiple dwelling house the width of rooms should be at least:

bedroom for one person - 2,2 m,

bedroom for two persons - 2,7 m,k

kitchen in one-room flat - 1,8 m,

kitchen in many-roomed flat - 2,4 m.

At least one room in the flat should have the area not smaller than 16m².

§ 95. 1. Shape and dimensions of the hall should make possible an invalid transfer on stretchers as well as the realization of manoeuvre of cripplehood trolley in places where there is a change of movement direction.

§ 95. 2. Corridors which are used for internal communication in the flat should have the width at least 1,2m, with the admittance of local narrowing to 0,9m on the length of corridor not larger than 1,5m.

1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?

They don't include it at all.

1.1.10 What kind of requirements is defined for barrier free construction? Name of the code?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: [2]

§ 16. 1. To the entrances of multi-familial residential blocks, collective dwellings and utility buildings, leading from accesses and drives, addressed in § 14 section 1 and 3, there should be hardened access paths of a minimal width of 1,5 m, provided that at least one of the drives provides access for the handicapped to the whole building or those parts of it, which those persons can use.

§ 42. 1. Gates and wickets in fences cannot open outwards from the plot or have thresholds hindering the access of handicapped persons in wheelchairs.

§ 54. 2. In residential blocks, collective dwellings and utility buildings equipped with lifts, access to them and to all usable floors must be provided for handicapped persons.

§ 55. 1. In multi-familial residential blocks unequipped with lifts, the manufacture of a ramp or installation of suitable technical units, enabling access for handicapped persons to flats situated on the ground floor must be provided.

2. In newly constructed low collective dwellings and utility buildings, not exacting, according to § 54 section 1, equipping with lifts, technical units enabling handicapped persons access to floors with usable facilities, which those persons need to utilize, must be installed. The foregoing does not apply to barrack buildings, as well as accommodation buildings in penitentiaries, detention houses, reformatories and

homes for detained juveniles.

3. It is allowed not to equip a 5-story building with a lift, provided that all facilities on the last floor are parts of two-level flats.

§ 61. 1. The placement of entrance doors as well as the shape and dimensions of entrance rooms should enable convenient movement conditions, including for handicapped persons.

2. The required adaptation of entrances for handicapped persons does not apply to single-family dwellings and farm dwellings as well as individual recreation buildings, barrack buildings, buildings in penitentiaries, detention houses, reformatories and homes for detained juveniles.

The use of the ramp	The location of the ramp	
	outside, without cover	inside building or with cover
	% slope	% slope
1	2	3
For pedestrian traffic and for the use of handicapped persons moving with the aid of a wheelchair, with the height of the ramp:		
a) up to 0,15 m	15	15
b) up to 0,5 m	8	10
c) exceeding 0,5 m*)	6	8

*) A slope for pedestrian traffic and for the use of handicapped persons exceeding the length of 9 m should be divided into shorter sections, using landings of at least 1,4 m in length.

§ 71. 1. Ramps for the use of handicapped persons should have a movement surface 1,2 m wide, curbs of at least 0,07 m high and bilateral handrails corresponding with the conditions stated in § 298, provided that the gap between them remains between 1 and 1,1 m.

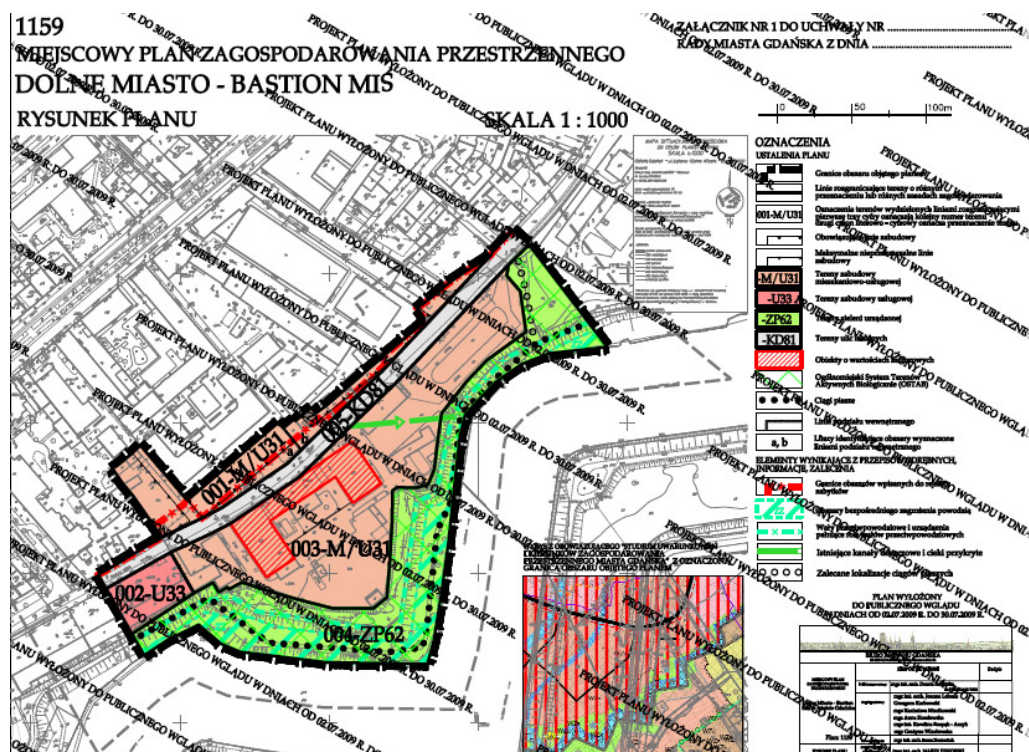
2. The length of the horizontal movement surface at the beginning and end of the ramp should be at least 1,5 m.

3. The manoeuvring surface on the landing connected to a ramp in front of a building should enable manoeuvring a wheelchair and opening doors as well as have dimensions of at least 1,5x1,5 m.

1.1.11 Which plans control the local urban and architectural design, what are the common criteria and where can they be found?

Local development plan (“miejscowy plan zagospodarowania przestrzennego”) is a kind of local law which controls urban and architectural design. It consists of two parts: textual and graphical.

An example of graphical part of a local development plan of the city of Gdansk:



Local plans can be found in the seat of local authorities.

Examples of issues which must be defined in local development plan:

1. the use of specific terrains and borders of those terrains
2. rules of protection and forming of a land management (process of managing the use and development of land resources in a sustainable way)
3. rules of protection of the environment
4. rules of protection of traditional heritage, historic monuments and modern culture goods
5. requirements resulting from the needs of public space forming
6. parameters and coefficients of development forming and terrain use, for example:
 - a) development lines
 - b) building overall dimensions
 - c) development intensity coefficients
7. specific rules of terrain development and use limitations, also construction works prohibition

1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept of investor, client and architect?

Just a part of the concept of investor, client and architect.

1.1.13 What criteria should be involved to describe the quality of the urban area of the site?

Criteria determining the quality of the urban area and the site may be based on the rules of “spatial order”, concept being in use in Poland, which is defined as harmonic composition, proportions, attractiveness of spatial organization. However it is very uncertain and wide definition.

1.2 Structural Design – Poland PP5

1.2.1 What are the climatic conditions?

Poland has typical meteorological years and statistical climate data for the territory of Poland for energy calculations of buildings, determined on the basis of incomplete 30-year measuring series in source data.

Available (only in Polish) at :

http://www.mi.gov.pl/2-48203f1e24e2f-1787735-p_1.htm [3]

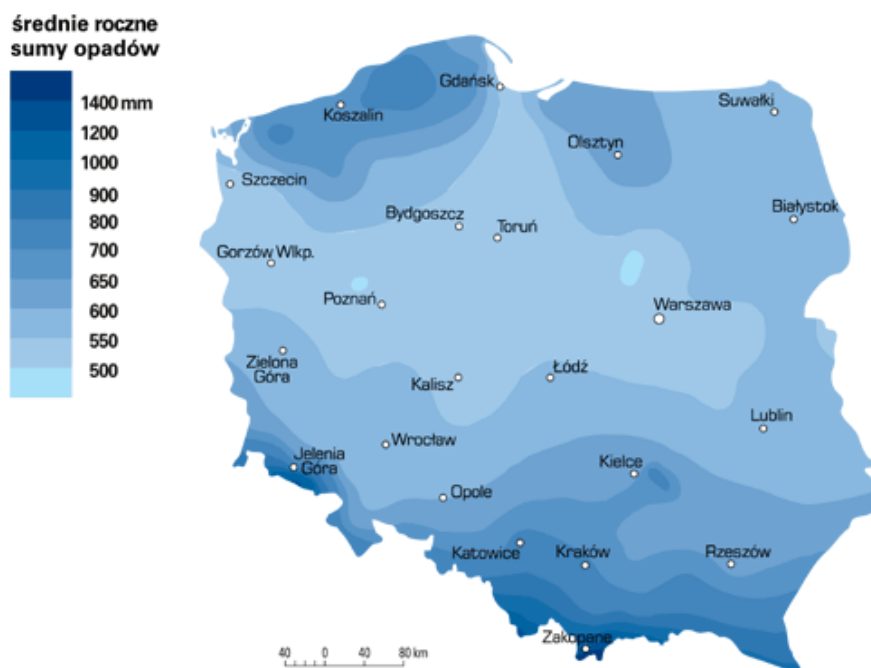
The greatest influence on the climate of Poland, determining its transitional nature, are the polar-sea and polar-continental air masses.

Storms – the lack of any reliable statistics

Floods – [the map of flood hazard in Europe](#) [4]

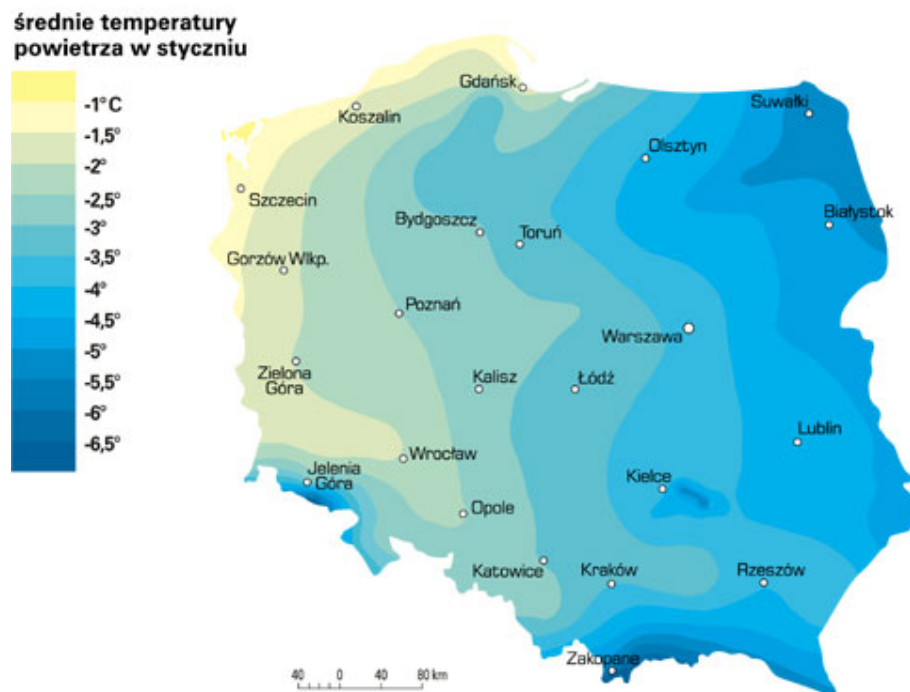
Mean sum of annual precipitation (rainfall?) in Poland is about 600 mm. This includes the sum of rainfall in the summer (2/3 of rainfall) and in winter (30% of rainfall).

AVERAGE ANNUAL RAINFALL:

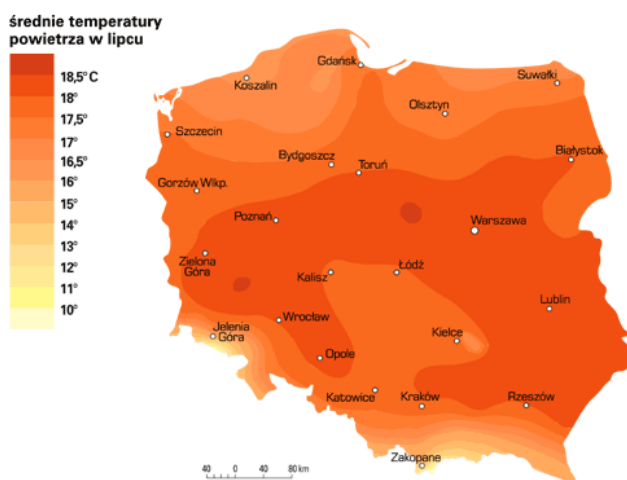


Mean annual temperature in Poland varies between 5-7°C in the heights of the Pomeranian and Mazurskie Lake Districts as well as in the uplands, to 8-10°C in the subkarpatian valley belt as well as in the Slaski and Wielkopolski Lowland Planes. Only in the upland parts of Karpaty and Sudety does it amount to about 0°C (Kasprowy Wierch -0,8°C, Śnieżka -0,4°C). July is the warmest month, with a mean temperature of 16-19°C. The coldest regions in July are the mountains where air temperature drops with the increase of latitude (about 0,6°C per 100 m). The high points of Karpaty and Sudety in July have a mean temperature of only about 9°C. Lower temperatures in July are also observed in Polish regions adjacent to the Baltic Sea (about 16°C), resulting from the cooling effect of sea water. Central Poland is the hottest, with temperatures exceeding 18°C. Hot days, with a temperature of at least 15°C, are observable in Poland from May to September. Their number increases with the distance from the sea. On average, only 5 such days occur at Cape Rozewie, above 40 - in Sandomierska Valley and Lubelska Upland. The coldest month in Poland is January. Due to icy continental air coming in from the east, the eastern regions of Poland are some of the coldest in the country in January. Winter comes to Poland from the north-east. The mean number of cold days varies from about 25 annually over lower Odra and along the coast, to 65 days on the Suwalski Lake District. In the mountains it reaches 132 on Śnieżka and 150 on Kasprowy Wierch. The number of frosty days, occurring usually in late spring and early autumn, varies in the lowland plains between 90 (at the seaside) and 130, and in the mountains exceeds 200. The differentiation of air temperatures influences the length of the vegetation period, during which the mean twenty-four-hour air temperature amounts to at least 5°C. On average the vegetation period in Poland last for 200 days. It is shorter in the mountains, the eastern part of the Pomeranian Lake District, as well as in the Mazurski and Suwalski Lake Districts. It is the longest in the Slaski Lowland Plain and in regions situated along the lower stream of Odra.

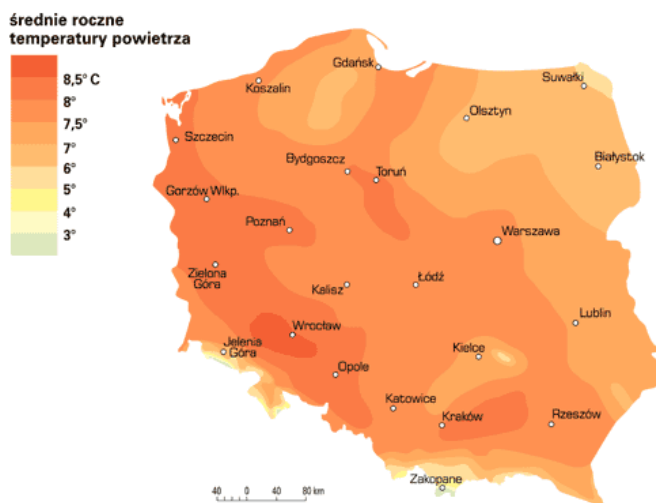
AVERAGE AIR TEMPERATURE IN JANUARY:



AVERAGE AIR TEMPERATURE IN JULY:



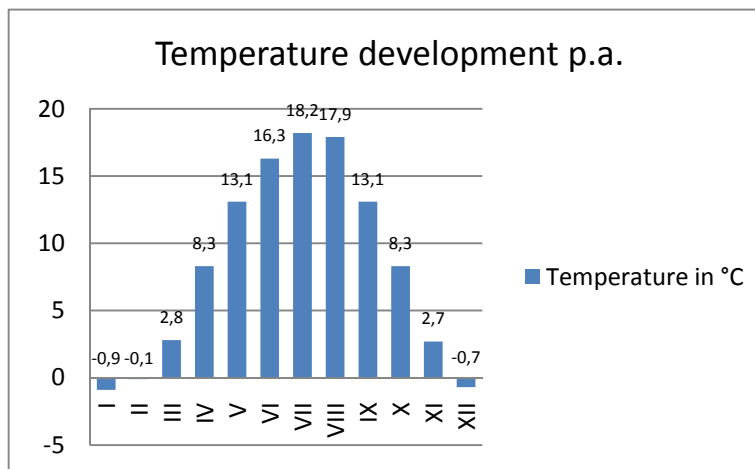
AVERAGE ANNUAL AIR TEMPERATURE:



The mean annual number of days with snowfall is 30-40 days in western and central Poland, and over 50 days in north-eastern regions. In Karkonosze snow falls for 120 days, and in Tatry even up to 145. Snow remains the longest in the mountains (up to 200 days) and in north-western Poland (90-120 days). It remains the shortest in the west (40-50 days).

Temperature development per annum

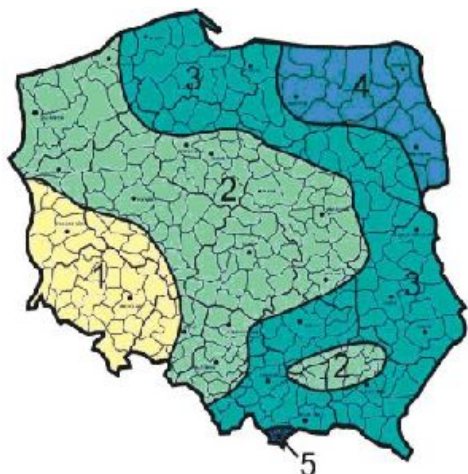
Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Temp.	-0,9	-0,1	2,8	8,3	13,1	16,3	18,2	17,9	13,1	8,3	2,7	-0,7	8,3



Solar radiation supply in Poland:

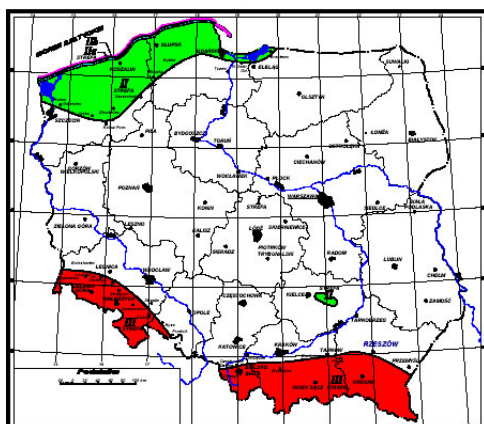


Snowfall zones map (taken from the code PN-80/B-02010 – Loads In Static Calculations – Snow Loads): [5]



Zone	Q_k , kN/m ²
1	0,007A-1,4; $Q_k \geq 0,7$
2	0,9
3	0,006A-0,6; $Q_k \geq 1,2$
4	1,6
5	$0,93 \exp(0,00134A)$; $Q_k \geq 2,0$
A – altitude, height above sea level (m)	

Wind zones map (taken from the code PN-77/B-02011 – Loads In Static Calculations – Wind Loads):[6]



Zone	Velocity, m/s
I	20
II	24
IIa	27
IIb	30
III	24-47

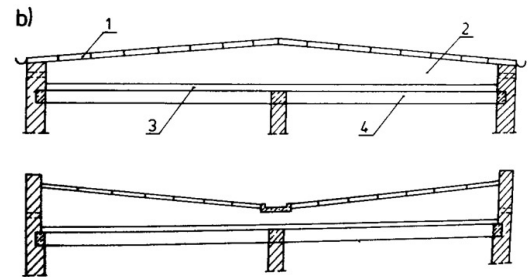
Zone	Pressure, Pa
I	250
II	350
IIa	450
IIb	550
III	$250 + 0,5A > 350$ A – altitude (m)

1.2.2 What types of roof structure are used in residential houses?

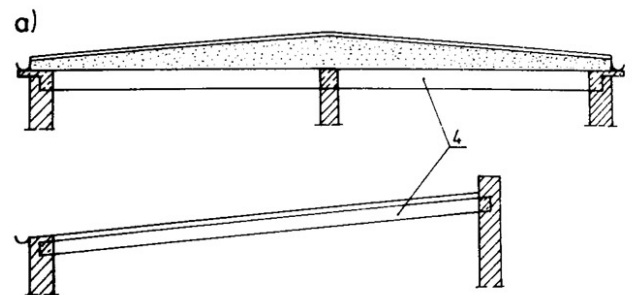
Slanted roofs predominate over flat roofs in the low-rise buildings and flat roofs are characteristic for high-rise buildings.

Until the year 1985 the most popular were flat roofs:

- ventilated

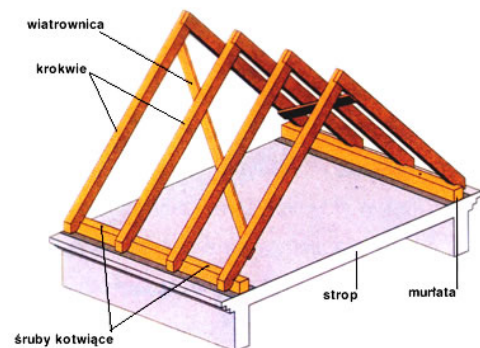


unventilated (full)

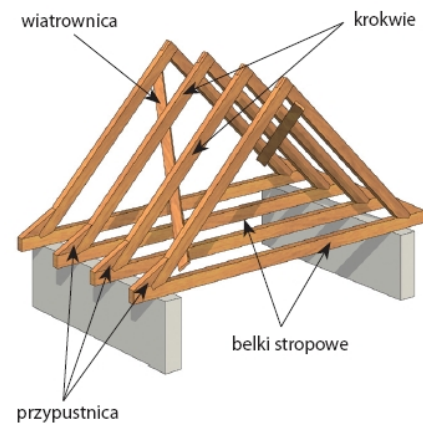


After the year 1985 slanted roofs began to predominate:

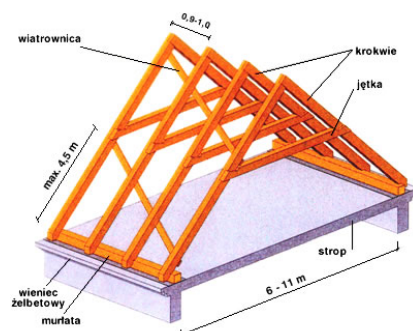
- rafter construction



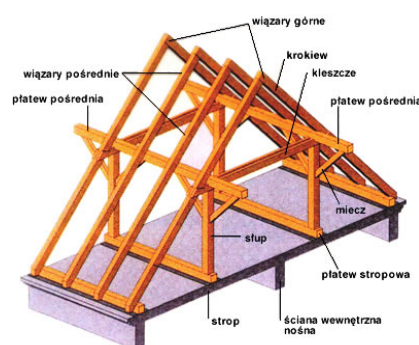
- rafter-beam truss



- collar truss



- purlin-strut truss



1.2.3 What types of load bearing structure are used in residential houses?

New blocks are usually built in the improved traditional method of constructing (load-bearing structure are masonry walls) or as a combination of a concrete skeleton (slab-column systems) with a brick filling.

1.2.4 Is there any national code to calculate load structures?

Norms which are not based on Eurocodes:

PN-82/B-02001 Building loads – Permanent loads [7]

PN-87/B-02013 Building loads – Environmental loads – icing loads [8]

PN-86/B-02014 Building loads – Environmental loads – temperature loads [9]

PN-82/B-02003 Building loads – Changeable technological loads – Basic technological loads [10]

PN-88/B-02014 Building loads – Soil loads [11]

PN-80/B-02010 Loads in static calculations – Snow loads [5]

PN-77/B-02011 Loads in static calculations – Wind loads [6]

Norms based on Eurocodes:

PN-EN 13116:2004 Curtain walling - Resistance to wind load - Performance requirements [25]

PN-EN 1991-1-1:2004 Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings[26]

PN-EN 1991-1-2:2005 Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire[27]

PN-EN 1991-1-3:2005 Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads[28]

PN-EN 1991-1-4:2005 Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions[29]

PN-EN 1991-1-5:2005 Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions[30]

PN-EN 1991-1-6:2007 Eurocode 1 - Actions on structures Part 1-6: General actions - Actions during execution[31]

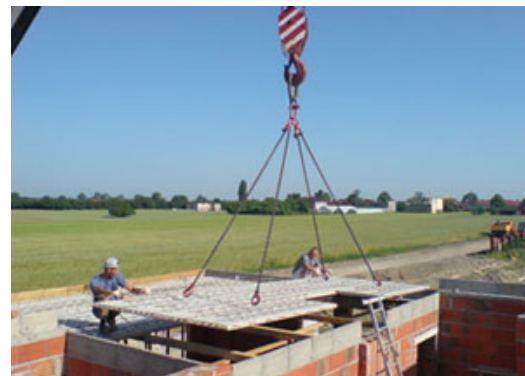
1.2.5 How highly-developed are the industrial prefabricated materials?

In polish constructional tradition prefabrication systems were intensely developed. The polish concrete panel buildings were born in the 50s. and up until the 1980s. constituted the basis of polish housing construction. Prefabricates used nowadays are predominantly the very popular filigran floor slabs and canal ceilings. Over the last few years prefabricate technologies used in zero-energy buildings, like prefabricated leca concrete walls, are gaining more and more popularity.



Filigran floor slabs

(source: www.prefabud.com.pl)



Mounting of filigran floor slabs

(source: www.prefabud.com.pl)



Prefabricated leca concrete walls



Building with prefabricated leca concrete walls

1.2.6 How is the proportion between handcraft building method and industrialised building?

Industrialized building was popular in the 70's and the 80's. Nowadays a vast majority of new buildings are built by the handcraft building method, but there are widely used prefabricated materials like filigran floor slabs.

1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?

Generally there are two main criteria: finance and building time.

1.3 Energy standards – Poland PP5

1.3.1 Is there any national code for Energy efficiency of buildings?

Yes:

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. [2]

There are no technical requirements, which place a maximum energy consumption for every one of the presented consumption sources. There is a single main requirement for maximum value of EP annual index of computational demand for non-renewable primal heating energy, ventilation, hot usable water preparation and cooling (Section X - Energy saving and heat isolation). All consumption sources are included in the EP index.

However, there are supplementary requirements:

Section IV - Technical equipment

E.g.:

§ 120. 2. The installation of hot water should provide, at drawing points, water temperature of at least 55°C, but not exceeding 60°C. The installation should enable execution of periodic thermal disinfections at a water temperature of at least 70°C.

§ 133. 9. Heat loss on feeding and returning wires of a central heating water installation should be at a rationally low level. Heat insulation of these wires should meet the requirements listen in annex 2 to the regulation.

§ 133. 10. Heat loss on air heating wires should be at a rationally low level. Heat insulation of these wires should meet the requirements listen in annex 2 to the regulation.

§ 151. 1. In general mechanical ventilation installations and comfort air conditioning with an efficiency of 2 000 m³/h and more, devices for heat recapture from blown-out air with minimal efficacy of 50% or recirculation, where possible, should be used. In case of recirculation the outside air stream cannot be smaller than indicated in the sanitary requirements, but no less than 10% of air blown-in. For technological ventilation using heat recapture should result from technological and economic balance conditions.

1.3.2 What is average specific heat consumption of residential buildings in kWh/m²a?

Value of new construction: 95-110KWh/m² · a

Data about heat consumption of residential buildings grouped according to systematic in 1.3.1 is not available.

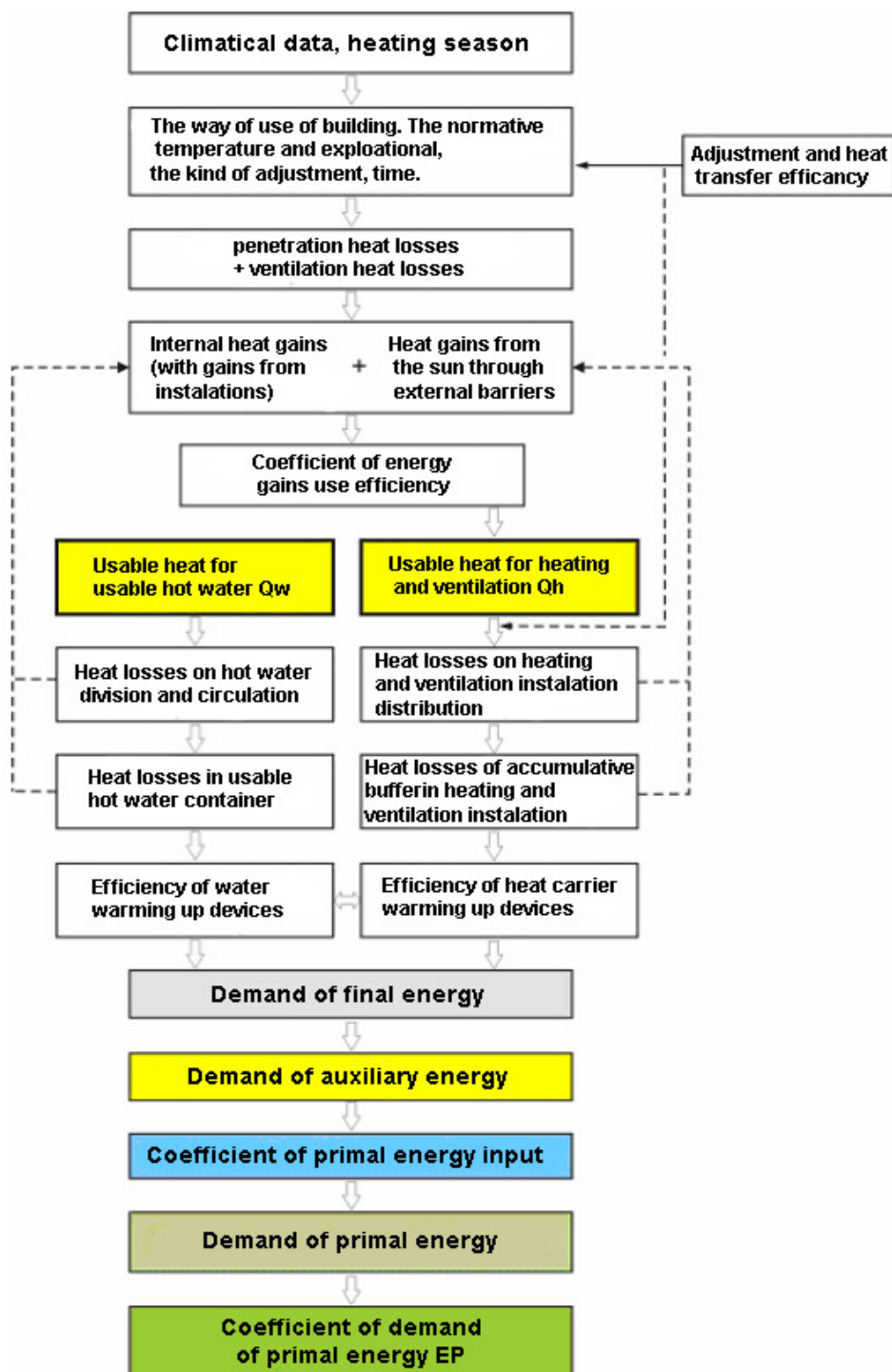
1.3.3 Is there any national code for thermal insulation of buildings?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. Section IX - Energy saving and heat insulation

Annex No. 2 Heat insulation requirements and other requirements connected with energy saving [12]

1.3.4 What method is implemented to calculate energy demand?

The method is described in "Energy profile calculation methodology of buildings and flats", Decree of The Minister Of Infrastructure of 6 November 2008: [32]



1.4 Building materials – Poland PP5

1.4.1 What kind of building materials are used for: roof structure, load bearing structure, foundation, external wall, internal wall, floor, ceiling, façade, windows, thermal insulation?

Any reliable percentage statistics are not available.

Roofing:	Slanted roofs: ceramic tile, plate tile, cement tile
Flat roofs:	roofing paper
Load-bearing structure:	Wood, steel, concrete
Foundations:	Reinforced concrete
External walls:	Ceramic brick, lime-cement bricks, cellular concrete, leca concrete reinforced concrete, wood
Internal walls:	Ceramic brick, lime-cement bricks, cellular concrete, leca concrete reinforced concrete, cardboard-plaster walls
Floors:	Ceramic floors, floor panel, wooden floors, stone plates
Ceilings:	Reinforced concrete (monolithic and prefabricated), wooden
Elevations:	Various types of plaster, brick, stone, wood, ceramic plates
Windows:	Wooden, PVC
Heat insulation:	Styrofoam, styrodur, mineral wool, leca

1.4.2 What are the reasons of the material usage?

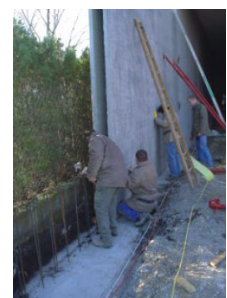
Premises for the use of a particular material (in order of frequency of occurrence):

- assurance of appropriate technical properties at minimal price
- social habit (cellular concrete, ceramic brick)
- tradition (eg. Traditional highlander log house, shingles, thatched roofs)

1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?

Implementation of union directive 2002/91, the effects of which we will see in the future. Up until this point: continuous technological development.

Example: Prefabricated concrete complex walls which are performs a role of stay-in-place formwork





Thermal conductivity λ (W/mK) of new materials:

Material	λ (W/mK)
Leca concrete	0,39-0,90 (depending on density)
Hollow brick masonry wall	0,25-0,42
Autoclaved Aerated concrete (AAC)	0,15-0,30
Mineral wool	0,045-0,050
EPS	0,036-0,045
XPS	0,035-0,041

1.4.4 Is there any ecological declaration of building materials?

Yes, but their use is not obligatory.

In Poland ecological declarations of building materials are consistent with ISO 14020 [13] series norms, but they remain a novelty in our country. Three types of ecological declarations were distinguished:

TYPE I - signs (labels) confirming concordance with ecological criteria, awarded by independent units after carrying out research and analysis of detailed criteria.

TYPE II - information provided with the the basis of their own ecological number of characteristics of the Biodegradability, recycling.

TYPE III - ecological declarations units. The aim of preparing a information about ecological aspects of



product by the producer on standards concerned with a product, eg.

approved by independent declaration is providing the product or service.

Enclosed information are based on results from the life cycle assessment (LCA), and the rules of placing them in a document are uniform, which facilitates comparison of similar products and services. They are mostly used in communications between producers, but they can also be used in producer-consumer communication.

1.4.5 What criteria are involved in this declaration? (health risks, potentials to accumulate or to abolish the ozone layer, potentials for greenhouse effect, potentials for acidification and overfertilization, risks for the local and global environment)

In dependence from the type of the declaration.

For specific information look at ISO 14020 [13], ISO 14021[33], ISO 14024 [34], ISO 14025 [35].

ISO 14020	Environmental Labelling: General Principles Sets out nine general principles that apply not only to labelling schemes but to all environmental claims, designed to promote accurate, verifiable and relevant information.
ISO 14021	Environmental Labels and Declarations: Self-Declaration Environmental Claims, Terms and Definitions Sets out requirements for Type II labels, i.e. environmental claims made for goods and services by the producer.
ISO 14024	Environmental Labels and Declarations: Environmental Labelling Type I, Guiding Principles and Procedures Provides guidance on developing programmes that verify the environmental attributes of a product via a seal of approval.
ISO 14025	Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures Establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations. Type III environmental declarations as described in ISO 14025:2006 are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded.

1.4.6 Are there any declarations or codes for waste materials?

The Act dated 27 April 2001 on refuse Official no. 62 position 628 with later changes. [14]



It defines the rules of conduct concerning refuse in a way ensuring the safety of the lives and health of people and environmental protection in accordance with the rule of balanced development, and in particular with the rule of preventing the creation of waste or limitation of the amount of waste and it's negative influence on the environment, as well as recycling or neutralizing waste.

1.5 Building physics – Poland PP5

1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?

For a complete (finished?) construction:

- Heat penetration coefficient U [$W/K \cdot m^2$]
- Temperature (thermal?) coefficient f_{Rsi} [-], (the risk of fungus emergence on the interior surface of barriers and the risk of condensation of water vapour on the inside of the barrier)

For a non-built-in material:

- Specific heat c [$J/kg \cdot K$],
- Humidity w [%]
- Material density ρ [kg/m^3]
- Heat conductivity coefficient λ [$W/m \cdot K$]
- Vapor-permeability coefficient δ [$g/m \cdot h \cdot Pa$]

1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?

A norm exists, but it is not compulsory:

PN-85/N-08013 – Ergonomics. Moderate thermal environment. Definition of the PMV, PPD index and the requirements concerning thermal comfort. [15]

1.5.3 What requirements are defined for acoustic comfort? Name of the code?

Only maximum values of noise are given. Residential facilities in a residential building:

40dB during the day

30dB at night

Kitchen and sanitary areas:

45dB during the day

40dB at night

All regulations concerning acoustics can be found in: "Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes.[2]

The forgoing ordinance refers to the following norms:

PN-87/B-02151.02 Construction acoustics. Protection from noise in building facilities. [16]

Acceptable levels of noise in rooms.

PN-B-02151-3:1999 Construction acoustics. Protection from noise in building facilities. Acoustic insulation of building barriers and acoustic insulation of construction elements. [17]

1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?

No requirements.

1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: [2]

Section VIII - Health and hygiene.

§ 309. Buildings should be designed and constructed using such materials and products, as well as in such a way, so as not to constitute a hazard to the hygiene and health of users or their neighbours, especially due to:

- emanation of toxic gases
- presence of harmful dusts and gases in the air
- dangerous radiation
- contamination or poisoning of water or soil
- incorrect removal of smoke and fumes as well as waste and refuse in solid or liquid form
- occurrence of moisture in construction elements or on their surfaces
- uncontrolled infiltration of outside air
- penetration of the inside by rodents
- limitation of natural light and insolation.

Moreover certain requirements concerning the protection of air purity and prevention from raising damp and biological corrosion, among others:

§ 321. 1. There can be no condensation of water vapour enabling growth of mould fungus on the internal surface of a nontransparent external barrier

2. On the inside of the barrier, mentioned in section 1, there can be no raising damp caused by condensation of water vapour.

3. Conditions defined in paragraph 1 and 2 are fulfilled, if barriers meet requirements defined in point 2.2.4. of enclosure No. 2 of decree.

§ 322. 1. Material-construction solutions of external barriers of a building, heat-humidity conditions, as well as the intensity of air exchange in rooms, should prevent the formation of fungus.

1.5.6 What requirements are defined for the building envelope? Name of the code?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes: Annex no. 2 [12]

2.3. Air-tightness.

2.3.1. In residential building, collective residence building, building of public usefulness and also in production building the external nontransparent barriers, connections between barriers and parts of barriers as well as connections of windows with jambs should be designed and executed in order to achieve their total tightness on penetration air.

2.3.2. . In residential building, collective residence building, building of public usefulness the coefficient of infiltration of air for openable windows and balcony doors should come to not more than $0,3 \text{ m}^3/(\text{m} \cdot \text{h} \cdot \text{daPa}^{2/3})$, with the exception of § 155 section 3 and 4 of the decree.

It is recommended to execute the verification of air-tightness of building. Required tightness is:

- 1) buildings with gravitational ventilation - $n_{50} \leq 3,0 \text{ h}^{-1}$;
- 2) buildings with mechanical ventilation - $n_{50} \leq 1,5 \text{ h}^{-1}$.

There is a “blower door” testing method being performed according to ISO 9972 [36](Thermal performance of buildings -- Determination of air permeability of buildings -- Fan pressurization method).

ISO 9972:2006 [37] is intended for the measurement of the air permeability of buildings or parts of buildings in the field. It specifies the use of mechanical pressurization or depressurization of a building or part of a building. It describes the measurement of the resulting air flow rates over a range of indoor-outdoor static pressure differences. (source: www.iso.org)

Energy efficiency:

The thermal isolation of barriers and floors on ground.

Values of coefficient of warmth penetration of walls, ceilings and flat roofs, counted according to Polish Standards, can not be greater than $U_{(max)}$ value defined in tables in residential buildings:

No.	Barrier type and room temperature	$U_{(max)}$ [W/(m ² *K)]
1	2	3
1	External walls (adjoining with external air, independently from the type of wall): $t_i > 16^\circ\text{C}$ $t_i \leq 16^\circ\text{C}$	0,30 0,80
2	Internal walls between heated and unheated rooms, staircases or corridors	1,00
3	Walls adjoining to dilatation gaps with a width of: to 5 cm , fixedly closed and filled with thermal insulation at least 20 cm deep above 5 cm, independently from closing way and gap isolation	1,00 0,70
4	Walls of unheated underground storeys	no requirements
5	Slanted and flat roofs, ceilings under unheated attics or above passages: $t_i > 16^\circ\text{C}$ $8^\circ\text{C} < t_i \leq 16^\circ\text{C}$	0,25 0,50
6	Ceilings above unheated cellars, ground floors	0,45

7	Ceilings above heated underground storeys	no requirements
8	Internal walls separating heated room from unheated room	1,00
t_i - computational temperature in room according to § 134 section 2 of the decree.		

Besides:

§ 329. 3. Maximum values of EP annual coefficient of computational demand on unrenovable primal energy for heating, ventilation and preparation of warm water as well as the cooling, in dependence from the ratio of shape of building A/V_e , amount to:

1) in residential buildings to heating and ventilation as well as preparation of warm water

(EP) annual:

for $A/V_e \leq 0,2$; $EP = 73 + \Delta EP$; [kWh/m² · a)],

for $0,2 \leq A/V_e \leq 1,05$; $EP = 55 + 90 \cdot (A/V) + \Delta EP$; [kWh/(m² · a)],

dla $A/V_e \geq 1,05$; $EP = 149,5 + \Delta EP$; [kWh/m² · a)]

where:

$\Delta EP = \Delta EP_w$ - the addition for elementary demand on unrenovable primal energy for preparation of warm water during a year,

$\Delta EP_w = 7800/(300 + 0,1 \cdot A)$; [kWh/(m² · a)],

is the sum of areas of all barriers in the building which separate heated section of the building with external air, ground and adjoining unheated rooms, calculated along external contour,

A - is the sum of areas of all barriers in the building which separate heated section of the building with external air, ground and adjoining unheated rooms, calculated along external contour,

V_e - is the cubature of heated section of building, diminished by arcades, balconies, loggias, galleries etc., calculated on external contour,

A_f – the area of heated section of a building (or a flat)

2) in residential buildings for heating, ventilation and cooling as well as preparation of warm water (EP_{HC+W}) during a year:

$EP_{HC+W} = EP_{H+W} + (5 + 15 \cdot A_{w,e}/A_f) (1 - 0,2 \cdot A/V_e) \cdot A_{f,c}/A_f$; [kWh/(m² · a)]

where:

EP_{H+W} – value according to the dependence presented in point 1,

$A_{w,e}$ – the area of external walls of a building, calculated along external contour,

$A_{f,c}$ – the area of cooled section of a building (or a flat)

A_f – the area of heated section of a building (or a flat)

V_e - is the cubature of heated section of building, diminished by arcades, balconies, loggias, galleries etc., calculated on external contour,

Moisture resistance:

§ 321. 1. On the internal surface of untransparent external barrier

can not be any condensation of water steam what leads to mould fungus spread.

2. In the interior of a barrier, which is mentioned in section 1, can not be moisture growing annually caused by the condensation of water steam.

3. Conditions defined in section 1 and 2 are met, when barriers meet requirements defined in point 2.2.4 of annex no.2 of the decree.

Annex no.2:

2.2. Conditions relating surface moisture condensation

2.2.1. In order to fulfil the condition, which is mentioned in § 321 section 1 of the decree, in reference to external barriers of residential buildings, collective residence buildings, buildings of public usefulness and production buildings, solutions of external barriers and their construction assemblies should have temperature coefficient with minimum value which is described in specific Polish Standards relating to the method of calculating the temperature of internal surfaces of walls.

2.2.4. The verification of the condition, which is mentioned in § 321 section 3 of the decree, should be done according to chapter 6 of Polish Standard mentioned in 2.2.1.

This do not take effect if the practise has showed that the risk of moisture condensation in the interior of barriers does not exist, for example like in single-layer masonry walls.

1.5.7 What requirements are defined for fire prevention? Name of the code?

"Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes:

Annex no. 2 [12]

Section VI – Fire Prevention

Fire resistance class of parts of a residential building

The number of storeys/height	Load bearing structure	Roof structure	Ceiling	External wall	Internal wall	Roofing
≤4 / ≤12m	R30	no req.	REI 30	EI 30	no req.	no req.
4-9 / 12-25m	R60	R15	REI 60	EI 30	EI 15	E 15
10-18 / 25-55m	R 120	R30	REI 60	EI 60	EI 30	E 30
>55m	R 120	R30	REI 60	EI 60	EI 30	E 30

Symbols used according to the annex of European Commission Decision of 3 May 2000 (2000/367/EC) – implementing Council Directive 89/106/EEC [38] as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof.

REI - fire protection rating related to load bearing / integrity / insulation (in minutes)

1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?

No requirements are defined.

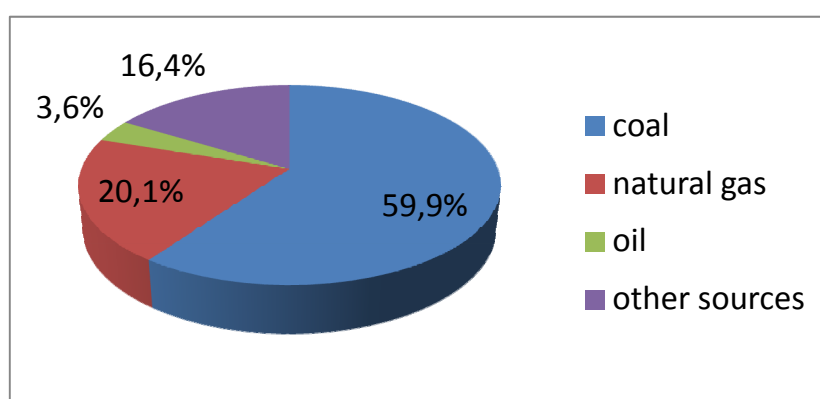
1.5.9 What criterions are involved to determine Energy Efficiency of building?

- EP (coefficient explained in the question 1.5.6)
- U-value

1.6 Technical facilities and services – Poland PP5

1.6.1 What kind of heating energy sources are used in residential houses?

Coal, natural gas, biogas, bio fuels, biomass, solar energy, geothermal energy, electricity [1]



1.6.2 What kind of heating system is used in residential houses? Central heating, district heating etc.? What kind of heating generators are used?

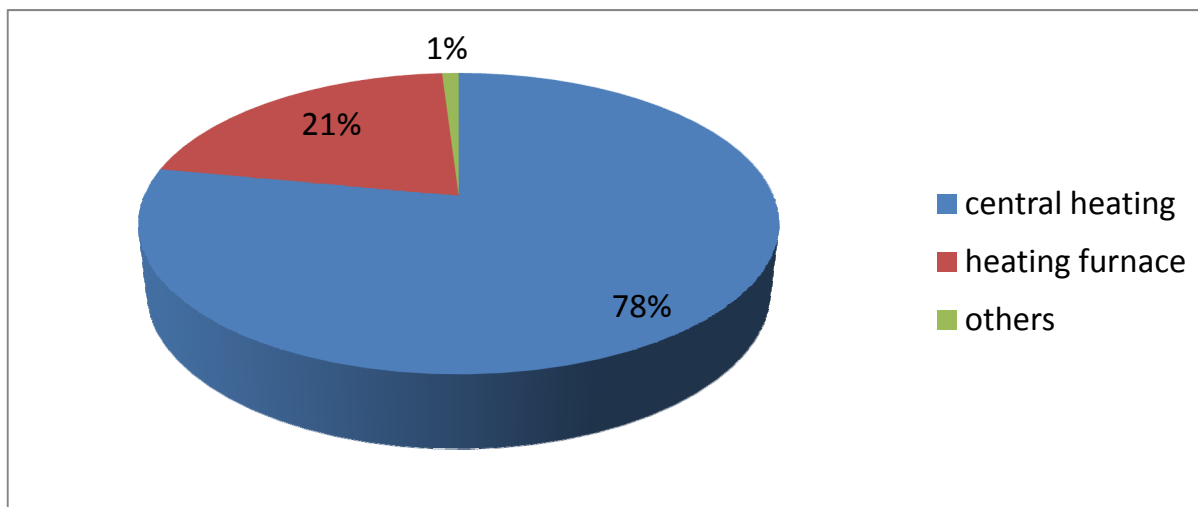
Types of heating system

The central heating system

- Heat provided by thermal-electric power station or local boiler house using the heating network transmission for more than one residential building
- Heat provided by local boiler house for residential units only in one building
- Local central heating system covering one floor or zone

Heating furnace using coal, firewood or electricity

Others like small radiators using natural gas or electricity



[1]

Classification of heating systems through:

location of the heat generator:

- individual heating, central heating, district heating

Standard boiler, low temperature boiler, condensing boiler, heat pump heating

art of energy:

- coal heating, gas heating, oil heating, electrical heating, solar heating (collectors, storage with heat exchanger, control of the pump function, photovoltaic),

heat carrier: hot water heating, steam heater, air heating

heat distribution:

- radiators, convectors, heat surface plates, special (e.g. floor heating)

art of heat emission: convection heating, radiation heating, air heating, combined heating

heating boilers:

condensing boiler

low temperature boiler

wood pellet boiler

electric heat pump

solar heating system

1.6.3 What kind of cooling system is used in residential houses?

air conditioning, cooling system

1.6.4 What type of ventilation system is used in residential houses?

gravity ventilation,

mechanical ventilation

- mechanical ventilation with single ventilators
- mechanical ventilation with in- and out-leading air elements and a function of heat recovery

air conditioning

1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)

Following the requirement of Directive 2002/91/EC, the Government of Poland implemented the regulations on maintenance and cleaning a heating, cooling and ventilation system. [18]

The frequency of inspections of boilers, heating and air conditioning systems has been defined in:

The Act of 19th September 2007 on amending the act – Construction law (J. O. No. 191, item 1373).[19]

Art. 62. 1. All the buildings shall be carried out an inspection by the owners and administrators during their usage:

- 5) Periodically, including boiler functionality check, an assessment of the boiler efficiency and the boiler sizing compared to the heating requirements of the building:
 - At least every two years – for boilers fired by non-renewable liquid or solid fuel of an effective rated output of more than 100 kW,
 - At least every four years – for boilers fired by non-renewable liquid or solid fuel of an effective rated output of 20 kW to 100kW and for gas boilers;
- 6) Periodically, at least every five years, including an assessment of the air-conditioning efficiency and the sizing compared to the cooling requirements of the building of an effective rated output of more than 12kW.
 - 1b All the heating installations with boilers of an effective rated output of more than 20 kW which are older than 15 years, shall be carried out a one-off inspection of whole heating installation. This inspection shall include an assessment of the boiler efficiency and the boiler sizing compared to the heating requirements of the building.

Art. 62. 5. The inspection of functionality of electricity system, lightning-conductor system and gas system, which is mentioned in section 1.: point 1 subsection c, point 2, and section 1b., shall be carried out by person with suitable qualifications required for supervision of facilities, gas and electricity systems exploitation.

The requirements of maintenance and cleaning of systems are also defined in the Ordinance of the Ministry of Infrastructure of 12th March 2009 on amending the ordinance - technical conditions for buildings and their location. [20]

§153. 5. All the air ducts shall be equipped with inspection holes authorized by The Polish Norm on the elements of ducts facilitating the maintenance and cleaning. These inspection holes shall enable to clean the ducts and technical facilities in case of no other possibilities of cleaning. It is important not to locate these inspection holes in rooms with high hygiene standard.

1.6.6 What requirements are defined for water supply and domestic sewage?

The requirements for water supply and domestic sewage are expressed in the Act of 7th June 2001 on collective water supply and domestic sewage. [21]

Art. 5. 1. All the water-supply and sewerage companies are obligated to ensure a capacity of technical facilities to provide required amount and pressure of water. Water supply and sewage disposal shall be realized in a constant and reliable way with a view to final quality.

Art. 9. 3. All the water-supply and sewerage companies are obligated to carry out a regular inspection of amount and quality of community and industrial sewage. They are also expected to carry out an inspection of sewage draining conditions into sewerage system.

Art. 12. 1. The supervision over the quality of water destined to consumption by human shall be carried out by The Government Sanitary on the basis of sanitary law.

1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.

There is no data available for the water demand per square meter.

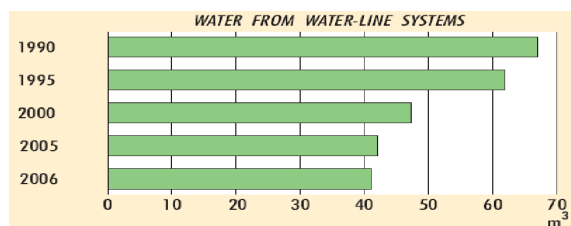
Further on, consumption of water in households per person 1990-2006 is presented: In order to estimate the water consumption per person, It is recommended to use parameters defined in the Ordinance of the Ministry of Infrastructure of 14th January 2002 on the quantification of average water consumption.[22]

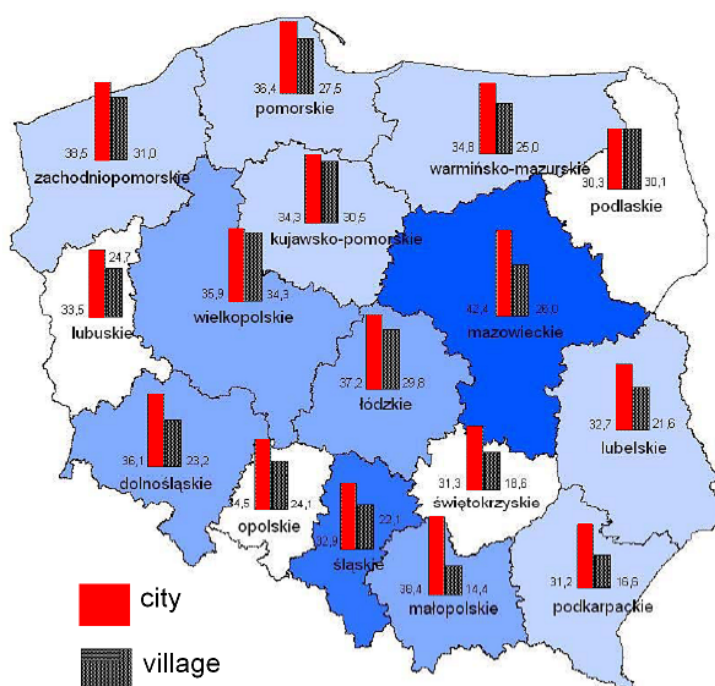
average consumption of water in households per capita	
dm ³ /24h	m ³ /month
140-160*	4,2-5,4*

*related to residential buildings with a connection to the sewage system.

There are no statistical information about domestic sewage consumption per person in residential buildings. It is assumed that domestic sewage consumption is on the same level as water consumption. The exception to the rule are stand-alone and farm buildings where a part of total water consumption is intended for watering etc. In this case a level of water consumption is higher than domestic sewage consumption. Moreover water consumption in such buildings is about 5-10% bigger than in residential buildings.

	1990	1995	2000	2005	2006
l per day	183,6	169,3	128,8	113,7	112,3





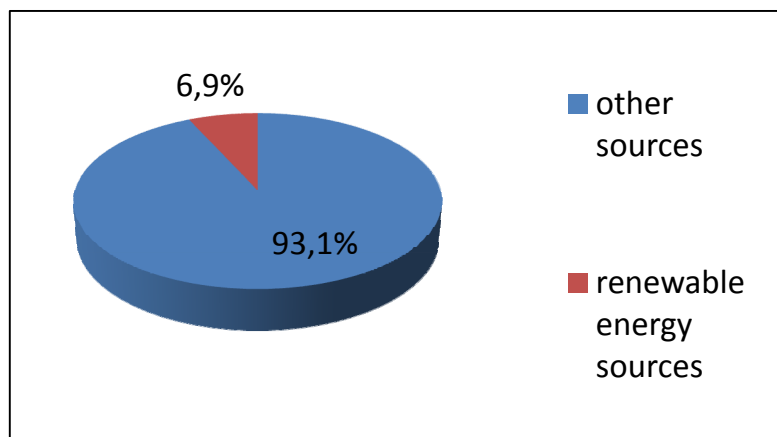
Water consumption per capita in 2007

1.6.8 What requirements are defined for security? Bulger security in doors, in windows?

There is no data available to define the requirements for security.

1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels to heat, cool or ventilate buildings? (percentages of total energy demand)

The renewable energy sources are used instead of fossil fuels to heat, cool and ventilate buildings. Their percentage contribution to total energy demand is presented:



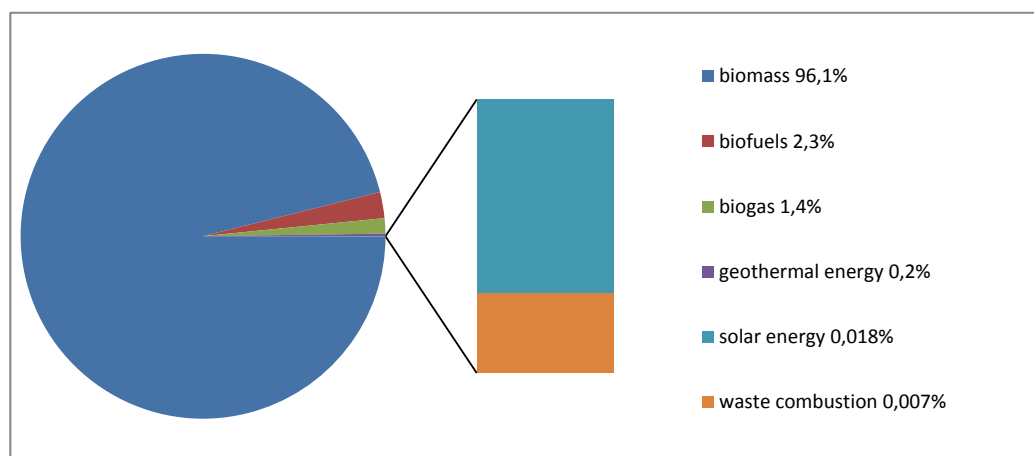
1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?

Energy supplying systems of residential buildings use such renewable heat sources as

- biogas
- bio fuel
- biomass
- waste combustio
- solar energy
- geothermal energy.

1.6.11 How popular is the usage of renewable heat sources in residential houses?

Percentage contribution to usage of each renewable heat source in residential houses is presented:



Description of each source:

Biomass – it is used mainly by local central heating systems and by small installations co-generating electricity and heat, as well as by individual heating installations. The biomass fuels are the products cultivation special plants for biomass and wastes from agriculture and forestry

Solar energy – is not a significant source in electricity production. Significance of solar energy for heat production is also small. This energy is sporadically used for heating water for general purposes

Biogas – from waste dump, sewage treatment plant and from farms is used for heat production (in a small scale).

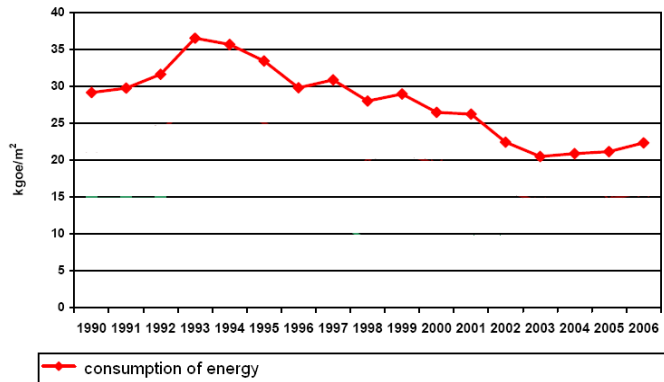
Bio fuels – mainly used as an additive to transport fuels, in a small scale used for heat production

Waste combustion - is neither a significant source in electricity production nor in heat production (used in a small scale)

Geothermal energy is used in local heating systems. It is also used in electricity production (in a small scale)

1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.

There is no data available for the energy demand per person. Further on, consumption of energy in households per square meter 1990-2006 is presented:



The energy demand in residential buildings is presented:

	1 person	2 persons	3 persons	4 persons	5 persons
kWh per year	1950	3100	3500	4500	5700
kWh per day	5,3	8,5	9,6	12,3	15,6

1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?

There are no energy efficient requirements on fans, pumps and temperature efficiency of heat recovery.

1.7 Quality of process and integration of sustainable aspects – Poland PP5

1.7.1 If there exist “Energy Performing Certificates” for houses in your country which standards signifies these certificates? Show example.

The Act of 19th September 2007 on amending the act – Construction law (J. O. No. 191, item 1373). The Ordinance of the Ministry of Infrastructure of 21st January 2008 on training and examination for licence to prepare the energy performance certificates for buildings and residential unit. The Ordinance of the Ministry of Infrastructure of 6th November 2008 on methodology of calculation of the energy performance of buildings and residential unit as well as way of preparing and patterns of their energy performance certificates.[19]

These standards specifies:

- overall indicators to express the energy performance of whole buildings, including heating, ventilation, air conditioning, domestic hot water and lightning systems.
- Information about training and examination for licence to prepare the energy performance certificates for buildings and residential unit
- ways to express energy requirements for the design of new buildings
- procedures to define reference values
- ways to design a procedure for building energy certification.

1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?

There are no regulations referred to Green Building Certificates.

1.7.3 Which standards signify a “low energy house”, “passive house”, “zero energy building”?

There are no specified regulations referred to these terms. However there are regulations which define an energy performance factor EP, whose value determines the energy class of the building or residential unit. These regulations are expressed in the Ordinance of the Ministry of Infrastructure of 6th November 2008 on amending the ordinance - technical conditions for buildings and their location. [23]

1.7.4 Following up procedure of the performance of the building energy system

There isn't any following up procedure of the performance of the building energy system.

1.8 Definition of quality standards – Poland PP5

1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?

There is no unified system of legal rules which defines sustainability as part of preparation and planning of the project. It is partly regulated by:

- Act of 19th September 2007 on amending the act – construction law (J. O. No. 191, item 1373). [19]
- The Act of 27th April 2001 on environmental protection law (J. O. No. 62, item 627 as amended) [24]

Art. 71. 1. The rules of sustainability and environmental protection form the basis for preparing and amendment of land use planning conception of the country, the development strategy of the provinces, land use planning conception of the provinces, the research on conditionings and direction of land use planning of the boroughs and local land use planning conception.

1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

The requirements which demand the confirmation of sustainability in tendering and placing are expressed in the Act of 27th April 2001 on environmental protection law (J. O. No. 62, item 627 as amended) [24]

Art. 76. 1. All the new and modernized buildings, complex of buildings or systems cannot be used if they do not comply with requirements mentioned in section 2.

Art. 76. 2. The requirements of environmental protection for new and modernized buildings, complex of buildings or systems are:

- The implementation of technical means required by the law to protect the environment
- The usage of proper technical solutions resulted from the acts and regulations
- The obtaining of required regulations about the scope and conditions of using the environment
- The execution of tests and verifications, complying with standards and conditions of atmospheric emission required by the Law.

1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?

There are requirements which define sustainability as part of the construction process but only in consideration of energy demand. From legal point of view it is regulated by the Ordinance of the Ministry of Infrastructure of 6th November 2008 [23] on amending the ordinance - technical conditions for buildings and their location. The quality assurance of the execution is expressed in the form of the energy performance certificate for buildings and residential unit which is carried out on the basis of the Ordinance of the Ministry of Infrastructure of 6th November 2008 on methodology of calculation of the energy performance of buildings and residential unit as well as way of preparing and patterns of their energy performance certificates.

1.9 References – Poland PP5

- [1] Central Statistical Office
- [2] "Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes.
- [3] Climate dates of the last 30 years in Polish: http://www.mi.gov.pl/2-48203f1e24e2f-1787735-p_1.htm
- [4] Map of flood hazards in Europe: http://www.preventionweb.net/files/3827_Floodhazard8702N3.jpg
- [5] PN-80/B-02010 – Loads In Static Calculations – Snow Loads
- [6] PN-77/B-02011 – Loads In Static Calculations – Wind Loads
- [7] PN-82/B-02001 Building loads – Permanent loads
- [8] PN-87/B-02013 Building loads – Environmental loads – icing loads
- [9] PN-86/B-02014 Building loads – Environmental loads – temperature loads
- [10] PN-82/B-02003 Building loads – Changeable technological loads – Basic technological loads
- [11] PN-88/B-02014 Building loads – Soil loads
- [12] "Technical Conditions, which buildings and their location should meet", Decree Of The Minister Of Infrastructure of 12 April 2002 r. with later changes. Section IX - Energy saving and heat insulation
- Annex No. 2 Heat insulation requirements and other requirements connected with energy saving
- [13] ISO 14020 series norms
- [14] Act on refuse Official no. 62 position 628 with later changes. 27 April 2001.
- [15] PN-85/N-08013 – Ergonomics. Moderate thermal environment. Definition of the PMV, PPD index and the requirements concerning thermal comfort.
- [16] PN-87/B-02151.02 Construction acoustics. Protection from noise in building facilities.
- [17] PN-B-02151-3:1999 Construction acoustics. Protection from noise in building facilities. Acoustic insulation of building barriers and acoustic insulation of construction elements.
- [18] Following the requirement of Directive 2002/91/EC, the Government of Poland implemented the regulations on maintenance and cleaning a heating, cooling and ventilation system.
- [19] Act of 19th September 2007 on amending the act – Construction law (J. O. No. 191, item 1373). Frequency of inspections of boilers, heating and air conditioning systems
- [20] Ordinance of the Ministry of Infrastructure of 12th March 2009 on amending the ordinance - technical conditions for buildings and their location. Requirements of maintenance and cleaning of systems.
- [21] Act of 7th June 2001 on collective water supply and domestic sewage.
- [22] Ordinance of the Ministry of Infrastructure of 14th January 2002 on the quantification of average water consumption.

- [23] Ordinance of the Ministry of Infrastructure of 6th November 2008 on amending the ordinance - technical conditions for buildings and their location.
- [24] Act of 27th April 2001 on environmental protection law (J. O. No. 62, item 627 as amended), Art. 71.
- [25] PN-EN 13116:2004 Curtain walling - Resistance to wind load - Performance requirements
- [26] PN-EN 1991-1-1:2004 Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings
- [27] PN-EN 1991-1-2:2005 Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire
- [28] PN-EN 1991-1-3:2005 Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads
- [29] PN-EN 1991-1-4:2005 Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions
- [30] PN-EN 1991-1-5:2005 Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions
- [31] PN-EN 1991-1-6:2007 Eurocode 1 - Actions on structures Part 1-6: General actions - Actions during execution
- [32] "Energy profile calculation methodology of buildings and flats", Decree of The Minister Of Infrastructure of 6 November 2008
- [33] ISO 14021
- [34] ISO 14024
- [35] ISO 14025
- [36] ISO 9972: Thermal performance of buildings -- Determination of air permeability of buildings -- Fan pressurization method
- [37] ISO 9972:2006
- [38] European Council Directive 89/106/EEC



2.1 Currently applied planning methods – Poland PP6

2.1.1 Describe the currently applied planning methods in your country in short words.

Urban planning in the cities and municipalities is based essentially on two stages of planning: the preparatory land-use plan (Studium uwarunkowań i kierunków rozwoju) [1] and the various legally binding land-use plans (Miejscowy plan zagospodarowania przestrzennego). [2]

2.1.2 What local or national planning laws do exist?

In Poland exist Building Code [3] and Local planning laws [4]. The legally binding land-use plan (Miejscowy plan zagospodarowania przestrzennego), [2] as a local law, contains the legally binding designations to control orderly urban development within a specific area.

2.1.3 What kind of energy and sustainable needs are required according to the planning law?

Required are electricity, water and sanitary fittings. Fittings of drainage, heating and hot water preparing could be determine.

2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)

Entitled to the planning is everyone, who have suitable building power and is a member of the polish engineer's , urban's or architect's chamber.

2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)

In planning process take part architects, structural engineers and sanitary fittings engineers. Architect plans the building and coordinates all trade. He is (after authorization) a representative of investor in bureau.

2.2 Building permit rules – Poland PP6

2.2.1 Describe the building permit procedure in short words. How long is it valid?

The investor submits an application for building permit to the bureau of the county. With the application must he attach the project with agreements. After max. 65 days bureau give building permit.

2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)

With application must be attached object's project with agreements and energy performance.

2.2.3 What kind of national or local building permit rules do exist?

The Building Code (Ustawa Prawo Budowlane) establishes planning principles and procedural rules. Urban planning in the cities and municipalities is based essentially on two stages of planning: the preparatory land-use plan (Studium uwarunkowań i kierunków rozwoju) and the various legally binding land-use plans (Miejscowy plan zagospodarowania przestrzennego). Each municipality is responsible for preparing the urban land-use plans for the territory under its control. When the urban land-use plan not exist, municipality publish decision of development's conditions (Decyzja o warunkach zabudowy).

2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?

To apply for a building permit is entitled owner, co-owner, leaseholder (with owner's permit), and perpetual user (with owner's permit).

2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)

In the building permit procedure take part investor, owner, co-owner, perpetual users and developer's manager in influence territory.

2.2.6 How does the inspection system work and who checks the documents?

Inspection (Nadzór Budowlany) can check building site accord permission of construction.

2.2.7 How much time has the administration to finish the procedure and is there any law to force this?

The administration has 65 days to finish procedure, according to the Building Code (Ustawa Prawo Budowlane).

2.2.8 What does a building permit cost?

Treasury fee amount to 47 PLN (10 Euro). Houses are released.

2.3 Tendering rules and laws – Poland PP6

2.3.1 Describe the tendering procedure in short words.

Investor submits an application for building permit to the bureau of the county. With the application must he attach the project with agreements.

After 30 days, when bureau have nothing against, construction can begin. Investor must tender the beginning of building's construction in inspection's bureau (Powiatowy Nadzór Budowlany)

2.3.2 What kind of national or local tendering rules and laws do exist?

Tendering procedure is conducting according Building Code.[3] Buildings must allow for land-use plan [2] or decision of development's conditions.

2.3.3 What types of tendering procedure are there? (public building, private building,...)

To tendering procedure belongs to object, for example: farming building to 35 m² and construction span 4,80m; domestic open swimming pool to 30 m².

2.3.4 What are the limits for the national tendering process? (in relation to EU)

2.3.5 Are there any time limits for the tendering procedure?

Bureau has 30 days to publish objections.

2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

No.

2.4 Construction process – Poland PP6

2.4.1 Are there any rules to comply during the construction?

The construction must be lead according Building Code [3] and safety regulations (BHP).

2.4.2 Is there an obligatory checking from the authorities?

No.

2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?

Building construction can manage person, who have suitable building power and is a member of the polish engineer's chamber. Foreigners must be member of the polish engineer's chamber, too.

2.4.4 Is there obligatory construction supervision?

No.

2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?

Foreigners must have a suitable building power and be a member of the polish engineer's chamber.

2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?

Before the building can be inhabited, required is permission for use. Are required: Energy-Pass (Świadectwo charakterystyki energetycznej) [5], Announcement construction's site manager about according construction to project (Announcement about the end of the works), other permissions (fire department, sanitary departments).

2.5 Conditions and habits of operating/ facility management – Poland PP6

2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?

No.

2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).

Average cost of constructions amounts 3.895 PLN per m² (866 euro per m²).



2.6 Commercial parameters, housing industry key data, urban infrastructure and housing situation – Poland PP6

2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?

No. It's only subsidized thermo modernization.

2.7 References – Poland PP6

- [1] Studium uwarunkowań i kierunków rozwoju: preparatory land-use plan
- [2] Miejscowy plan zagospodarowania przestrzennego: legally binding land-use plans
- [3] Ustawa Prawo Budowlane: Building Code
- [4] Local planning laws
- [5] Świadectwo charakterystyki energetycznej: Energy-Pass



3.1 Demographic analysis of housing needs and the target group of population – Poland PP7

3.1.1 How is the private-home ownership rate?

Private ownership rate is approximately 48,6%.

3.1.2 What can be generally said about the residential buildings, e.g. - multi-storey buildings vs. detached houses, year of construction, private or public owner respectively hybrid forms such as associations?

The total number of residential buildings in cities is approximately 1780000. 16,8% of them were built after 1988. An average number of flats in a building is 4,6.

3.1.3 What statements can be done about the residential structure, e.g. habitant per sq. km., living space per person, anticipated requirement of residential buildings in the next 5 years, predicted demographic trends for the country or the region?

122 habitants per km². Present living space per person: 23,8m². Present space per person will increase to 26m². It is estimated that the Polish population will decrease by 12% till 2050.

3.1.4 What can be said about the structure of the households, e.g. age distribution, distribution of income, amount in % for rental costs of net household income, development of the living standard, gross domestic product?

Age: 0÷17 -21,9%; 18÷64 (working age) - 62,9%; older than 60 (women)/ 65 (men): 15,2%. The average net income per household: ~1040€. The average rental cost is 9€ per square meter. (450€ for 50m² apartment). However the average housing cost for private owners is app. 88€ for one apartment.

3.1.5 Are there any regional distinctions or similarities concerning the climate?

All Polish regions have similar climatic conditions. Considerable differences are only in mountain regions at the south (wind and snow loads, average temperatures). The average sun radiation is almost the same in every region.

3.1.6 Construction, maintenance and operation costs per m², m³? The structuring of financial resources in building practices (budget, private finances, bank credits). Dynamics of last 15 years. The dynamic of price development of living area per sq.m and the average salary in participating countries, Dynamics of expenses of average family for building maintenance, Dynamics of expenses of average family for building maintenance.

Construction cost for single-family house: 630€/m². Maintenance costs: see 3.4.5 operating costs: see 3.4.1

3.2 Sustainability aspects – Poland PP7

3.2.1 How is the energy saving/sustainable construction of residential buildings connected with any financial support?

Construction cost for single-family house: 630€/m². Maintenance costs: see 3.4.5

Operating costs: see 3.4.1

3.2.2 Are there any existing capital allowances regarding sustainability building practice?

There are no capital allowances regarding sustainability building practice.

3.3 Economical energy supply – Poland PP7

3.3.1 What is (how high) the energy consumption per m2 and what is the needed expense per m2?

In the last 10 years the energy consumption fell from 162 to 146 kWh/m2. Average heating price equals to 8.70€/m2

3.3.2 How was the development of energy costs for private household (incl. TAX) within the last few years?

The energy prices increased in the last years. Average cost of heating in 1998 - 0,04€/kWh , in 2007 - 0,07€/kWh

3.3.3 What is the rate of CO2 –emission of the used energy resources of buildings? Dynamics of demand of energy resources per 1 sq. m. of living area (depending on fuel, materials, constructions; during building period and lifetime).

District heating: 0,38kg/kWh, Oil: 0,29kg/kWh, Natural gas: 0,2kg/kWh

3.4 Evaluation of current maintenance and operating costs – Poland PP7

3.4.1 What can be said about the operating costs?

Operating costs include: common maintenance, sanitation, planned and periodic replacement.

3.4.2 What kind of performing benchmarks are available?

There are no performance benchmarks.

3.4.3 Which costs can be listed in the bill of operating costs and which not?

Operating costs include:

- taxes,
- water supply,
- sewage,
- operating, cleaning, maintenance of facilities to water and heating supply.
- operating of elevators
- street cleaning and waste disposal,
- house cleaning,
- garden maintenance,
- lighting

3.4.4 How was the development of maintenance and operating costs in the last few years?

There is no data available.

3.4.5 What are the costs of maintenance and administration costs?

The cost of maintenance depends on the age of the building and the structure type.

3.4.6 What can be said about stability of value and life cycle costs? (development)

No data available.

3.5 Housing development programmes of the participating countries – Poland PP7

3.5.1 What kind of financial support does exist for owners and lodgers/renters, respectively for construction of residential buildings?

The majority of residential buildings are managed by homeowners' associations, which can hire a professional manager / administrator.

3.5.2 Who is the target group for these supporting programs?

The target group are owners.



3.6 Management models , owner's structures – Poland PP7

3.6.1 How can the structure of ownership, i.e. the proportion of “classic” real estate manager and yield-oriented investors be described?

According to some expert estimates 50% of the new constructed houses in Moscow and St. Petersburg is used as a yield-oriented houses for the rent.

3.6.2 What are the procedures to make a decision within owners' associations?

The decision is made by the majority of votes. Votes are distributed between members either proportionally to their share in the property or accordingly to the principle 1 member = 1 vote.

3.7 Condition of real estate management – Poland PP7

3.7.1 What are national distinctions in the tenancy law?

The tenancy in Poland is regulated by Civil Code[1].

3.7.2 How was the development of the rental prices in the last few years?

The prices increased by 20% from 2006 to 2008 depending on the type of dwelling.

3.8 Benefit analyses for owners and investors – Poland PP7

3.8.1 What are the models of calculation of profitability? Examples.

Static and dynamic methods of calculations: accounting Rate of Return, Net Present Value, Internal Rate of Return, Modified Internal Rate of Return, Profitability Index.

3.9 Financing and funding instruments and mechanism – Poland PP7

3.9.1 What are the financing instruments on local/ regional/ national/ EU level for housing development/ such as public private partnership (PPP) respectively financial supports? Supporting instruments for house owner and renter/lodgers (see above).

3.9.2

Bank loans/credits, subsidies, grants, PPP

3.9.3 How to make investment decisions and for which time period these decisions are planed and are validly?

Investment decisions are preceded by the profitability calculations. The chosen calculation method and analyzed time period depends on the type of investment.

3.10 References – Poland PP7

[1] Civil Code

13.5 Details Russia

- Engineering and building technology standards in Russia
- Method of planning, permit and tendering procedures in Russia
- Economical and financial basis, industry and quality in Russia

1.1 Architectural and Urban Design – Russia ass. PP13

1.1.1 What kind of residential buildings is usual in the participating countries (multiple dwelling, detached houses, etc.)?

In the city the usual typology of the residential building is multi-storey multi-family building, in the countryside and suburbia – private single family houses. There are also block houses, townhouses, dormitories and other typologies, but they amount insignificant number in comparison to the bulk of residential buildings.

1.1.2 What can be generally said about the residential buildings (e.g. year of construction, private or public owner respectively hybrid forms such as associations)?

Buildings most parts of St. Petersburg (with the exception of the central historical areas of the city) are represented mainly by massive series of house-building plant built 60-x (5 storied) and 70-80-ies of the last century. Construction of new dwellings actively began in the second half of the 90-ies and is represented by new brick-monolithic panel houses with 12-16 floors. The share of other types of dwellings is relatively small.

Multi-storey multifamily building. The dwellings can be private property of owners (privatized) or be the State property; also they can be rent to the residents. The most residents try to privatize the dwellings. The servicing company of multi-storey buildings is enlisted by the owners of apartments and provided by the State. Single family houses are private property of the owners.

1.1.3 What is the common architectural design of residential buildings (pictures, drawings, floor plan, view)?

Architecture of the houses in Russia is very different. Low-store houses are typically single-family detached houses or multifamily houses built with brick, wood or concrete. In the recent times there have been developed social buildings, built mostly with wood structures.

1.1.4 What are the common requirements for living spaces? (number of rooms, number of persons per household, sq m per person, height of different rooms, min area of the living room, information about usual living spaces)

According to the national code (СНИП (SNiP)- Building standards and rules [1] there have to be 18 sq m of the total living area per person. In the real life it depends on the solvency of the owner. Traditionally there is some kind of hall (like lobby) in the entrance of the apartment. It connects living room, kitchen and bathroom.

Kitchen and bathroom can be separate rooms and also they can be connected to common room, it depends on the owners wishes. It is preferably for each member of the family to have own sleeping room. Married couples have their general sleeping room. The second bathroom in the apartment is an indicator of a high level of comfort. In the last time the second bathroom in 3- and more room apartment became obligatory for new residential buildings. It is commonly that apartments have loggia- glazed balcony and single family houses have terrace. The built-in closets and small pantries have to be built in according to the norms. In the big apartments and houses there are also additional rooms: office room, sauna, terrace and pool...

1.1.5 Are there any building envelope design limitations (e.g material, windows, etc.)?

Building standards for the residential buildings have a numerous and demanding requirements. They determine size and orientation of the windows of residential buildings, thermal conductivity and fire resistance of the wall materials, number of elevators, type of stairs. The rules have a lot of specific requirements and restrictions. There are some regulations for insulation, that consider the window surface area, orientation of the building and etc. Window surface area has to be generally between 12 and 30% of floor area.

1.1.6 Are there any specific standards (e.g. elevator, cellar, entrance, etc.)?

There are building norms and regulations, especially the urban planning documentation in the separate subjects of Russian Federation.

Single family houses have mostly pitched roof, upper floor - as mansard. If hydrological conditions permit, the owners try to make a cellar or basement, used as a garage or for household needs. Usually the house has 2 living floors. The first one - for general rooms: entrance hall, main living room, kitchen, bathroom, terrace and sometimes one sleeping room. In the second floor there are sleeping rooms and bathrooms.

Multi-storey multifamily building. Residential building of the 20th century have almost always flat roof, older buildings – pitched roof. In the entrance there is commonly room for concierge. Almost all residential buildings have intercom. Elevators are required in case the building is higher than 4 floors. In the stairs there have to be windows and exit to the street. In the buildings, which have more than 9 floors there are used stairs with smoke protection.

Sometimes the mansard (relay) storeys are built over the multi-storey multiple dwelling buildings of the 19th century. The most multi-storey multifamily buildings of the 19,20th century don't have garages inside. Cellars and attics of buildings were used for technical purposes. New houses are built only with parking in the basement and ground floor.

1.1.7 What are the definitions or guidelines for roof design?

SNIP II-26-76: "Roofs".

Slopes of roofs: generally between 1:1 and 1:5 (ratio of length from apex to eaves and height);

rolled-strip roofing: slope of 0° - 2,5°;

asbestos-cement roofing: 10° - 33°;

concrete panel with imbrex: 5° - 10°

1.1.8 What are the functional guidelines (space efficiency, reusing ability, accessibility, and bicycle comfort)?

SNIP 31-01-2003: "Multicomartment residential buildings".

1.1.9 How do the existing guidelines or rules include art, urban quality and design quality?

Existing standards define the height and majority of the building; they don't include art and design. Aesthetic quality of the building in the city determines the governmental official responsible for the architecture in this area or city.

1.1.10 What kind of requirements is defined for barrier free construction? Name of the code?

There are no such kind of requirements..

1.1.11 Which plans control the local urban and architectural design, what are the common criteria and where can they be found?

Only the Urban development code of Russian Federation.

1.1.12 Are there social guidelines for the architectural planning, or is it just part of the concept?

Regulation concerns the general concept of urban development of the city. That is taken into account in the provision of building plots. There are some restrictions generally concerned with solving the master plan, the ratio of types of apartments, the balance of the area- at the discretion of the investors.

1.1.13 What criteria should be involved to describe the quality of the urban area of the site?

Availability of dwelling according to the costs, distance to the metro, convenient transport links, availability of recreation areas, parks, squares.

1.2 Structural Design – Russia ass. PP13

1.2.1 What are the climatic conditions?

Russia belongs to the temperate climate zone and is divided into 4 construction-climatic regions. Sankt Petersburg is characterized by wet, close to the maritime climate with warm summers and relatively long cold winters. Average temperature in summer is $+18^{\circ}\text{C}$, average winter temperature is -8°C . In summer, temperature can reach max. $+25^{\circ}\text{C}$ till $+30^{\circ}\text{C}$. In winter a significant cooling happens: up to -25°C ... -30°C . There is rainfall of 634 mm per year. The average temperature in winter - about -10°C , $+3.5^{\circ}\text{C}$ in spring, and $+4.5^{\circ}\text{C}$ in autumn. St. Petersburg applies to IIV construction-climatic region with temperature of the coldest five days supplied by $0.92 -26^{\circ}\text{C}$ (SNiP 2.01.01-82) [3], II wind area with the standard wind pressure 0.3 kPa, and III area of snow with snow regulatory burden 1.3 kPa (SNIP 2.01.0785 *) [4]. In St. Petersburg there are floods, but the construction works are more influenced by high ground water levels, frequent rains and frosty winter. Number of heatingdays can be calculated with formula, which are described in SNIP 23-01-99* "BUILDING CLIMATOLOGY"

1.2.2 What types of roof structure are used in residential houses?

Pitched roof - wooden rafter with a wooden crate, metal rafter with wood and metal crate.

Flat roofs - monolithic reinforced concrete and prefabricated coverings.

1.2.3 What types of load bearing structure are used in residential houses?

In modern multi-residential buildings there is used monolithic reinforced concrete skeleton of the interior walls, pillars and ceilings. Exterior walls –not load bearing, are often from the gas (porous) block with exterior finish of brick. In single family houses the walls are from the gas blocks or bricks, floors - prefabricated reinforced concrete or reinforced concrete, coating - wooden rafter.

1.2.4 Is there any national code to calculate load structures?

Constructions are calculated according to SNiP Building standards and rules: 12-01-2004 SNIP [5] SNIP 52-01-2003 Concrete and reinforced concrete structures [6], SNIP 2.01.07-85 * Pressures and impacts [7] SNIP 2.02.01-83 * Foundations of buildings and structures [8], SNIP Pile foundations 2.02.03-85 [9], SNIP II-22-81 Stone and armature stone design [10], SNIP II-23-81 * - Steel structures [11], etc.

1.2.5 How highly-developed are the industrial prefabricated materials?

Construction of multistory buildings of reinforced concrete panels is used, but their share is insignificant.

1.2.6 How is the proportion between handcraft building method and industrialised building?

The proportion of manual and industrial labors approximately half to half. Shuttering used to be set manually, accessories have to be knit, concrete have to be brought by cars, gas concrete blocks are used to be placed by hand, etc. Construction companies tend to perform most work on their own, if it does not affect the quality of work. Glazing and finishing facades order to specialized firms.

1.2.7 What are the typical criteria to make a decision in favour of a certain construction method?

Criteria for the selection of construction:

Reliability, durability, efficiency, fire resistance.

1.3 Energy standards – Russia ass. PP13

1.3.1 Is there any national code for Energy efficiency of buildings?

The main national code for energy efficiency of building in our country is “Building standards and rule” (СНИП 23-02-2003) “THERMAL PERFORMANCE OF THE BUILDINGS” [12]. In designing we also use “Residential and public buildings. Microclimate parameters for indoor enclosures” (ГОСТ 30494-96) [13]. In practice two

different ways are used usually: specific heat consumption q_h^{des} , kW/m²°K and required heat-transfer R.

1.3.2 What is average specific heat consumption of residential buildings in kWh/m²a?

Specific heat consumption q_h^{des} for residential buildings depends on number building storey and heating space. q_h^{des} is calculated as:

$$q_h^{des} = Q_h^v / A_h \cdot C$$

hear Q_h^v – need thermal energy for building during heating period, A_h - building heating surface, m², C- variable quantity is depended on geographic area and hygienic requirements:

$$C = (t_g - t_h) Z$$

hear t_g, t_h – typical indoor and outdoor temperature; Z – days of heating period.

For example, St. Petersburg C is $C = (18-1.8) 220 = 4796$

Values of q_h^{des} are shown in tab.1 and 2 (kJoule/m²°K·day)

Tab.1

building heating surface, m ²	number building storey			
	1	2	3	4
100	125	135	-	-
150	110	120	130	-

250	100	105	110	115
400	-	90	95	100
600	-	80	85	90
1000 и более	-	70	75	80

Tab.2

Type of building	number building storey					
	1-3	4, 5	6, 7	8, 9	10, 11	12 and >
Living, hotels	Tab 1	85[31]	80[29]	76[27,5]	72[26]	70[25]
2 Public	1 storey -[42]; 2 storey -[38]; 3 storey -[36]	[32]	[31]	[29,5]	[28]	-

Commentary: Values in [*] are $q_h^{des} = Q_h^v / V_h \cdot C$, (kJoule/m³ oK·day), where V_h – building heating volume, m³.

1.3.3 Is there any national code for thermal insulation of buildings?

Need thermal insulation of external construction for different buildings are regulated in “Building standards and rule” (СНиП 23-02-2003) “THERMAL PERFORMANCE OF THE BUILDINGS”. [12]

1.3.4 What method is implemented to calculate energy demand?

No certificated method.

1.4 Building materials – Russia ass. PP13

1.4.1 What kind of building materials are used for: roof structure, load bearing structure, foundation, external wall, internal wall, floor, ceiling, façade, windows, thermal insulation?

roof structure: ceramic tile, plate tile, cement tile; Flat roofs: membrane

load bearing structure: walls of brick and building stone and reinforced concrete

foundation: reinforced concrete

external wall: brick, masonry blocks, reinforced concrete, wood

internal wall: construction built with wood, steel and brick

floor: wood, floor tiles, carpet, stone plates

ceiling: reinforced concrete and suspended ceiling

façade: brick, various types of stone, ceramic plates, wooden and siding panels

windows: wooden and plastic windows

thermal insulation: mineral and glass wool, polystyrene extruded foam and styrofoam

1.4.2 What are the reasons of the material usage?

The reasons of the material usage are technical, economical, ecological, regulations.

1.4.3 What kind of progress/development is significantly shown in building materials and energy standards within the last years?

New composite materials are being actively introduced, frame house constructions are being developed, foreign technologies in the construction of low-rise buildings are being tested. "Energy-saving housing construction in Moscow for the 2010-2014. And with the perspective up to 2020" law has been adopted and passes a final reading.

1.4.4 Is there any ecological declaration of building materials

All building materials being used in Russia have ecological declarations.

1.4.5 What criteria are involved in this declaration? ? (health risks, potentials to accumulate or to abolish the ozone layer, potentials for greenhouse effect, potentials for acidification and overfertilization, risks for the local and global environment)

Criteria involved in this declaration are health risks and fire risk.

1.4.6 Are there any declarations or codes for waste materials?

There are not such kind declarations or codes in Russia.

1.5 Building physics – Russia ass. PP13

1.5.1 Which material standards or characteristics are generally used to describe material and building conditions (e.g. U-Value $W/(K \cdot m^2)$) ?

Thermal-conductivity coefficient, (thermal- transmission) λ , $W/(m^2 \cdot K)$;
vapor penetration μ , $mg/(m \cdot h \cdot Pa)$

1.5.2 What requirements are defined for thermal comfort (internal thermal conditions) in winter and summer? Name of the code?

“Residential and public buildings. Microclimate parameters for indoor enclosures” (ГОСТ 30494-96). [13]

In winter indoor air temperature have to equal 18 or 20 °C. In summer indoor air temperature is standardized only for public building.

1.5.3 What requirements are defined for acoustic comfort? Name of the code?

Projection of sound insulation of separating constructions in domestic and public building (СП 23-103-2003). [14]

Building standards and rule “ SOUND PROTECTION” (СНиП 23-03-2003). [15]

These code define: indoor and outdoor sound (pressure) level (dB, dBA) and sound insulation of windows, balcony doors, indoor construction.

1.5.4 What requirements are defined for visual comfort? (natural and artificial light, façade, ...) Name of the code?

No requirements.

1.5.5 What requirements are defined for interior hygiene (e.g. mould)? Name of the code?

“Residential and public buildings. Microclimate parameters for indoor enclosures” (ГОСТ 30494-96) defines criteria for indoor air temperature, air humidity and concentration air contamination. [13]

1.5.6 What requirements are defined for the building envelope? Name of the code?

Air – tightness, moisture proofing, sound insulation of windows, balcony doors, heat transmission

1.5.7 What requirements are defined for fire prevention? Name of the code?

All requirements are in SNIP СНиП 2.01.02-85* "Fireproof norms", SNIP 21-01-97* "Fire safety of buildings and works".

1.5.8 What requirements are defined for soil sealing and laying claims to surface? Name of the code?

Rules and rates ЕнП (ЕНП): Collection E8 Issue 1,2,3;ЕнП (ЕНП) Collection E11.

1.5.9 What criterions are involved to determine Energy Efficiency of building?

All criterions and requirements written in SNIP 23-02-2003 "Thermal performance of the buildings"

1.6 Technical facilities and services – Russia ass. PP13

1.6.1 What kind of heating energy sources are used in residential houses?

Coal, wood (firewood), electricity and natural gas are used as heating energy sources.

1.6.2 What kind of heating system is used in residential houses? Central heating, district heating etc.? What kind of heating generators are used?

Predominately central heating (district heating plant) is used; also dwellers of village detached houses use local heating systems.

Heating generators are mostly gas boilers, oil boilers and electric heat pumps.

1.6.3 What kind of cooling system is used in residential houses?

air conditioning

cooling system

1.6.4 What type of ventilation system is used in residential houses?

Mechanical, automatic and combined extract and input ventilation

1.6.5 What requirements are defined for maintenance and cleaning of these systems? (heating, cooling, ventilation systems)

All requirements can be found in SNIP 2.08.01-89* "Living houses" and reference guides for maintenance and cleaning of HVAC systems. [16]

1.6.6 What requirements are defined for water supply and domestic sewage?

GOST R 51232-98 "Drinking water, General requirements for organization and quality control methods";

Sanitary-hygienic rules and norms [17]

SanPiN 2.1.4.1074-01 "Drinking water. Hygienic requirements to quality of water of the centralised systems of drinking water supply. Quality control". [18]

1.6.7 Show the development of water and domestic sewage consumption per person and square meter in the last years in residential buildings.

There is no data available.

1.6.8 What requirements are defined for security? Bulger security in doors, in windows?

There is no data available to define the requirements for security.

1.6.9 Is renewable energy like solar, wind, bio mass or geothermal resources used instead of fossil fuels to heat, cool or ventilate buildings? (percentages of total energy demand)

The use of renewable energy isn't spread in Russia. There are cheap technologies for use solar, wind and bio mass energy, but they have not found their consumer among the population.

1.6.10 Are renewable heat sources used in energy supply systems of residential buildings?

Renewable heat sources are not used in energy supply systems of residential buildings.

1.6.11 How popular is the usage of renewable heat sources in residential houses?

No data for residential building.

1.6.12 Show the development of energy demand per person and square meter in the last years in residential buildings.

It is defined by the standards for consumption of electrical energy within the living quarters on the basis of differentiation depending on the number of rooms and number of people, which are established by the Office of Housing, Communal Services and other authorized institutions.

1.6.13 Energy efficient requirements on fans, pumps and temperature efficiency of heat recovery?

There are not such kind of energy efficient requirements.

1.7 Quality of process and integration of sustainable aspects – Russia ass. PP13

1.7.1 If there exist “Energy Performing Certificates” for houses in your country which standards signifies these certificates? Show example.

There are not such kind of certificates.

1.7.2 If there exist “Green Building Certificates” for houses in your country which standards signifies these certificates?

There are not such kind of certificates.

1.7.3 Which standards signify a “low energy house”, “passive house”, “zero energy building”?

There are not standards for these types of houses.

1.7.4 Following up procedure of the performance of the building energy system

There isn't any following up procedure of the performance of the building energy system.

1.8 Definition of quality standards – Russia ass. PP13

1.8.1 Are there any codes or requirements which define sustainability as part of the preparation and planning of the project?

Urban development code and local urban development regulations.

1.8.2 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

There are not any codes.

1.8.3 Are there any codes or requirements which define sustainability as part of the construction process? Is there a quality assurance of the execution?

Only in recent times some of local plans include guidelines for sustainable urban development.

1.9 References – Russia ass. PP13

- [1] (СНиП (SNiP)- Building standards and rules
- [2] Urban Planning Code of the Russian Federation
- [3] SNiP 2.01.01-82
- [4] SNIP 2.01.0785
- [5] SNiP Building standards and rules: 12-01-2004 SNIP
- [6] SNIP 52-01-2003 Concrete and reinforced concrete structures
- [7] SNIP 2.01.07-85 * Pressures and impacts
- [8] SNIP 2.02.01-83 * Foundations of buildings and structures
- [9] SNIP Pile foundations 2.02.03-85
- [10] SNIP II-22-81 Stone and armature stone design
- [11] SNIP II-23-81 * - Steel structures
- [12] СНиП 23-02-2003 "THERMAL PERFORMANCE OF THE BUILDINGS"
- [13] ГОСТ 30494-96 "Residential and public buildings. Microclimate parameters for indoor enclosures"
- [14] СП 23-103-2003 "Projection of sound insulation of separating constructions in domestic and public building"
- [15] СНиП 23-03-2003 " SOUND PROTECTION"
- [16] SNIP 2.08.01-89* "Living houses"
- [17] GOST R 51232-98 "Drinking water, General requirements for organization and quality control methods"
- [18] SanPiN 2.1.4.1074-01 "Drinking water. Hygienic requirements to quality of water of the centralised systems of drinking water supply. Quality control"

2.1 Currently applied planning methods – Russia ass. PP14

2.1.1 Describe the currently applied planning methods in your country in short words.

Committee of urban development planning and architecture approves urban development plans. District architects oversee the observance of the regulations and produce urban plans for the separate plots and define the boundaries of the design planning in accordance to the future development of the site. They control the observance of sanitary zones. The third level are inhabitants, developers, investors, architects and etc., to comply and conform to the regulations set by the State government and municipalities.

2.1.2 What local or national planning laws do exist?

Urban development code of Russian Federation [1] and norms of the subjects of Russian Federation.

2.1.3 What kind of energy and sustainable needs are required according to the planning law?

There are no energy and sustainable requirements according to the planning law.

2.1.4 Who is entitled to do the planning? (foreigners, national habitants, locals,...)

Only legal entities licensed to perform the respective types of works with subsequent examination of the documents by the State Architectural and Construction Supervision.

2.1.5 Which people take part in the planning process and what is their role? (architect, structural engineer, physical engineer, ...)

The lead architect of the project, the lead engineer of the project.

2.2 Building permit rules – Russia ass. PP14

2.2.1 Describe the building permit procedure in short words. How long is it valid?

Building permits are issued by municipality of the first level in the presence of the project documentation, which passed the state examination. Building permit is valid during the time established in the project documentation. Passage of the state expertise: all project documentation have to be passed in GASN, as well as the land lease contract, charter documents of customer and designer, license of the designer and technical conditions for the connection to the utilities, with the agreement of the network holders of the relevant sections of the project. Customer pays for the contract for examination. The official date of the examination - 1 month. In practice, the examination takes longer because of the elimination of the comments.

2.2.2 What is the application form and what documents have to be filed for the local authority in order to get a construction permit? (construction description, energy performance, cadastral data etc.)

Land lease contract, expert opinion.

2.2.3 What kind of national or local building permit rules do exist?

Urban development code [1] and local urban development regulations [2].

2.2.4 Who is entitled to apply for a building permit? Are there any special laws for developers from foreign countries?

Only customer of the building (legal or private person).

2.2.5 Which people take part in the building permit procedure and what is their role? (architect, structural engineer, physical engineer, ...)

Administration takes a statement and a set of documents from the land lease contract to the conclusion of the State Architectural and Construction Supervision (GASN).

2.2.6 How does the inspection system work and who checks the documents?

State Architectural and Construction Supervision (GASN).

2.2.7 How much time has the administration to finish the procedure and is there any law to force this?

Application processing time is 10 days.

2.2.8 What does a building permit cost?

Building permit is issued free of charge. The cost of the state examination has to be calculated by a special technique.

2.3 Tendering rules and laws – Russia ass. PP14

2.3.1 Describe the tendering procedure in short words.

Tendering procedure has to take place in accordance with the urban planning code. The main procedures are open tendering or auction. Announcement of tender are published in the media 30 days before the tendering takes place.

2.3.2 What kind of national or local tendering rules and laws do exist?

see 2.3.1

2.3.3 What types of tendering procedure are there? (public building, private building,...)

see 2.3.1

2.3.4 What are the limits for the national tendering process? (in relation to EU)

Only joint ventures with Russia' s capital can acquire land in private ownership. Foreign companies can only obtain land on lease.

2.3.5 Are there any time limits for the tendering procedure?

Thirty days before tendering, the result is on the day of tendering and in accordance with protocol.

2.3.6 Are there any codes or requirements which demand the confirmation of sustainability in tendering and placing?

Defined by terms of tendering in accordance with urban planning code and local regulations.

2.4 Construction process – Russia ass. PP14

2.4.1 Are there any rules to comply during the construction?

Building codes and regulations, technical regulations adopted at the federal level.

2.4.2 Is there an obligatory checking from the authorities?

Yes. Current control inspection by the State Architectural and Construction Supervision in the process of production works.

2.4.3 Who is entitled to do the construction management? Are there any laws for managers from foreign countries?

Construction management is carried out in a general manner by the Service Chief Engineer and Technical Supervision Service, a licensed building organisation. The license is federal. From the first January 2010 the licenses will be cancelled. Qualifying of the organisations will be confirmed by the Regional self-regulatory organisations of the building complex.

2.4.4 Is there obligatory construction supervision?

State Architectural and Construction Supervision (GASN) [3].

2.4.5 Who is entitled to do the construction supervision? Are there any laws for managers from foreign countries?

There are no special laws for foreign experts. Construction management is engaged by the Service Chief Engineer- general contractor.

2.4.6 What procedures/ documentations are required at the end of the construction works – before the building can be inhabited?

Building permit, statements of commissioning of engineering systems and the statement of commissioning of the facility of the completed construction.

2.5 Conditions and habits of operating/ facility management – Russia ass. PP14

2.5.1 Are there any rules or laws that give information about operating/ facility management of a building?

Yes, there is the Law of Russian Federation "The law about associations of the homeowners " [4], "Housing Code of the RF" [5], "Rules of providing facility services", "Rules and standards of for maintenance of housing resources and others".

2.5.2 Please give some data about operation costs and construction costs (diagrams and schedules).

Prices for construction depend on many factors - from the market value of the land till the climatic conditions of the area of the construction. Average figures are incorrect.

2.6 Commercial parameters, housing industry key data and housing situation – Russia ass. PP14

2.6.1 Are there any rules or laws to support a decisive (ecological) construction process economically?

There are no rules to support a decisive (ecological) construction process economically.

2.7 References – Russia ass. PP14

- [1] Urban development code of Russian Federation
- [2] local urban development regulations
- [3] State Architectural and Construction Supervision
- [4] "The law about associations of the homeowners "
- [5] "Housing Code of the Russian Federation"