



Energy research Centre of the Netherlands

Experiences with financing social housing refurbishment

WP2 overview report for the InoFin project

Supported by the European Commission

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ECN-E--07-012



February 2007

Acknowledgement

This report is the result of a study provided within Work Package 2 of the project ‘Innovative Financing of Social Housing Refurbishment in the Enlarged Europe’ (InoFin). The European Commission under the Intelligent Energy Europe Programme supports this project. We are grateful to the European Commission for part funding this work. The study is jointly conducted by the InoFin project team and is registered under ECN project number 7.7735. This present report contains an overview and comparison of eight country reports, analysing the situation of housing refurbishment in Denmark, Germany, the Netherlands, the Czech Republic, Slovakia, Poland, Latvia and Bulgaria.

The author wishes to thank the following contributors to the report:

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Abstract

This report provides a review of experiences with financing social housing refurbishment in Denmark, Germany, the Netherlands, Bulgaria, the Czech Republic, Latvia, Poland and Slovakia. The report shows large differences in the social housing sector between the three Western European countries and the five new Member States. Apart from differences in energy performance, of major importance is the difference in ownership structure of the social housing stock. Where the three Western European countries still have a large rental sector, the major share of the (social) housing stock in the new Member States has been transferred to private ownership. The review shows that private ownership in buildings with multiple dwellings is a complicating factor in organising housing refurbishments. As financing of social housing refurbishment regards, public grants are limited in their possibility of tackling current refurbishment needs. The possibilities of using financial sources from the commercial sector are increasing however, both in the old and new Member States.

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Summary

This report, part of the IEE project InoFin¹, gives a comprehensive review of experiences with financing refurbishment in the social housing sector in Denmark, Germany, the Netherlands, Bulgaria, Czech Republic, Latvia, Poland and Slovakia. The basic objective of the project is to design innovative financing schemes for financing social housing refurbishment. This is combined with ‘knowledge exchange’ between the ‘old’ EU Member States Denmark, Germany and the Netherlands and the ‘new’ EU Member States Bulgaria, Czech Republic, Latvia, Poland and Slovakia.

Previous European projects such as LOCOSOC and FRAMES, analysing the housing situation in the new EU Member States, found out that large differences exist in the way housing ownership and involvement of national and local governments developed during the economic transition after 1989. One common feature found in these studies is the lack of financial resources, both with governments as with occupants, to finance refurbishment of the housing stock. These refurbishments are needed to improve the quality of living in general but also to improve the energy performance of the building stock in specific. Therefore, the InoFin project aims at overcoming the financial barriers by developing innovative financing schemes in cooperation with governments and public and private financing institutions.

This report contains an overview of the main findings of eight national reports analysing the situation in social housing refurbishment in each of the InoFin countries. The national reports were drafted according to a common survey that included facts about the housing stock, the regulatory and institutional framework, financing of housing refurbishment by the public and private sector including specific refurbishment projects. The report concludes with a set of recommendations, based on identified drivers and barriers to housing refurbishment.

Facts of the (social) housing stock

The review shows that old EU Member States like Denmark, Germany and the Netherlands have a relatively large and well-defined social housing sector. Although not always defined by law (e.g. Netherlands), it is relatively easy to divide the social housing sector from the owner occupied sector. In all three countries, housing cooperatives are the main (in the Netherlands the only) owner of social housing. In the new EU Member States (Czech Republic, Slovakia, Poland, Latvia and Bulgaria) however, a specific social housing sector cannot be easily defined. This is due to the rapidly changing ownership structure during the economic transition in the nineties.

Due to these different kinds of ownership structures, the target group for social housing refurbishment cannot be easily defined. Rental dwellings, and especially those occupied by weak social groups, form a very limited share of the housing stock and one cannot say that only this selected category encompasses the social housing stock. Generally, the prefabricated housing blocks in the new Member States (built after WW II) are those that are in the largest need of refurbishment.

Because of these different kinds of ownership structures it was necessary to create a broader definition of social housing within the InoFin project. Social housing has therefore been defined as “*accommodation for lower income groups including recently privatised housing stock as well as accommodation for vulnerable social groups*”. This definition covers the broad sector of housing that can be specified as ‘social’ in all the countries participating in InoFin.

¹ For more information about the project objectives see also the project website: <http://www.join-inofin.eu/>.

Energy performance

A comparison has been made of the energy performance of the housing stock. Countries like Denmark, Germany and the Netherlands have significantly reduced the energy performance of new buildings during the second part of the twentieth century. The energy performance of the dwellings in the new Member States lags behind and is in most cases at least twice as high. Especially the housing blocks built between 1960 and 1990 have very high-energy intensities meaning that the quality of these dwellings, at least from an energy efficiency viewpoint, is very low.

Due to rapidly increasing energy costs during the last decade, combined with the poor energy performance of the existing building stock, energy costs of households have increased leading to unbearable energy costs among parts of the population. Energy costs as percentage of the household budget in the new Member States are significantly higher than in the old Member States and vary between 10-16%. Energy costs for vulnerable social groups can be far higher, however, especially during winter months. E.g. in Bulgaria a large number of households cannot afford to pay their energy bill and therefore a large number of dwellings are not normally heated. Estimates show that this concerns as much as 40% of households.

The housing regulatory framework

In Denmark, Germany and the Netherlands a separate social housing sector is covered in the regulatory framework. All three countries have introduced acts and decrees regulating the rent of social dwellings and have also rental subsidies in place for low-income groups.

The situation in the five new Member States is less organised, partly due to dramatically changing ownership structures after the economic transition. A regulatory framework for (social) housing has been developed in recent years in many new Member States. Examples are rental laws declaring the relationship between tenants and owners and maximum rent increases for special housing. The problem is that in many cases, housing and rental laws are still outdated leading to problems like:

- Insufficient rental income in rental dwellings for regular maintenance, because allowed rent increases in (part) of rental housing remains strictly regulated.
- Insufficient decision-making procedures in flats occupied by homeowners as there is usually the condition that 75% or even 100% of homeowners should agree on any planned refurbishment.

Housing ownership structures

In Denmark, Germany and the Netherlands, housing cooperatives and municipalities own the complete social housing stock. In the Netherlands, housing cooperatives are practically the only owners, in Denmark and Germany, both municipalities and housing cooperatives own social housing.

The housing ownership structure in the new Member States is heavily influenced by the housing stock privatisation in the nineties. Municipalities became the owners of the formal state-owned housing stock in the early nineties and as they did often not have the capacity or the financial means to take care of this building stock, the major share of this building stock has been privatised. This means that they have been sold to the occupants at relatively attractive prices.

What part of the housing stock has been transferred to private ownership differs per country:

- In Poland, the Czech Republic and Slovakia housing cooperatives exist owning a substantial part of the housing stock, 29%, 17% and 12% respectively. Housing cooperatives in these countries have, however, a different status and form practically homeowner associations with shared ownership of the common parts of multifamily buildings.

- In the Czech Republic, municipalities also own still about 17% of the housing stock, in Poland this percentage is about 12%. In Slovakia and Bulgaria this is a very limited percentage (below 5%).
- In Latvia, municipalities own more than half of the housing stock, which is the far highest percentage in the region.
- In Bulgaria, 97% of all dwellings is privately owned (almost all municipal dwellings have been privatised).

The fact that the greater part of the housing stock in multifamily dwellings is in private hands creates an additional barrier when planning any housing refurbishment. Plans for refurbishment have to be agreed by a large majority of the owners and often require an organised approach. In countries where homeowner associations have been formed², decision-making procedures are often easier, but not every association can act as a legal entity representing the owners in e.g. applying for a loan.

Financial support for housing refurbishment

During the last five to ten years, some kind of financial support has been set up for refurbishment of the current housing stock in the new Member States. Different types of support can be distinguished:

- Grants - usually introduced to promote new technologies with relatively high purchase prices that prevent their massive introduction. Although grants can be effective in promoting certain technologies, there remains a risk of free-rider effects.
- Soft loans - The provision of loans with lower interest rates than commercial loans helps to overcome the financial barrier for larger investments that are on the brink of feasibility with a commercial loan. Soft loans are applied in the former East Germany under the KfW programme and have been introduced in new Member States like the Czech Republic also.
- Credit guarantees - Provided by a large institution (e.g. government agency) to reach lower interest rates at banks that still see relatively small-scale housing projects as a risky activity. This is a good option when access to capital is major barrier and not the economic feasibility of the project.

There are a number of general differences between housing refurbishment projects undertaken in Denmark, Netherlands and Germany on one hand and the new Member States on the other:

- The role of housing cooperatives is leading in Denmark, the Netherlands and Germany, in the new Member States much of the programmes are aimed at single households (with the Czech Republic as exception where programmes are often aimed at housing cooperatives).
- Refurbishments in the new Member States are mainly aimed at the technical infrastructure, improving buildings in bad technical state. Programmes in the Netherlands and Germany look at refurbishment of whole city quarters, improving the liveability of quarters.

Although some kind of financial support is available in the new Member States, the financial means available are small in comparison to the housing stock that needs refurbishment. Therefore, private sector initiatives will be necessary.

Barriers and drivers to housing refurbishment:

Major barriers to accelerated housing refurbishments are generally related to financing, ownership structures and awareness:

- Lack of suitable financial mechanisms - Given the enormous amount of houses that need to be refurbished, the available public financial sources and programmes are limited.

² In some countries such as the Czech Republic and Slovakia, homeowner associations have own financial means available, saved from contributions of the homeowners.

- Conditions for access to capital (e.g. mortgages) remain relatively restricted and a large part of the population does not qualify for loans. Furthermore, an important psychological barrier is that people are not yet used to take loans.
- Transfer of ownership and resulting problems with decision-making about refurbishment - The privatisation of the housing stock in the new Member States leads to complex decision-making processes among the new home-owners.
- Lack of awareness among residents towards new energy efficient technologies and the experience with starting a refurbishment project. This remains a serious barrier as little to no information is available from independent agencies.

The main drivers for housing refurbishment are related to:

- Rapidly increasing prices of the main energy carriers making housing refurbishment projects more economically feasible.
- The aging and deteriorating housing stock increases the need for refurbishment. Extending the lifetime of the existing housing stock represents a far cheaper option than demolishing this old building stock and building new houses.
- Housing refurbishment and increasing the energy performance will make the housing stock more attractive; possibility to increase rent of rental housing and increase of real estate value of owner-occupied dwellings.

Recommendations

Recommendations to accelerating social housing refurbishments in the new Member States are related to strengthening institutional structures, coordinating grant programmes, facilitate access to private financing and providing independent advice to residents.

Due to the high share of private ownership in the new Member States it is necessary to oblige homeowners to form homeowner associations. These homeowner associations should receive a legal status, so that they may represent homeowners when undertaking refurbishments.

A large number of refurbishment projects are cost-effective in the long-term as they lead to decreased energy costs and improving indoor comfort, finally increasing the value of real estate. Therefore homeowner associations and housing cooperatives should have the possibility to apply for loans at acceptable conditions. These loans should be offered against certain (preferable) conditions, e.g. small-sized loans should be offered against acceptable interest rates and for a relatively long duration period (ten years and more). Therefore, external organisation (government or foreign housing cooperative) could provide guarantees for loans so that lower interest rates can be agreed with financial institutions.

Grant programmes in both old and new Member States are dependent on limited government budgets. Therefore, they should be focused on limited types of projects instead of providing generic support. Examples are:

- Use of grant schemes for complete refurbishments or for combinations of technologies or for new less conventional technologies that are less accessible due to their high purchase price.
- Use grant support for project preparation. Preparation of refurbishment projects usually means a lot of work and not all residents are able to prepare a well-prepared refurbishment project for their dwelling. Providing grants for energy audits or project preparation activities could greatly overcome the knowledge barrier among residents.
- Design grant or soft loan programmes specifically aimed at weaker social groups. These groups have often little financial possibility to finance refurbishment and are also heavily affected by increasing energy prices.

As there have been both good as less good examples of housing refurbishment projects it is of major importance to disseminate these project examples. Lessons learned from both more and

less successful projects should be disseminated in order to avoid making mistakes in the future. This can lead to increased awareness among residents in non-refurbished dwellings so that they become aware of the technical and financial possibilities of housing refurbishment.

1. Introduction

This report, part of the IEE project InoFin³, gives a comprehensive review of experiences with financing refurbishment in the social housing sector in Denmark, Germany, the Netherlands, Bulgaria, Czech Republic, Latvia, Poland and Slovakia. The basic objective of the project is to transfer ideas about financing social housing refurbishment from the 'old' EU Member States Denmark, Germany and the Netherlands to the 'new' EU Member States and Candidate Countries Bulgaria, Czech Republic, Latvia, Poland and Slovakia. All three old Member States have a well-defined social housing sector and of these countries Germany has gained experience with refurbishment of housing blocks build during the communist times in East Germany. Therefore, this report will specifically look at the situation in the new German 'Bundesland' of Brandenburg.

The InoFin project builds upon the work of the recently terminated projects LOCOSOC and FRAMES, analysing the situation of housing refurbishment in both Western and Central Europe. These projects found out that large differences exist in the way housing ownership and involvement of national and local governments developed during the economic transition after 1989. One common feature of the housing stock is clear, however, and that is the lack of financial means, both with governments as with occupants to finance refurbishment of the housing stock. Refurbishments are needed to improve the quality of living in general but also improve the energy performance of the building stock in specific. Therefore, the InoFin project aims at overcoming the financial barriers by developing innovative financing schemes in cooperation with governments and public and private financing institutions.

This report forms the final report of Work Package 2 of the InoFin project. The purpose of this work package was to identify the essential factors for success and barriers to successful implementation of financing schemes for the refurbishment of social housing. The outcomes are based on a common survey undertaken in the participating countries of INOFIN, Denmark, Germany (mainly Brandenburg), the Netherlands, the Czech Republic, Slovakia, Poland, Latvia and Bulgaria.

1.1 The INOFIN survey

This report contains an overview of the main findings of eight national reports analysing the situation in social housing refurbishment in each of the InoFin countries. The national reports were drafted according to a common survey that included the following elements:

- Facts about the (social) housing stock, including dwelling characteristics and ownership, financial situation of the tenants.
- Regulatory framework for (social) housing including the implementation of the EPBD in national legislation and regulations.
- Institutional framework, such as the organizations involved in housing policy incl. housing cooperatives.
- Financial framework, overview of government support and subsidy and grant programmes
- Private sector initiatives in housing refurbishment, what kind of organisations are involved in (financing) housing refurbishments.
- Description of specific projects.
- Identification of drivers and barriers to increasing energy efficiency through new financing schemes.

³ For more information about the project see also the project website: <http://www.join-inofin.eu/>.

This report will first review/summarise the current situation in social housing in the eight countries based on the survey above. Then a cross-country comparison will be made, focusing mainly on the financial framework of social housing refurbishment and the identification of drivers and barriers to increasing energy efficiency through new financing schemes for refurbishment.

The report will conclude with lessons learned resulting in suggestions for further improvements to avoid repetition of the failures, as well as in transfer to and application of this knowledge in countries and regions other than included in the InoFin project.

1.2 Social housing

Within the InoFin project, *social housing concerns the provision of good quality accommodation for lower income groups including recently privatised housing stock as well as accommodation for vulnerable social groups*. This is a relatively broad definition of social housing, giving the fact that each country defines social housing slightly different.

For countries with social housing cooperatives, such as Denmark or the Netherlands, social housing can be relatively well defined. Especially in the new EU Member States however, a specific social housing sector cannot be easily defined.

2. Country reviews

This chapter summarizes all eight country reports by providing the main features of the social housing sector in each of the InoFin countries. This includes basic data about the (social) housing stock and its energy performance data, the housing regulatory framework, description of its main institutions and the financial framework, including both public and private grant and loan programmes.

2.1 Denmark

The number of dwellings in social housings in Denmark is approximately 522,000 out of a total of 2,444,000 dwellings nationwide. The social housing stock consists of apartment blocks and of terraced semi-detached houses, owned and administered by approximately 8,000 housing departments that are economic independent entities. The departments are organised in social housing cooperatives of which approximately 700 exist in Denmark. The majority of social housing cooperatives are members of the Federation of Non-Profit Housing Associations in Denmark. The purpose of the federation is to attend the interest of the social housing cooperatives, the social housing departments and not least the tenants in social housing dwellings.

Social housing in Denmark is here defined as: “*rental accommodations that have received state support for either establishment or renovation or is owned by a municipality*”. Most of these are owned by a not-for-profit housing cooperative (mission: common social benefit). The state investment subsidy defines that special laws and regulations that influence rental rate and residential democracy regulate the dwellings.

Changing the Ownership Structure

From the 1st July 2004 a new law was given a two-year trial period. The law supports an experiment with sale of single-family social housing. The trial period running from 1st January 2005 to 31st December 2007 was initiated to give the tenants the option to choose between renting or owning their dwellings, the idea was to ensure a more diverse housing sector in areas primarily represented by social housing.

By 21st December 2005, a permanent agreement was approved, allowing sale of single-family social housing to minimise negative social ghettos in problematic social housing areas. For both above-mentioned type of sale, the Ministry of Social Affairs needs to approve the sale. However, at this stage the intention of privatisation has not been successful, as only a marginal number of tenants have bought their dwellings.

Apartment dwelling characteristics

The average floor space topped in the 1970s at a level of a little more than 81 m². The energy demand per m² has been lowered significantly during the last century, decreasing from more than 160 kWh/m² per year for houses constructed before 1945 to around 65 kWh/m² for houses constructed after 1990⁴.

Type of heating

In Denmark the majority of dwellings (80%) are supplied by district heating. Close to 90% of the district heating for the social housing sector is produced in CHP plants. Municipal solid waste and biomass cover approx. 36% of the heat demand covered by district heating systems. Natural gas, fuel oil and coal cover the rest of the heating sources.

⁴ Including heating, ventilation and domestic hot water (Danish Building Code, 2006).

Energy costs for households

Energy including electricity accounts for 7.5% weight in the EU harmonised consumer price index (HICP). Heating alone accounts for 4.4%. The average monthly cost of electricity and heating in rented flats was 150 €/month in 2002, which is the newest number available.⁵

2.1.1 Regulatory framework

The Ministry of Social Affairs is the main administrative body of the Danish social housing sector. Rent legislation includes the '*Act relative to the Rent*'⁶, and the '*Act on the Rent of Social Dwellings*'⁷. In particular; these acts contain the rules regulating relations between tenant and landlord. Special examples including rules on rent determination and rent adjustment, maintenance, improvement, termination and cancellation are provided in these acts. The '*Act on Social Dwellings*'⁸ determines the overall regulatory framework of social dwellings in Denmark.

The '*Act on the Rent of Social Dwellings*' stipulates who and how adjustment and regulation of the rent can be made. There are no direct limits to the amount the rent can increase within a year but if the rent is increased by more than 1% per year, a municipal authority approval is needed. According to the Act, refurbishment costs can be calculated into the rent increase but the same rule as described above applies. The Act applies to the following types of social dwellings:

- Social dwellings belonging to social housing cooperatives,
- Social dwellings for the elderly belonging to municipal or county authorities,
- Social dwellings belonging to independent organisations

Individual housing subsidies exist with the objective to allow families with lower income - especially families with children and senior citizens - to obtain and keep an adequate dwelling. There are rules on how to be eligible to the housing subsidy, as the tenants need to be a legal resident of Denmark and to have a permanent domicile.

Law on Energy Savings in Buildings

To support energy saving measures and increase the efficiency of energy consumption in buildings the '*Law on energy savings in buildings*'⁹ has been adopted. The law does not directly target social housing but applies to all housing in Denmark and includes:

- Energy Labelling (since 1996).
- Renovation exceeding 25% of building envelop or exceeding 25% of building costs must apply to stricter building regulation.
- Heat costs to be set by the Danish Energy Regulatory Authority.
- Until 2002 subsidies were available for energy efficient heating systems.

Energy Labelling and Energy Certificate

The energy labelling of buildings in Denmark was developed in the context of a long history of energy saving policy initiatives. Energy labelling was and still is seen as an important way to achieve energy savings in buildings - both existing and new - since the potential for energy savings in the residential built environment is considered to be quite large.

⁵ Danish Statistics: Statistical yearbook 2005.

⁶ '*Act relative to the Rent*', LBK no. 920 of 10/09/2004 (Valid).

⁷ '*Act on the Rent of Social Dwellings*', LBK no 921 of 10/09/2004 (Valid).

⁸ '*Act on Social Dwellings*' LBK no. 610 of 21/06/05.

⁹ '*Law on energy savings in buildings*' Law no. 585 of 24/06/2005 (Valid).

Denmark has implemented two energy labelling schemes for buildings:

- Energy management in large buildings (the ELO Scheme) for buildings >1,500 m².
- Energy management in small buildings (the EM Scheme), concerning one-family houses, apartments and other residential buildings <1,500 m².

These schemes came into force by Danish legislation in 1996 and have recently been revised in relation to implementation of the EU Building Directive - EPBD. Since Denmark has already an energy-labelling scheme in place for buildings, only minor adjustments were needed to suffice EPBD standards.

2.1.2 Institutional framework

The social housing stock in Denmark includes two types of housing:

- Social housing for families - constructed and administered by social housing cooperatives.
- Social housing for the elderly - constructed and administered by municipalities or independent institutions. Only municipalities own this type of social housing.

Actors in the Social Housing Sector in Denmark

The social housing sector is managed by social housing cooperatives. At present, 700 of these social housing cooperatives exist in Denmark and their role is to construct, rent out, administer, maintain and modernise buildings and connected common areas.

Tenants and the social building departments are the actors that can influence the implementation of energy efficient measures. The municipalities have little to no influence in this process. Technical changes and purchase of equipment will often only be approved after a collective process in which the social housing departments display their interests and approval. The democracy of the tenants (the local social housing department) is a characteristic of the social housing sector in Denmark; it ensures that the tenants have full influence of the operation of their social housing departments.

2.1.3 Financial framework

Through the years, social housing in Denmark has been financed in a number of ways and with differentiations in the division between the state, municipality and tenants. However, a common characteristic was that municipal authority has partly provided a direct contribution and partly contributed by covering the debt servicing on the granted loan on behalf of the state. On top of this, financing of social housing area was made more complex by different support and financing opportunities depending on the specific social housing type¹⁰.

Within the last years, financing of the different social housing types is unified. In details, the following is valid from 15 June 2001 until 1 January 2007:

- Original capital covers 7% of the initial costs (covered by municipality or commune).
- The tenants (department) contribution covers 2% of the capital.
- 91% is covered by loan or by mortgage on real property, the state is then covering the debt servicing on the granted loan.

Resources for Construction and Refurbishment in the Social Housing Sector in Denmark are generated through the *National Building Fund*. The National Building Fund is an independent institution, with the objective to promote the self-financing of social housing. The revenues of the National Building Fund are generated by payments from the social housing cooperatives, independent institutions, local authorities and municipal authorities. The Minister for Social Affairs can approve that the Fund obtain a government loan to cover the funds expenses.

¹⁰ <http://www.social.dk/>- 10.04.06.

The initiative for renovation or refurbishment of existing social housing often comes from the social housing committees or from individual tenants within the social housing department. In most of the social dwellings, the tenants have appointed members to a local social housing committee of their dwelling to watch over their interests. If rent increase due to renovation/refurbishment is more than 15%, an election for all tenants is required and the majority has to agree.

Approval from municipal authority is needed for building regulations, economic conditions, grants and loans.

Private sector initiatives

In Denmark, there is very limited experience with private sector engagement in energy saving activities, including the social housing sector. Thus - at this stage - there are no examples of ESCO arrangement or similar concepts for undertaking of energy saving measures within social housing.

However, there are two types of developments that could change the situation. The Government sees in its Energy Action Plan the possibility for private actors to engage in energy services (related to the new EU Directive on Energy Services). The market actors themselves drive second type of development. E.g. the Danish Confederation of Industry is currently active with promoting the ESCO concept and recently held a conference on this topic.

Due to the immature present stage it is too early to say at what time the activation of such type of private sector involvement would become an integrated element in financing and operating energy retrofitting of social housing.

2.2 The Netherlands

In the Netherlands a significant part of the housing stock is owned by social housing cooperatives providing housing to lower and middle-income households. Although not strictly defined, one can say that social housing in the Netherlands is the housing stock owned by social housing cooperatives. Of the total number of dwellings of 6.8 million, about 2.36 million are part of the social housing stock. This social housing stock can further be divided into apartments (1,129,000) and single-family houses (1,233,000)¹¹.

Because of a large natural gas reserves in the Netherlands, around 99% of dwellings are heated by natural gas. District heating has a less significant share in space heating in the Netherlands, although it is regaining attention due to its environmental benefits. Individual central heating systems are used in the majority of dwellings. The penetration of individual central heating systems has increased to 82%, decreasing the share of single heaters and heating systems per housing block. Cooling systems are not commonly used in the Netherlands yet. In 2001 mobile cooling units were available in 1.5% of the dwellings in the Netherlands. The energy use in apartments has gradually decreased during the past decades. Apartments build up to the fifties have energy consumption well over 90 kWh/m² year, nowadays decreased to below 60 kWh/m² year¹².

¹¹ For a more detailed overview of financing of energy savings in the Dutch social housing sector, see the report by Ten Donkelaar *et al* (2006).

¹² These data only concern apartments, not single-family houses.

2.2.1 Regulatory framework

Housing in the Netherlands is strictly regulated within a number of acts and decrees. The main acts/decrees related to housing in general and social housing in particular are:

- *The Civil Code (Burgerlijk wetboek)*, in which basic rights and obligations for house-owners and tenants are formulated.
- *The Housing Act (Woningwet)*, includes all aspects of building and housing such as building and demolition prescriptions, building permits, government supervision and minimum standards of dwellings. The act obliges municipalities to set up specific regulations for building and refurbishment. Under the Housing Act, so-called permitted organisations are appointed to build social houses (housing cooperatives).
- *The Act on Rental Prices of Habitation (Uitvoeringswet Huurprijzen Woonruimte)*, which regulates in detail the maximum rent price for all habitation. On the basis of all sorts of objective criteria, House Assessment Points (*Woonwaardpunten*) can be awarded to dwellings. If the house-owner and tenant disagree on the rental price, a special Rental Commission determines the maximum rental price on the basis of awarded House Assessment Points. With refurbishment the amount of House Assessment Points and the rents can be increased. The act obliges the minister of housing to determine a maximum rent increase for a given year. This percentage is derived from inflation-indexes and is only applicable to rents up to a certain threshold (under € 604 per month in 2006).
- The *Decree on social housing maintenance (Besluit Beheer Sociale Huursector)* regulates the obligations and responsibilities of social housing cooperatives in detail. It elaborates the rules set in the housing act for ‘permitted organisations’.
- The *Rent Bonus Act (Huurtoeslagwet)* regulates subsidies that low-income tenants receive for renting. If tenants are eligible for a rent bonus the amount of the bonus depends on:
 - The income and resources of the tenants.
 - The rental price of the dwelling.Rent-bonuses can only be granted if the rent of a dwelling doesn't exceed the yearly set maximum for social housing (€ 604 per month in 2006).

From a technical and energy performance perspective new houses as well as refurbishments are covered within the *Building Code (Bouwbesluit)*, which is derived from the housing act, contains some specific rules on energy saving within new-to-build dwellings. Minimal standards are formulated for insulation quality of walls, floors, ceilings, doors and windows. Next to this standards for specific parts the Energy Performance Standard (EPN) regulates the energy use of entire buildings. The standard says, to obtain a construction permit, the energy-use of a dwelling may not exceed a certain coefficient (EPC)¹³. This coefficient must be calculated in a prescribed way. The energy standard for residential buildings does only apply to new-to-build houses or when a house is (almost) completely renovated in a refurbishment project. There are no specific energy performance standards for social housing in the Netherlands, other than the standards valid for all houses.

Implementation of the EPBD

Most of the articles contained in the EPBD have been already implemented in the Netherlands. The compliance with Article 6 (energy performance requirements for new buildings) is legislatively guaranteed by means of the Building Code. No binding requirements apply for existing buildings yet, only if they are drastically renovated. Articles 7 and 9 have not yet been implemented. Article 8a) has been partly implemented, concerning the periodical inspection and maintenance regime of boilers with installed capacity higher than 100 kW. This requirement has already been included in the Law on Environmental Protection.

¹³ The EPN (Energy Performance Standard) for new buildings has been implemented in 1995. The calculation issues an Energy Performance Coefficient (EPC) which requires a certain theoretical energy performance. For houses, the EPC has been sharpened from the original value of 1.4 in 1995 to 1.2 in 1998, further to 1.0 in 2002 and since the 1st of January 2006 to 0.8. An EPC of 1.0 means an overall annual consumption of around 1000 m³ of natural gas equivalent per dwelling (for space and hot water heating and cooking).

The EPBD instruments require still certain adjustments into the Housing Law, the Law on Environmental Protection and the Building Code. The intention is that the certification duty shall be embedded in the law (by means of a complete modification of Dutch building law) in January 2007.

Heat cost regulation

Since the 1980s an informal heat cost regulation system is in use. At the time the public energy suppliers decided to base heat cost rates on the total costs a comparable household would make for heating with an individual central heating system on natural gas. This Not More Than Usual (NMDA) principle is normative for most district heating in the Netherlands which are maintained by energy companies. Nowadays energy suppliers are being criticized for suspected misuse of the principle. Energy-suppliers are blamed to calculate NMDA in a non-transparent and incorrect way to raise profits.

To protect heat consumers, the Dutch parliament is discussing an act to regulate heat costs. This Heat Act will have to regulate heat costs in two ways. Instead of deriving district heating costs from individual heating systems, they must be based on real costs made by the energy-supplier raised by a reasonable profit. Despite these cost-based rates the total heat costs for household will be limited to the level of costs for individual heating systems. Therefore, the act formalises the NMDA principle in a transparent way fixing the maximum heat costs.

2.2.2 Institutional framework

Housing cooperatives own nearly the whole social housing stock in the Netherlands, making them practically the only provider of social housing. Due to their large autonomy, housing cooperatives can decide to invest in energy reduction measures, on a small or a large scale, without the approval of any public authority. These public authorities have no means to force cooperatives to make these investments.

Housing refurbishments are regulated based on whether it concerns small, large and district-scale refurbishments. Small changes within dwellings or small expansions can be made without a building permit. For larger scale house refurbishments a building permit is compulsory. In general, both municipalities and cooperatives are involved in town/city quarter-scale refurbishments. In the latter case often (commercial) real estate developers are involved. Usually, most of the costs are covered by the developer and/or cooperative. It is quiet common that refurbishment is combined with new dwelling construction, especially when commercial developers are involved. The sale of these new houses provides the financial means necessary for refurbishment. At the same time it helps to attract higher income people into low-class neighbourhoods. So housing refurbishments often have a broader objective, not only improving the technical and energy efficiency standard of existing dwelling or housing blocks but improving whole neighbourhoods and city quarters leading to a diversification of the ownership structure.

Today housing cooperatives in the Netherlands have relatively large financial means available for refurbishment and construction of new social housing. Currently, housing cooperatives generate their resources mainly by investments on the capital market, from rents and by selling part of the housing stock (the value of which has increased considerably during the last decade). Housing cooperatives of today are capital-intensive enterprises. To a great extent, they finance their investments in real estates by loans from the capital market. Many housing cooperatives have an ambitious program for building new houses and substantial parts of the property will be restructured and investments will be done in the maintenance of old city quarters.

To easily gain credit from banks, the Dutch Guarantee Fund for Social Housing (*Waarborgfonds Sociale Woningbouw - WSW*) acts as guarantor for investments of housing coopera-

tives in the construction and maintenance of their building stock. The Dutch Municipality Bank (BNG) is one of the main financiers of the housing cooperatives. Granting of credits and loans at the BNG is rapidly increasing. Especially the number and size of long-term loans have been increased. The bank has a leading position in financing of projects of housing cooperatives.

The system of House Assessment Points, included in the Act on Rental Prices of Habitation, that determines the rents of social housing in the Netherlands is linked to a maximum rent for a certain category of social rental houses. Energy saving measures are only included in a dwelling to a certain extent. For example, insulation measures count for a certain number of points, but replacing one type of insulation by another (with a higher RC-value) does not mean extra House Assessment Points. These additional investments can therefore not be used to increase the rent and may refrain housing cooperatives from making such an investment.

2.2.3 Financial framework

Energy conservation became an important issue in the Netherlands at the time of first and second oil crises in the seventies. Energy saving in the residential sector was one of the main issues in the policy plans and grant programmes that have been developed by then. Programmes developed during the seventies and eighties were:

- The *National Insulation Program* (NIP) ran from 1978 to 1987. Energy saving measures such as grants for insulation of existing dwellings or for condensing boilers were subsidised. In 1982, grants for owner occupied houses came to an end, whereas grants for rental houses continued. Within this programme, a total amount of 1.67 billion NLG¹⁴ has been spent. It is not completely clear how much of this money was spent on insulation. As result of the NIP in total 1,821,000 dwellings have been insulated with grants (and an additional 1.5 million dwellings without grants). The total accumulated natural gas savings are estimated at 9.9 billion m³, and a saving for every following year of 1.47 billion m³.
- The '*National Hunt for Cracks*'. By advertising on television, on radio, in newspapers and brochures, the government tried to motivate residents to tighten their dwellings from uncontrolled air leaks. This led to massive application of polyurethane foam in houses, but often led to worsening indoor climate conditions. The '*National Hunt for Cracks*' is an example of a campaign with an important negative effect on the indoor climate.

During the nineties a number of new programmes were introduced:

- Between 2000-2004, SenterNovem (the Dutch energy agency) ran the so-called *Energy Premium Scheme* (EPR). This instrument was intended for energy saving measures in existing buildings and connected to the EPA (*Energy Performance Advice*). Within this programme, an independent EPA advisor carried out an inspection, evaluated the energy performance of the building and issued an Energy Index. Moreover, the EPA advisor defined a package of energy saving measures, which can be applied in the house. If, afterwards, any advised measure is carried out, it should be eligible for a subsidy. The list of measures eligible for a subsidy has been reviewed each year. Only the best available technologies have been subsidised. The Dutch government put an end to the EPR in 2004, but the EPA still exists.
- The *EIA* (Energy Investment Deduction) and the *EINP* (Energy Investment Deduction for Non Profit Organisations) support(ed) investments in energy saving technologies in the service sector. Investments in the private sector have been supported by the EIA. Investments in the non-profit sector have been supported by the EINP. Housing cooperatives, usually non-profit organisations, have made use of the EINP programme, which ran from 1995 to 2002 only.
- Through the *TELI programme*, the government stimulates low-income households to implement energy saving measures. Low-income households often live in old, badly insulated

¹⁴ 1 NLG (Dutch guilder) = 0.4538 EUR.

dwellings. These households usually spend little money on insulation or on energy efficient appliances, while the savings from energy efficiency are very welcome. Grants from the TELI programme can be used for projects that inform, advice or help low income households with energy saving and energy efficiency. Grants amount maximally € 460,000 per project. In 2002 and 2003 there have been two tenders, granted to 17 projects. The TELI regulation has been evaluated in 2004. A third tender for the TELI programme has been issued in May 2006.

- Energy utilities have been involved in energy efficiency measures for Dutch households since the beginning of the nineties. In 1991 the energy industry together with the Ministry of Economic Affairs launched the *Environmental Action Plan* (MAP). The main focus of the MAP was on addressing the energy use of small-scale end-users through advisory services and subsidy schemes for energy conservation.
- *Green Funds Scheme* - For private house-owners or housing cooperatives wishing to build or reconstruct houses it is possible to receive a mortgage with a lower interest rate for a (newly constructed or refurbished) dwelling with a significantly higher energy performance than the existing EPC standard. Such a 'green mortgage' has been made possible under the Green Funds Scheme. The Green Funds Scheme is a government tax incentive instrument whereby private money is used for investment projects with environmental benefits, such as sustainable buildings. Investing in the Green Funds Scheme means that individual investors lend their own 'cheap' money to banks, at a lower interest rate. These banks then offer cheaper loans through 'green funding' of environmental projects. This encourages the implementation of innovative environmental projects with a lower return on investments than 'conventional' projects but, in this way, can still be realised. Investors receive a lower interest rate when investing their money in a green fund, but in return they receive a tax deduction on their interests.

2.2.4 Private sector initiatives

In the Netherlands, housing refurbishment is mainly undertaken by housing cooperatives themselves, sometimes with government support, sometimes only based on own funding. ESCOs, financing projects through realised energy savings, have a minor position in the Netherlands.

2.2.4.1 Housing cooperatives

Most housing cooperatives finance housing refurbishments themselves. The investments can be returned through increase of the rents but also by extending the lifetime of the housing stock, meaning revenues through the rents for an additional number of years. When housing cooperatives are financing refurbishment themselves, they have a number of possibilities of how to finance the refurbishment costs:

1. Conventional financing - Tenants will be completely/partly charged for the investment by means of the rent increase. Here the House Assessment Point System determines whether the refurbishment can be completely covered by the rent increase. Main problem with this system is that tenants see their rent increased directly, but the decrease of energy costs much later, as they pay a fixed amount each month (corrected once a year for actual consumption).
2. Energy accounts through the housing cooperative - A housing cooperative invests in refurbishment and at the same time agrees on a collective agreement with the energy supplier (negotiating lower rates than a single tenant could get). Tenants pay the energy bill to the cooperative. As a result, they will find their housing and energy costs on one bill, showing rent increase and energy costs decrease.
3. Energy supply company as the executive party - A housing cooperative selects an energy supply company to directly manage the energy supply on its premises. E.g. the energy supplier replaces a boiler in a housing block by a new one and the tenant leases/hires the boiler from the energy supplier. Through the new boiler energy costs are decreased and the energy

- supplier uses this amount of money to finance additional energy saving measures. This is a suitable construction when housing cooperative owns a collective (block) heating system.
4. Energy Performance Contract - investments and accompanying services regarding the realization and monitoring of energy saving measures are financed from the generated savings on energy consumption. The contract is closed among tenants, housing cooperative and an external party for a longer period (approximately ten years). The energy performance contract is mostly focused on (collective) energy supply with accompanying energy management/administration.
 5. Living Expenses Guarantee - housing cooperative gives tenants a guarantee that the total living expenses (consisting of the rent, maintenance and energy costs) during a certain period of time will not increase more than a common inflation rate. This removes the rent increase barriers for tenants.

Although most housing cooperatives chose a more conventional way of financing (e.g. option 1 or 2), examples do exist of refurbishments carried out together with energy supply companies. There is an example of a housing cooperative in the city of Tilburg that guaranteed that living expenses did not increase after refurbishment, which actually was the case.

2.2.4.2 Financing energy efficiency investments through the mortgage

An example of financing energy efficiency investments in new houses through the mortgage is realised through the so-called PPM-formula of Seinen Projectotwikkeling - a housing development company.

When people apply for a mortgage to buy a house, this mortgage is limited to a certain amount of money, depending on income of the person(s) who are applying for it. The limit of the mortgage is called the 'mortgage quotum'. The European Commission and the Dutch National Bank prohibit mortgages higher than the mortgage quotum.

The PPM-formula makes it possible to borrow an additional amount of money, on top of the mortgage quotum. This additional amount of money is also considered to be part of the mortgage with the same tax conditions as the rest of the mortgage. This additional amount of money, should however, be solely reserved for investments in energy efficiency and renewable energy measures. When doing so, the costs of living of the new house owner will decrease due to a decrease in energy costs. This fact makes a higher mortgage quotum possible, as long as the additional amount of money is spent on energy efficiency measures. At present, Seinen Projectotwikkeling, the company that has developed the scheme, in cooperation with the ABN-AMRO BANK, only applies this mechanism.

For refurbishments in rental dwellings, financing energy efficiency investments through the mortgage is not an option, as tenants have, of course, no mortgage. Here leasing constructions can be applied and a few examples do already exist in the Netherlands. When a housing cooperative undertakes a refurbishment they are limited in the rent increase, which limits the pay-back of the investment. When a leasing company offers the energy efficient equipment to the consumers separately, the limited rent increase is not an issue. The consumer pays a fixed price to the leasing company and in return will see its energy bill decreased. This scheme is also attractive for the housing cooperative, as it will have its apartments refurbished without having to take care of any investment.

2.2.5 International financing of housing refurbishment

In 2000, the 'Dutch International Guarantees for Housing' foundation (DIGH)¹⁵ has been founded. DIGH is a Dutch foundation that mediates in the financing of public housing projects

¹⁵ For more information see also <http://www.digh.nl/>.

in economies in transition (including CEE countries) and developing countries. DIGH was established by a number of persons from the Dutch public housing sector and has a permanent cooperative relationship with Aedes, the umbrella organisation of Dutch housing cooperatives.

Organizations in economies in transition are often not in the position to contract affordable loans for social housing projects, as we will see further in this report. (Commercial) banks consider the risk of defaulting on interest and repayment to be too high. Once there are creditworthy organizations who guarantee interest and repayments, banks are willing to grant affordable loans. A number of Dutch housing cooperatives and municipalities are willing to stand surety through DIGH. DIGH acts as an intermediary between these local organizations and guarantors. DIGH reviews the loan applications of local organizations and presents the outcome to potential guarantors. If a guarantor approves an application, DIGH will contract a bank to grant a loan with guaranteed interest and repayment commitments and transfer this loan to a local organization (DIGH loan). Therefore, DIGH could play a role in future housing refurbishment projects in the InoFin countries.

2.3 Germany

The section on Germany will partly include the situation of the country Germany and of the 'Land' *Brandenburg*. The reason is that every German state ('Land') has its own specific housing policy and support. Brandenburg is as a new state from the former East Germany a relevant example for InoFin.

2.3.1 The housing stock

There are about 37 million flats in Germany, 30% of this housing stock is more than 50 years old, and 11% were constructed in the last decade. The energy consumption of these buildings amounts to one third of the entire energy consumption in Germany. In 2002 there were 35.8 million occupied flats in Germany, 20.6 million flats were rented and 15.2 million occupied by their owners. The decline in population in the new federal states (former East-Germany) have resulted in vacancies over 1 million flats.

29.4% of flats in Germany have been built before 1948, about a half of the flats were built between 1949 and 1978, a good one fifth was built in 1979 and later. In the East the number of flats built before 1948 amounted to 45.8%, while in the West it constituted one fourth.

Heating

The predominant part of flats is equipped with a collective heating system. This includes district heating, block heating, central heating and heating systems covering one floor. The importance of single or multi-room stoves is still declining in Germany. Mainly gas and heating oil is used for heating purposes. In West Germany natural gas predominates now while in the past it was heating oil. In East Germany natural gas plays a minor role; therefore district heating is more significant, especially in the cities or for heating the industrial buildings from the time of the German Democratic Republic.

2.3.1.1 Housing stock in Brandenburg

Because the federal state of Brandenburg has only a few 'real' social housing flats at its disposal, the not-redeveloped stock of flats at fixed rents plays the role usually attributed to social housing.

The fuel used in Brandenburg reflects the heating systems installed. For stove heating the use of coal (above all brown coal briquette) is typical. Many flats with stove heating were modernised in former East-Germany times by installing off-peak electric or gas heaters. Especially in the

countryside wood is used as fuel beside coal. In the heating of larger buildings, natural gas prevails over fuel oil, due to the already existing infrastructure of gas supply in bigger towns and to the aggressive marketing of gas companies. Fuel oil is mainly being used in places, where natural gas is not being delivered.

The predominant share of flats supplied by district heating is noticeable, it has risen after 1949 and has been decreasing since 1991, amongst others due to the present backlog demand for single and two family houses, heated mainly by gas heating. The originally prevailing brown coal has been widely replaced by gas and oil. Brown coal, though, is being used in some of the new heating stations in the form of coal powder.

Flats built after 1949 usually were produced by an industrial prefabricated method of construction. In the federal state of Brandenburg a total of 194,400 industrially produced flats are located in 41 urban areas with over 2,200 flats each. Those areas comprise more than 50% of the housing stock built after 1949.

Priorities of modernization and repair

According to the BBU (Association of Housing Companies of Berlin-Brandenburg), building activities of housing companies in the federal state of Brandenburg are concentrated mainly on the modernization and repair of flats. In the years up to 1990, maintenance of the housing stock was severely neglected. Therefore a huge backlog in the demand for renovation measures has built up and the need for modernization is considerable.

The modernization and repair of these industrially constructed flats usually comprises the following measures:

- The renovation or replacement of roof sealing.
- Thermal insulation of exterior walls, the upper storey ceiling and the cellar ceiling.
- Installation of heat insulating and sound absorbing windows.
- Repair of balconies and loggias and installing new balustrades.
- The replacement of sanitary facilities such as bathrooms.
- The replacement of main electricity cables and of electricity meters.
- The conversion from single stove heating to collective heating systems with gas boilers or with a connection to district heating systems.
- The conversion or renovation of water heating as central or decentralized systems.

Buildings made from prefabricated slabs have, in addition to the renovation measures described above, to undergo renovation measures on a large scale to redevelop and seal the joints between the elements of the exterior walls, i.e. removing the weak points of the construction. Because the carrying out of all these measures together is more expensive than the simple renovation of joints, more and more housing companies start off as a first step by only sealing the joints and level them with the front. The renovation of the concrete is then to be carried out later, together with the thermal insulation, either as a combined system of thermal insulation or as an insulated front system aired from behind. Especially for buildings of the 70ties, which were built with concrete sandwich slabs, this is a good way to stretch the limited means available for renovation.

For flats built before 1948, modernisation is a priority due to their low level of equipment. Part of those measures is the installation of bathrooms, a collective heating system and an operative water heater as well as the increase of electricity installations and the installation of telecommunication connections. Also urgent are repair measures at the outer walls and roof and of the buildings' technical systems. Priorities of modernisation and repair are widely identical to the activities of housing companies in the federal states of West Germany operating housing stocks of the same age; their experience in modernisation and repair can thus be applied in East Germany. But because of the huge backlog in the execution of renovation measures, a much higher

expenditure is needed. The main emphasis of the modernisations and repair measures of the housing companies in the federal state of Brandenburg was placed on flats with prefabricated slabs.

2.3.2 Regulatory framework

The task of housing policy, as part of the social policy in Germany, is to provide, among other things, appropriate accommodation for disadvantaged or socially weaker groups of the population. With these groups in mind, two major tools that have been adopted by the housing policy include (1) Social housing and (2) Housing benefits.

The following federal laws and their executive ordinances form important legal foundations for housing support:

- the Second Housing Law
- the Fair Housing Act
- the Rent Regulation Law
- the Second Billing Regulation
- the New Housing Rent Regulation.

Including, in the state of Brandenburg:

- the Housing Support Provision, which acts as an administrative regulation.

2.3.2.1 Social housing

According to Article 1 of the Second Housing Law housing support is defined as a public task: “The Federal Government, Länder (the German regions), municipalities and municipal associations have to promote the building of housing as a priority task, giving special preference to the building of residence property where its size, equipment and rent or encumbrances make it suitable for broad sections of the population to whom it is destined (*social housing*). The goal of the housing support is to eliminate housing shortage and to provide a wide range of titles for a broad population.”

Social housing involves the construction of housing with the use of public funds and is intended for socially disadvantaged groups with respect to encumbrances, equipment and size. It is not identical to tax-privileged housing. In the case of the latter, property tax is waived for newly built residential units which do not exceed certain sizes and are not subsidized with public funds. Therefore, the state waives its tax entitlement and thus subsidises tax-privileged housing. Social housing, on the other hand, is subsidized *directly* from the state, the *Länder* and the municipal budget.

Federal grant funds for social housing are distributed among the federal states based on their population density. In 2003, they amounted to approx. €500 million for the old federal states (55 million inhabitants) whereas around € 405 million for the new federal states (15 million inhabitants). In the state of Brandenburg, this grant funding amounts to approximately 10% of total funding for housing refurbishment.

Social housing subsidies are intended in particular to aid those households in need of reasonably priced and affordable dwellings and would normally not be able to afford it. The subvention of dwellings (direct subsidy) can be categorized as efficient within the framework of social housing. However, over the last few years, the subsidy requirements in the area of social rental housing have drastically increased. Nowadays, the subsidy requirement approximates € 10 per square meter of living area per month, and in extreme cases is even as high as over € 20. This cost increase results in a decrease in the quantity of subsidized housing being build, and that despite the state’s increasingly greater efforts.

The *rent* charged for social housing units refers to a rent amount covering current expenditures (Fair Housing Act - Article 8). This rent refers to rent applicable by law for new residential buildings, as by the Fair Housing Act. According to the Second Billing Regulation, rent calculation is based on a profitability calculation. Accordingly, current expenditures are subdivided into cost of capital (outside capital and own capital) and administration costs (including amortization, operating costs, maintenance costs, and risk of rent loss).

2.3.2.2 Housing refurbishment

A fundamental part of the Climate Protection Programme of the Federal Government is the Energy Conservation Regulation together with the loan programmes run by the Kreditanstalt für Wiederaufbau (KfW - Reconstruction Loan Corporation) for building refurbishment aiming at reducing CO₂ emissions. The legal framework conditions for the refurbishment of buildings in Germany is summarised in Table 2.1.

Table 2.1 *Legal framework for housing refurbishment in Germany*

	Law on Conservation of Energy	Rental Law	
	Legal basis for energy savings in buildings and heat cost regulation	Rental Law is a constituent of the German Civil Code. The rent is limited by an official rent index	
	Energy Conservation Regulation	Heat cost regulation	
Energy related requirements	Minimal standards for heating systems, domestic hot water and heat insulation	Heat costs are allocated: <ul style="list-style-type: none"> • 50-70% on basis of consumption • 50-30% on basis of surface area 	With the purpose of the energy saving measures the lessor may increase the annual rent by 11% of the energy saving investment
Execution	Difference for each federal state	Through the tenant: they can reduce the energy bill by up to 15%, if there is no heat cost allocation	The rent indexes are published and regularly updated by communes
Problems	Kind of inspection has not been defined yet		The rent indexes do not include information on the energy quality of the building

2.3.2.3 EPBD Directive

To fully implement the EPBD Directive, the German Energy Agency (DENA) is preparing a nationwide unitary and voluntary energy certificate for buildings. The energy certificate impartially informs the consumer, shows the energy saving potential and makes it possible to compare the energy demand of houses within the whole of Germany. A considerable part is an appealing label. On the real estate market the energy certificate shall become an instrument for more transparency. Moreover, it is planned to issue certification for the software used by architects and engineers for the estimation of the energy demand of buildings.

2.3.3 Financial framework

There are a number of *conventional loan programmes* in Germany that support only the modernisation of single parts of the buildings. This includes support of fixing new windows or new heating installations.

Innovative programmes do treat a building as a system of heating and thermal insulation. In such programmes the support depends either on the decrease of the energy demand, which is to be proved (*delta procedure*) or on the achievement of a defined energy demand level (*target*

procedure). The target procedure can be linked to the additional requirements on heat conservation in order to outrange the minimum requirements of the Energy Conservation Regulation.

2.3.3.1 Experience from German loan programmes¹⁶

CO₂ Reduction Programme of the KfW/Kreditanstalt für Wiederaufbau (Reconstruction Loan Corporation)

The CO₂ reduction programme, run by the KfW since 1996, supports mainly single measures within the old buildings stock. No higher insulating material thickness (Rc-value) as that required in the Heat Insulation Regulation in force will be required for respective construction elements. Additional energy savings will be introduced through the implementation of heat insulation measures which elsewhere did not take place. This applies to the insulation of the basement ceiling, the first floor ceiling, and in the case of plaster renovation - the insulation of the outer wall. According to the new Energy Conservation Regulation in some of the last-mentioned cases, heat insulation measures had to be undertaken anyhow; basement ceiling insulation, however, plays a marginal role in the KfW programmes.

The CO₂ Building Refurbishment Programme of the KfW

The Building Refurbishment Programme run by the KfW since 2001 supports the implementation of measure packages which are focused on a comprehensive refurbishment of buildings built before 1978, on a replacement of old heating installations and the construction of 'KfW supported energy saving houses 40', incl. passive houses. To comply with the support conditions there is a possibility to implement either the prescribed measure packages (see Table 2.2) with at least three individual measures or to prove a CO₂ reduction of 40 kg/m² floor space and per annum. In the first case the renovation of the heating installation and the minimum insulation measures that are on a higher level than prescribed in the legal provisions have to be implemented. In the case of CO₂ reduction the legal minimum requirements related to the heat insulation are obligatory.

Table 2.2 *Examples of measure packages in the KfW Programme*

Measure package 0	Measure package 1	Measure package 2	Measure package 3
Thermal insulation of outer walls	Renovation of heating system	Renovation of heating system	Renovation of heating system
Thermal insulation of the roof	Thermal insulation of the roof	Thermal insulation of the roof	Conversion of the heating energy source material
Thermal insulation of the basement ceiling/earth adjoining outer walls of heated rooms	Thermal insulation of outer walls	Thermal insulation of the basement ceiling/earth adjoining outer walls of heated rooms	Renovation of windows
Renovation of windows		Renovation of windows	

To prove compliance with the support conditions it is possible to implement one of the measure packages or to prove an annual CO₂ reduction of at least 40 kg/m² floor space within the additional *measure package 4*, the measures of which may be freely configured. Measure package 1 requires the modernization of the heating installation and the thermal insulation on an advanced level as it is legally prescribed. Should the measure package 4 be chosen, the minimum heat insulation must be additionally verified. Therefore for this model it is characteristic that there are no fixed requirements, but a result criterion obliges in the CO₂ reduction compared with the state of affairs from the period before modernization.

Hamburg Programme 'Heat Insulation in Apartment Houses'

The already finished Hamburger programme 'Heat Insulation in Apartment Houses' combined the prescription of target values for the final (refurbished) state and the energy savings. In this

¹⁶ Analysed by the Institut für Wohnen und Umwelt in Darmstadt (Institute for Housing and Environment) level.

case the allocation of grants was directly linked to the area-related heating energy demand. This heating energy demand was calculated on the basis of the procedures of the Heat Insulation Regulation. The amount of the grant complied on the one hand with the percentage of saving compared with the initial state and on the other hand with the absolute maximum of the heating energy demand in the final (target) state.

The specific feature of this concept consists of the fact that on the one hand one energy indicator has been used as a main standard for the subsidy level and on the other hand an additional minimum requirement for the singular construction elements has been introduced - the one related to the thermal transfer. On the basis of the special significance of the long-term heat insulation measures such a procedure seems to be very appealing.

Effectiveness of the Approaches

An accurate point of time for maintenance measures is often not provided because the construction elements that are already in a bad condition can still fulfil their functions for some time. Grants for specific measures like i.e. the CO₂ reduction programme can lead to an earlier implementation of the renovation measures. It is, however, difficult to say to what extent the scale of refurbishment within the old housing stock has increased as a result of the respective loan programmes. Besides, the question arises, whether appropriate measures would not have been implemented anyhow a few years later and without having been subsidized.

Against this background the support of high quality heat insulation measures implemented apart from the existing legal requirements seems to be a reasonable approach. This applies especially in view of the long lifetime of constructional measures. Various support concepts that have been implemented on the regional and municipal level are in accordance with this principle. For the renovation of different construction elements there is a minimum Rc-value prescribed that exceeds the legal minimum requirements. On the basis of relatively low extra costs related to the larger insulating material thickness the specific requirements of this kind constitute only a minor problem for the financing ability of the loan programmes. Comprehensive refurbishment works are not a rule, which can be concluded from the survey on the CO₂ reduction programmes. It turned out from the analysis that the medium living area-related energy savings achieved as a result of the measures subsidized between 1996 and 1998 do correspond to only one third of energy savings resulting from the comprehensive insulation and boiler replacement.

Apart from the content concept of loan programmes, the total comprehension of the support is significant and decisive for the achievement of sufficient energy savings. In this regard there are little attempts made in Germany to reach all the really necessary refurbishment works within the housing stock. And so within two and half years, the KfW Programme encompassed a total of 16 million m² living area, mostly in the form of partial refurbishment. Should this number be annualized at a medium rate and with the one-third factor to comprehensive refurbishment works, the result would be 2.1 million m² per year. In view of the total of the 3 billion m² living area in Germany, it still constitutes less than 0.1% of the housing stock per year. To support the energy saving, supply systems and the renewable energy sources various programmes have been established. There are, however, no visible results indicating a high achievement level within the housing stock. Apart from the limited financial sources there is a general problem related to the loan programmes, which is the lacking long-term continuity resulting from the dependence on the current budgetary position.

2.3.4 Institutional framework

After the German reunification, the municipal housing stock in the Eastern part of Germany (incl. Brandenburg) moved to municipal companies and cooperatives and private estate owners. Flats in urban areas and a large part of the remaining flats in multi-storey buildings are being run by housing companies that are members of the Registered Association of Housing Compa-

nies of Berlin-Brandenburg (BBU). BBU is part of the German roof association GdW, which is part of CECODHAS. BBU organises its work by several working groups of which one in technical matters, addressing energy performance and energy costs.

2.4 The Czech Republic

Up to now there is no official definition of social housing in the Czech Republic. The Ministry for Regional Development in close collaboration with the Ministry of Finance has recently prepared a working definition of social housing with the aim to keep the current reduced VAT rate of 5% applied to construction works related to social housing. Without such a definition it would be necessary to increase the VAT rate for building and refurbishment works from 5% to 19% from 1 January 2008¹⁷.

According to the proposal, social housing will include the following types of housing:

- Housing used for accommodation of that part of population which is under the risk of social segregation.
- Housing acquired using public financial sources or with their direct support, e.g. housing subsidised by the Ministry for Regional Development or by the State Housing Fund, respectively housing built by municipalities without government grant.
- Other flats or family houses if their total floor area would not overpass the given surface threshold, e.g. 150 m² in case of family houses and 90 m² in case of flats.

Taking into account the definition given above, such housing mostly concerns dwellings in pre-fabricated panel housing. Currently there are about 1,165,000 of these dwellings in panel houses, which is about 1/3 of the total housing stock. In each dwelling there are (on average) 3 people making the total number of people living in panel housing about 3.5 million people. Other data include¹⁸:

- According to the 2001 Public Census, *total housing stock* comprised 4,303,084 dwellings.
- The *size of the housing stock per capita* expressed by number of dwellings per 1,000 inhabitants was 427 in 2001.
- The *average age of the housing stock* is relatively high. In the year 2001 the average age of the housing stock was 46.9 years.

In 1991, the housing stock comprised of state- and company-owned dwellings (approx. 40%), cooperative dwellings (approx. 20%), and privately owned dwellings (approx. 40%). Fundamental changes have taken place since then. According to data from a selective survey of the Czech Statistical Office collected in 1999 and data of the 2001 Public Census, municipal rental housing included 17%, cooperative rental housing 17% and private rental housing 10% of the housing stock. About 50% of the housing stock is privately owned. The characteristics of the housing stock in the Czech Republic have changed significantly by period of construction as is shown in Table 2.3.

¹⁷ This is a requirement of the European Commission, Construction works should be charged with a higher VAT level unless a Member State applies for a specific exemption.

¹⁸ No specific data for social housing available.

Table 2.3 *Housing stock characteristics in the Czech Republic by period of construction*

Period of construction	Average floorspace		Average energy demand	
	(habitable area) All individual apartments	Social housing apartments	Apartments [kWh/m ²]	Social housing apartments [kWh/m ²]
Until 1945	50.5		170	
1946-1960	43.4	32.5	160	135
1961-1970	44.7	34.5	200	155
1971-1980	48.1	32.7	240	180
1981-1990	52.5	34.8	180	150
Since 1991	60.2	54.4	150	120

Source: Locosoc (Enviros, 2003).

The most common heating types used in dwellings are:

- district heating - 37% (of which the main energy carriers are 66% coal, 25% natural gas, 4% fuel oil, 4% biomass)
- central heating 37%
- single heaters 15%.

There is a part of the population that is not able to cover their living costs including energy bills. However, there are no statistics on percentage of household consumers who are not able to pay their energy bills. But there is a general practice to disconnect consumers from electricity/gas/DH networks/water supply networks if they do not pay their bills on time.

Housing allowance

The state contributes towards the cost of housing to families and individuals with low incomes. A person has the right to receive a housing allowance if she/he owns or rents an apartment where she/he is registered for permanent residency as long as his/her income is lower than 1.6 times the minimum subsistence level during the preceding calendar quarter. The benefit is awarded regardless of the type of apartment in which the beneficiary lives, whether it is a community apartment, cooperative apartment, private apartment or whether it is an apartment within the beneficiary's own house, and irrespective of real housing costs.

2.4.1 Regulatory framework

Housing policy is based on the Housing Policy Concept, which was approved by the Government under Resolution No 292 of 16 March 2005. The main objective of the state's housing policy is 'creating conditions under which every household is able to secure adequate housing corresponding to its needs and financial situation'.

Government Resolution No. 588/2001 requires regions and municipalities to develop their own housing policy. Such policy should deal with development of housing projects they would finance or co-finance and also with the way of distributing such financial sources. About 40% of the larger cities in the Czech Republic have already developed such housing policies.

Municipalities currently play a complicated *two-in-one role*; on the one hand, they are expected to maximise the profit from their assets to generate income for the municipal budget effectively, and on the other hand municipalities have been set the task of improving the conditions enjoyed by their inhabitants, including housing conditions.

A new *Rental Law* is currently under preparation. Within this law, the mutual status of tenants and lessors will be more balanced compared to the present situation. A new law is also being prepared regulating the ownership of flats, the essence of which, like now, will be a dualistic

concept where the owner of the residential unit is also a co-owner of the communal areas of a building. The new legislation will clarify the status, function, and activities of associations of unit owners and their bodies, will define the institution of the administrator, and will allow for the removal of obstacles stemming from present legislation that have complicated the application of the current Residential Unit Ownership Act in the long term. The changing regulatory framework for housing cooperatives will be covered in the prepared modification of the Commercial Code.

The new legal framework will also allow for the emergence and development of rented housing, which will be intended primarily for households with medium and lower incomes. This practically means the creation of a new social housing sector.

Heat cost regulation

The price of heat supplied through district heating systems to all customers is regulated in the way of cost-plus regulation. The price in a calendar year can include only eligible costs, fair profit and VAT¹⁹ where fair profit means profit according to a special Decree²⁰ directly related to heat supply.

Implementation of the EPBD

The main elements of the EPBD are to be included in the amended and updated Act on Energy Management. A draft of the Act passed through Parliament and was officially implemented by July 1, 2006. The complete secondary legislation with all executive decrees is to be expected by early 2007.

Elements of the EPBD that are still in development are the following:

- Methodology for the energy audit of buildings, used for the development of energy certificates, including the calculation tool (and determining the 'reference building').
- Decree concerning the inspection of boilers and air-conditioning systems.
- System for education/training of energy auditors.

2.4.2 Institutional framework

At national level, housing policy is under the jurisdiction of the Ministry for Regional Development. This ministry also operates some housing support programmes, which includes refurbishment of old panel buildings and new (social) housing (see also Section 2.4.3).

The SCMBD (Union of Czech and Moravian Co-operative Housing) is the interest association of housing cooperatives carrying out its activities throughout the Czech Republic. Its mission is to protect the interests of the cooperative housing sector as a whole and to provide housing cooperatives with methodical counselling as well as to evaluate their concrete problems that cannot be solved successfully by an individual cooperative or a region.

The sector of municipal rental housing accounts for approx. 17% of the housing market. Its functioning is negatively affected by rent control measures and civil-law provisions pertaining to lease of dwellings. The strict rent control limits possibility to increase rent after refurbishment meaning that necessary refurbishment activities are often postponed. Municipal housing consists of housing for both social and entirely commercial purposes. Future development of this sector will depend on the selected rental policy and the success of creating a non-profit rental sector. Even though some municipalities have already sold a large majority of their housing stock, this (sub)sector is still one of the biggest on the Czech housing market (second after the flats situated in family houses in the private ownership).

¹⁹ Act No. 235/2004 Coll., on value added tax.

²⁰ § 2 of the Decree No. 580/1990 Coll. implementing Act 526/1990 Coll., on prices as amended later.

As owners, municipalities are obliged to maintain buildings and pay the refurbishment. They cannot transfer the refurbishment costs to tenants and increase the rent. A different approach is used in case when a flat is rented to a new tenant - in such a case the municipality can set full cost rent taking into account the cost of refurbishment.

There is no specific role of municipalities in promotion of energy conservation in dwellings. Their activities in energy conservation in dwellings are solely their own decision and their risk in spending public money (own or subsidies from grants) and usually come from personal activities of members of the local government.

Housing cooperatives

The existing cooperative sector, which mostly consists of buildings owned by former construction cooperatives, accounts for some 17% of housing stock and in the vast majority of cases functions with no considerable problems. Taking into account the legal framework of transferring membership rights and duties, membership in a housing cooperative is very similar to home ownership. At present, the cooperative sector comprises approx. 650 thousand flats in total. Of them nearly 550 thousand are in the ownership of 'old' co-operatives.

Housing cooperatives generate resources from regular rents, from subsidies/grants provided from government programmes, and from commercial financing. But their main problem with financing has been found in a problematic or even impossible access to bank loans caused by their low credibility and poor legal framework. This especially holds for small, newly established house/flat ownership entities such as small ('one-house') housing cooperatives and association of flat owners - condominiums). This problem can be overcome through guaranties provided by the CMRZB (Czech and Moravian Development and Guarantee Bank).

At present, construction of cooperative housing is very low. Nonetheless, the government is preparing a law based on which construction of cooperative housing will be stimulated through subsidies and low-interest loans.

2.4.3 Financial framework

The range of economic instruments introduced in recent years to support housing (refurbishment) in the Czech Republic is relatively wide. The instruments described here are all targeted at specific groups and measures, but only a number of them can be used for energy efficiency measures.

The '*Housing Support Programme*' of the Ministry of Regional Development includes direct grant support for measures leading to:

1. Regeneration of prefabricated panel housing estates - assistance is available to municipalities having on their territory panel houses comprising of at least 150 flats. Support is provided as a special purpose grant of 70%. A total of 100 mln. CZK²¹ was provided in 2005 for this sub-programme.
2. The construction of rented flats - supporting the construction of rented flats owned by municipalities and intended for people in low-income classes. A maximum grant per dwelling of CZK 550,000 may be provided.
3. The construction of technical infrastructure for subsequent construction of apartment blocks and houses.
4. Support for the construction of subsidised flats. This programme supports the construction of flats for socially disadvantaged and disabled people.
5. Repairs of defects of prefabricated panel building - support for essential repairs in panel buildings in case serious defects occur.

²¹ Exchange rate 31 Aug. 2006 - 1 EUR = 28.14 CZK (<http://www.xe.com/ucc/>).

The Ministry of Regional Development also provides *support for mortgage loans* for young people up to 36 years of age. The aim of this form of support is to increase the availability of privately owned housing for young people. Support focuses on the acquisition of older housing, i.e. a flat or house, and is provided in the form of subsidised interest on mortgage loan; this subsidy on interest is provided only for mortgage loans or portions thereof of up to CZK 800,000 if a flat is purchased, or CZK 1.5 million if a house is purchased.

Support financed out of the *State Housing Development Fund* includes the following:

- Support for the construction of rented flats for persons in defined (low) income classes - support for the construction of rented flats owned by municipalities.
- Provision of low-interest loans to young people up to the age of 36 for new housing construction - soft loans available for young people purchasing a flat up to a certain size.
- Provision of low-interest loans to young people up to the age of 36 for the acquisition of a flat - providing soft loans up to a maximum of CZK 300,000 with a maximum repayment period of 20 years.
- PANEL programme - facilitating the financing of comprehensive repairs of residential panel buildings. This includes improvements in heat technology properties.
- Support for the provision of low-interest loans to municipal funds.

2.4.4 Private sector initiatives

The ESCO business in the Czech Republic started 10 years ago. Most ESCO companies finance projects with heat control technologies and the refurbishment of heat supply facilities. ESCO projects in the field of housing refurbishment are still not carried out due to long term payback period of energy efficiency measures in the housing sector. The only way for implementation of the project through the ESCO is to combine the project of ESCO taking care about short-term payback measures (heating supply, thermal insulation of the building shell) and municipality/cooperative taking care about long-term payback period measures (replacement of windows).

Apart from the ESCO business, there are a number of other private initiatives undertaken by private organisations:

- Revita G - a Czech building company, founded in 2000, concentrating on the rehabilitation of building envelopes owned by housing cooperatives.
- Association for the Rehabilitation of the Housing Sector (Bydleni+) - the initiative is aimed at medium-sized and large housing cooperatives for which the proposed support from structural funds (up to € 100,000) is too small and also for owners of housing that cannot use the PANEL programme. It provides a useful tool for private owners of housing built other than with panel technology.

Two important international financing possibilities for private subjects are:

- Soft loan financing through the Phare Energy Saving Fund - The soft loan is being achieved by blending grant money (borrowed to the bank by the state under the EU Phare programme) with commercial sources of the bank to reduce the final interest rate of the loan.
- International bank guarantee through the IFC Commercializing Energy Efficiency Finance Programme - It works in partnership with local financial institutions (FIs) to help them develop an energy efficiency lending business and offers them partial guarantees so as to share the credit risk of EE finance transactions.

2.5 Slovakia

Total housing stock in Slovakia is represented by 1,931,441 dwellings (2004), of which 1,665,536 are permanently inhabited. Of these dwellings 778,000 are in panel buildings. Other major housing stock features are:

- Per 1000 inhabitants 350.4 flats are registered, 309.6 when only taking the permanently inhabited flats into account.
- The average floor surface is 83.9 m² including 56.1 m² of inhabited area.
- The average density of dwelling occupation is 3.2 persons.

There is no social housing sector defined in the Slovak Republic. Therefore statistics do not include data particularly for social housing. Social housing can be understood as public rental housing owned by municipalities or the state. This share of rental housing stock has, however, significantly decreased during the last years. It decreased from 24% in 1991 to 3.5% today. Table 2.4 presents structure of ownership according to last available statistical data.

Table 2.4 *Structure of the housing stock in Slovakia according to ownership*

House owner	Number of apartments	Share [%]
Individual ownership	916 610	55.00
State	20 847	1.25
Municipality	39 676	2.38
Housing cooperative	194 723	11.69
National property fund of SR	662	0.04
Corporation	6 533	0.39
Other corporate body	18 444	1.11
Church	2 486	0.15
Foreign owner	439	0.03
Combined ownership	410 528	24.65
Other ownership	24 097	1.44
Not defined	30 491	1.83
Total:	1 665 536	-

Source: Population Census 2001.

Former Czechoslovakia has been one of the first countries in Europe, which introduced standard requirements for thermal protection of buildings in early 60-ties. However, up to 1983 these requirements were much lower than the current ones. Therefore buildings built before 1983, which account for about 75% of all the residential buildings, are the main target group of energy efficiency interventions. This mainly concerns thermal insulation of the envelope construction and for retrofitting/exchange of heating systems.

The annual average energy consumption for space heating in apartment buildings is 118 kWh/m² (build since 1991), taking into account the outdoor temperature difference. For domestic hot water preparation the energy consumption is 52 kWh/m², resulting in average energy consumption for DHW and space heating per dwelling of about 170 kWh/m². The average (annual) energy consumption per dwelling for heating is 9.64 MWh and for domestic hot water 4.22 MWh.

For space heating, natural gas is the main energy carrier as Slovakia has one of the most extensive gas networks in Europe. A large share of the housing stock is connected to district heating systems, whereas most of these systems use natural gas as energy source.

Energy expenditures

Average energy costs for households budget presents in Slovakia 16.9% (statistical data from 2004). Average net monthly income per inhabitant presents € 211, of which € 36 is spent on energy. In the third quarter of the year 2005 the average net monthly income per person was € 225, total from which € 37 pays for energy. There are no differences between summer and winter seasons in payments for district heat, due to fixed monthly payments, recalculated for the actual consumption at the end of the year. Differences are in case of households with individual heating, where customers pay for gas/electricity or other energy carriers according to actual consumption.

2.5.1 Regulatory framework

The elementary document for housing policy in the Slovak Republic is *The National Housing Policy Concept up to 2010*. It is a framework document for developing a fully functional housing market, aiming to coordinate supportive activities of the state in the period 2005 - 2010. This document represents an essential tool for the following objectives:

- Creating a market environment providing housing.
- Allowing households living in dwelling that fulfils their demand and income level.
- Enabling mobility of population within the existing building stock.
- Succeeding the demand without extensive pressure for new construction.

The National Housing Policy Concept addresses the major role of municipalities. They should:

- Prepare programmes for development of housing in the region.
- Create conditions for housing stock renovation.
- Administer a database of housing status at the municipality.
- Coordinate the housing development process in the municipalities.

Municipalities are also obliged, under the current regulatory framework, to prepare a program of economic and social development according to the regional programmes.

The regulatory framework addressing the housing sector in Slovakia includes:

- Act on Ownership of Apartments (includes possibility to form association of owners) - specifies the management of multi-flat buildings.
- Civil Code - specifies the rights of tenants and the obligation to provide housing substitution when tenants have to abandon their dwelling.
- Commercial Code - specifies the activities of housing cooperatives and allows the operation of housing management institutions within their own statutes.

Rental Prices are regulated under the National Council Act (No. 16/1996) on Prices.

- National government formulates maximum rent increase for publicly owned houses (max. 4% per year). Regulation of rents in privately owned houses are not included.
- Rental prices will be deregulated from July 2007.
- Maximum rent prices do not include service costs including energy and refurbishment costs. Any additional rent increase that is due to housing refurbishment will be based upon agreements between tenants and owners.

Heat regulation

The Regulatory Office for Network Industries carries out the heat price regulation. Regulation in network industries means a method on the calculation of the maximum price and the setting of the maximum price or tariff for goods or services, delivery of which is regarded as a performance of regulated activities. This also includes the regulation for heat supply from district heating systems.

According to the Act No. 657/2004 on heat energy sector, municipalities have to prepare development concepts in the field of thermal energy. A special methodology defines the minimum contents of the concept. After the approval of the development concept in the field of thermal energy by municipal representatives, this becomes a binding document.

EPBD implementation

Slovakia has implemented all requirements including four basic requirements of Directive 2002/91/EC by adopting of the National Council Act No. 555/2005 Coll. on Energy Performance of Buildings and on change and amendment of other laws, effective from 1.1.2006. Energy certification of buildings will start from 1.1.2008 onwards.

It is important to mention that the regulation will not bring any new technical data on certification of buildings to the already available method. The regulation will be an official document pointing at currently valid technical standards, which are already implemented with valid European standards.

2.5.2 Institutional framework

The main actors involved in the housing sector are:

- the state
- municipalities
- flat owners and their associations of flat owners and housing cooperatives.

The institution responsible for housing policy, city development and building industry in the Slovak Republic is the Ministry of Construction and Regional Development. The role of local government and municipalities is mainly the coordination of housing development, meeting principles of social inclusion and eliminating social segregation of particular groups.

Low income people meeting criteria defined by the *Act on Assistance in Material Need* (Act No. 599/2003) can apply for a certain form of housing subsidies. The requirements for such subsidies are under the competence of the Ministry of Social Affairs and Family. Housing cooperatives, municipalities and regional institutions do not have an obligation to subsidize households.

Flat owners

In order to refurbish the building, a voting system is being applied. It depends on the ownership structure and active contribution of flat owners to the decision making process whether they agree on refurbishment of the building. In case of large-scale refurbishment, 2/3 of all votes are required.

Currently, the communication about the advantages of energy savings from housing cooperatives, municipalities or energy agencies to consumers is not very clear hence the refurbishment process depends mainly on the composition of flat owners in the buildings and their attitude to energy saving measures.

The *Slovak association of housing cooperatives* (SZBD) is an association of housing cooperatives and legal entities that act in the field close to housing cooperatives. SZBD is a legal entity, can be associated in other interest bodies or other legal entities. The SZBD helps to discuss and solve issues of member cooperatives and coordinates these activities. Its role is to protect and promote interests of housing cooperatives, active cooperation with parliament members, state and local government institutions, institutions of skilled experts etc.

Association of flat owners associations - The association of flat owners is an association with voluntary membership, an independent non-profit association of legal entities registered ac-

ording to common law. It is a member organization and unites the associations of flat owners, which are civil associations formed under the Act No. 182/1993 Coll. on the ownership of housing and non-housing premises as amended.

2.5.3 Financial framework

There are three types of programmes in Slovakia financing housing refurbishment.

1. The *State Fund for Housing Development* (established in 1996), audits are required, providing support for:
 - Rental housing for lower income groups - soft loans for purchase or construction of dwellings for future renting to lower income groups.
 - Preparation of (technical) infrastructure - soft loans for technical infrastructure such as water and sewage pipes etc.
 - Removal of systematic defects - grants provided for building blocks to remove systematic defects not caused by the user.
2. The *Building Savings Programme* - three bank institutions offering this, the state provides a premium of 5 - 15% of project costs for energy saving measures.
3. For quickening the renewal of the housing stock and engaging resources of banking institutions for housing development, the *State Support Program for Housing Stock Renewal* through granting of bank guarantees for loans has been adopted.

In addition to these support programmes a State Support Program for the Housing Stock Renewal through granting bank guarantees for loans has been established. This programme aims at rapid renewal of the housing stock and engaging resources of banking institutions for housing development. Under the programme, state guarantees for credits (between 7,000 SKK and 300,000 SKK²²) for construction and refurbishment are applied:

- Repair of common parts (installations and accessories of flat-blocks).
- Modernisation of the common parts.
- Reconstruction of common parts.
- Eligible projects and projects focused on reducing energy demand (at least 20% reduction of thermal energy needed for heating).

In the framework of *structural funding* for the period 2007 - 2013 there have been efforts to involve the refurbishment of housing stock into supported programs now under the competence of the Ministry for Construction and Regional Development. Planned budget for the coming seven years of structural funding for refurbishment of the Slovak residential sector is about 4,200 mln. SKK. According to the estimates of the Ministry, this amount will contribute to the refurbishment of almost 50,000 flats in multi-flat buildings.

The new government has amended the national strategic reference framework for 2007-2013 and is now waiting for the approval of the European Commission, which will bring more light on how the future of structural funding will work out for Slovakia. Financial resources will be available for reconstruction of shared premises of houses, technical installations, infrastructure and decrease of energy demand. Structural funds will be only available for projects of complex revitalization of residential zones with at least with 1500 residents.

Commercial financing

Until the year 2004 there was a support of the state for individual mortgage loans. The idea was to develop mortgage funding until the market conditions make it an affordable way of financing. The form of support was done in partial contribution of State fund of housing development to the commercial interest rate. In 2003 the commercial interest rate was being decreased by 2.5%, in 2004 it was by 1%. Nowadays the partial contribution of the state to the decrease of

²² Exchange rate 31 Aug, 2006 - 1 EUR = 37.63 SKK (<http://www.xe.com/ucc/>)

commercial mortgage interest rate is 0%. The government stopped with the support because interest rates of private banks have significantly decreased in recent years.

2.5.4 Private sector initiatives

The private sector has a dominant role by activities related to the development and refurbishment of the housing stock. The sphere of activity covered by the private sector is connected to housing creation and development and providing financial sources for development activities in housing. The private sector includes institutions such as: investors, engineering and designing organizations, construction companies, citizens and other subjects such as foundations and non-profit organizations.

Energy service companies (ESCOs) are another subject in financing of energy saving projects in Slovakia. Typical energy service companies, working on the principle of energy performance contracts are quite rare in the Slovak Republic. The reason is the lack of free financial sources, free capital, risk distribution of energy service provider between private banks and ESCOs. Bank institutions have the tendency to not accept such risk due to lack of information, trust and motivation for long-term contracts. ESCOs in Slovakia are offering energy efficient solutions, focused mainly on the field of heat regulation and installation of low cost technologies at which the payback period is good (around six years).

2.6 Poland

Poland is divided into 2478 communes (municipalities) and 884 cities, acting as self-governments. In 1990 they have taken over the ownership of dwellings of the municipal housing stock from the state. Other basic data about the Polish housing stock are the following:

- Total no. of households/total no. of dwellings: 12,596,000 dwellings (2003).
- Average no. of inhabitants per dwelling: 3.03.
- The number of single family houses defined as ‘private property, with 1 dwelling’ amounts to 3,847,841, where the number of multi-apartment buildings defined as ‘mixed ownership with over 1 dwelling’ amounts to 924,887 with 8,017,926 dwellings.
- For purpose of the project the group of 567,931 buildings with 7,046,746 dwellings was defined. These are multifamily buildings that belong to the state, municipalities, cooperatives, house-owner associations (HOAs) and enterprises constructed until 2002.

The only definition, which contains the words ‘social housing’ is related to a very limited number of apartments, which are fully at the disposal of municipalities and where the total cost of maintenance is covered by communes. There are approx. of 32,000 such apartments in Poland (2.3% of communes owned apartment stock and 0.24% of total apartment stock). This housing stock is dedicated to vulnerable social groups. Extension of definition of social housing by ‘lower income groups’ and ‘recently privatised housing stock’ increases significantly the number of apartments. Under ‘*lower income groups*’ we understand the households, which are not able to construct or purchase their own single-family building or dwelling. It means that all apartments constructed by cooperatives, state, communes, enterprises and so-called social housing societies can be identified under this category.

Under ‘recently privatised housing stock’ we understand apartments in buildings, which have been constructed till 1990 by cooperatives, communes, enterprises and others, and where the owner started to sell the apartments to tenants after introduction of the Law on ownership of dwellings from 1994. There are 2,813,000 apartments of such housing stock, where 1,500,600 (53.3%) are recently (after 1994) privatised e.g. sold to tenants.

Not all rental apartments can be considered as social housing. Especially new housing stock constructed after 2000, thanks to development of loans is available for families with mid- and

high income. The new multifamily buildings have much better standard than the old ones, and they are offered at much higher rents or even for direct private ownership.

The average energy demand for heating purposes depends on the year of construction of the building e.g. on the preconditions set by the design norms valid in the given period independent on the kind of building. There are following periods for designing the energy demand for heating purposes:

Table 2.5 Average energy consumption for heating purposes of buildings in Poland

Period	Value [kWh/m ²]
-1985	250-380
1986-1992	160-200
1993-1997	120-160
1998-*	90-120

Source: NAPE (2006).

Domestic hot water is produced in individual hot water boilers in 30% of dwellings. The remaining part of dwellings is supplied with hot water together with hot water for heating purposes by block or district heat sources. The energy demand for domestic hot water is calculated separately and is not included in the above-mentioned figures. Till 1970 the energy demand for domestic hot water amounted to 70 kWh/m² year and after that to around 50 kWh/m² year.

The average energy costs for households

The average household in Poland has 3.07 persons and the disposable income amounts to 636 €/month/household. The energy cost + housing expenditures include approx. 118 €/month/household (18.6%). For heating purposes approx. 40 €/month/household (6%) is spent. The cost of heating in dwellings is usually distributed over the whole year in equal monthly rates as down payment and accounted one time during year - after the heating season.

Energy poverty is an important problem in Poland. Approx. 8% of households has problems with the monthly payments of the rent for dwellings, including the cost of (district) heating. Bills for electricity and natural gas are to be paid to utilities. The rate of non-paid bills for electricity and natural gas is not significant (1-3%) and disconnections from electricity and gas happen not very often. Disconnection from heating in a multi-apartment building is technically very difficult - in most cases impossible.

There is support from the municipal budgets for low-income people regarding their rents. Monthly about 800,000 of so-called dwelling subsidy are paid to low-income households. This system is controlled by the municipalities, which are checking the eligibility of households for this grant.

2.6.1 Regulatory framework

The draft document ‘Strategy of long-term development of housing for 2005-2025’ aims at reaching European standards in the Polish housing sector by 2025 especially in terms of the affordability of own dwellings (there are in Poland 300 dwellings/1000 inhabitants vs. 466 dwellings/1000 inhabitants in average in Europe) and space per person. The following instruments are proposed:

1. Increase of rents up to the level, which will allow financing of all current expenditures of buildings and of their refurbishment.
2. Continuation of social policy towards low-income families by extension of dwelling subsidies.
3. Continuation of the ‘thermo-renovation program’ (see also Section 2.6.3).

4. Limiting the 'housing loans' (with constant interest) to refurbishment of buildings only.
5. Extension of guarantee opportunities for home owners associations.
6. Setting up the necessary amount of social houses in each municipality, which will be maintained by the municipality.

There are no specific refurbishment plans stated in the state housing policy. The approach of the policy is rather market oriented e.g. owners of buildings and dwellings should take care of the stock. The state provides some support in the form of subsidizing loans and low-income families.

Regulation of rental prices is done according to the following regulations:

- Rent is maximised to 3% of recovery value of 1 m² of dwelling, which are announced by regional government each half year.
- Rent increase is maximised to inflation rate.
- Cooperatives and home-owner associations regulate themselves but rental income must meet maintenance and refurbishment costs.
- Social housing rent may not exceed 50% of rents of municipal housing stock and is aimed at low-incomes families (subsidies for covering the bills).

The social housing in narrow terms (dwellings for low-income families only) is defined by Law on security of tenants, communal housing stock from 2001 as dwellings which belong to communes and where rents cannot exceed 50% of rents related to municipal housing stock.

Heat costs are based on a cost plus system and controlled by the Ministry of Economy:

- Including max. 3% profit, fixed costs max. 30% of delivery price.
- Heat costs can contain energy saving measure costs.

State of EPBD implementation

The implementation of the EPBD will take place during 2007 and will be in force for new residential buildings (over 50 m²) and existing public buildings from 2008 onwards and for existing residential buildings from 2009 onwards. For existing buildings certification will be mandatory in case the buildings will be subject to sale and for all renovated buildings partially financed by the Thermorenovation Fund or where total renovation costs exceed 25% of actual value of the building.

2.6.2 Institutional framework

In Poland, the newly founded Ministry of Construction is responsible for both housing policy and city development. The housing cooperatives are represented by the Central Revision Union with 620 members managing 1.42 million dwellings. This union is member of CECODHAS. The homeowners associations are currently not represented by anybody. A new Association 'Common Home' is under registration.

The municipalities are owner of so-called communal housing stock and act as co-owner in homeowner associations. In the communal housing stock municipalities are solely responsible for maintenance and refurbishment of buildings. As members of homeowner associations the municipalities have the obligation to pay the down payments for maintenance and refurbishment according to the decision of the homeowners assembly, taken by majority of votes.

Both housing cooperatives and homeowner associations are most important owners of social housing stock. Each of these organisations governs approx. 3 million dwellings. Third important actor are communes which govern 0.6 million dwellings. Municipalities act as intermediary between the state system of dwelling subsidies and its beneficiaries e.g. low-income families. However, municipalities have no obligation to subsidise the rents of low-income families.

Housing cooperatives can generate resources for new projects/refurbishments from rents, selling part of the housing stock, construction of new buildings and sale of dwellings, renting of free spaces, loans subsidised by government and from commercial loans. Housing cooperatives can allocate the costs of (energy efficiency) investments into the rents. Increase of the rents is allowed up to the level accepted by assembly of members of cooperative. There are no official limits in this case.

2.6.3 Financial framework

Since 2004 a pilot programme is ongoing, providing a grant of 35% of investment costs for refurbishment projects. It is aimed at projects proposed by municipalities (€ 10 million have been reserved). About 3000 apartments can be beneficiaries of this pilot program. This is the only 'pure' grant program for energy efficiency refurbishments in Poland and is dedicated to social housing in narrow terms - for vulnerable families only.

For renewable energy investments there is a grant available through the state owned Foundation EcoFund. The Foundation provides grants to 40% of investment cost in solar hot water installations with surface area over 50 m².

Other programmes supporting refurbishment of housing and energy efficiency improvements are based on (soft) loans or a combination of loans and grants such as the Thermo-renovation Fund.

Thermorenovation Fund

Energy efficiency retrofitting of buildings is regulated by the facultative Act on support of thermo-renovation measures from 1998. This programme provides a 25% bonus to the loan taken by interested investors. Multi- & single-family dwellings, social infrastructure belonging to the community and common habitation facilities are eligible for this bonus (buildings in state ownership are excluded).

The process for developing and financing projects under this act is as follows:

- A refurbishment project is primarily financed by a commercial bank loan provided on the basis of a loan application including results of energy audit of a given building.
- An investor applies to the BGK Agency (administrator of the Fund) for a refurbishment bonus via the respective lending bank. Results of the respective energy audit are attached to this application.

Thermo-modernisation includes the following eligible project types:

- Modernisation of the heating system in the building (reducing annual energy demand with at least 10%).
- Comprehensive modernisation (reducing annual energy demand with at least 25%).
- Modernisation of heat source outside the building and district heating networks (reducing annual energy loss levels with at least 20%).
- Connection to district heating network (reducing annual heat costs with at least 20%).
- Conversion of conventional energy sources into renewable ones.

The base of issuing the bonus is the energy audit, which must be elaborated according to the Ordinance on scope and form of energy audit from 1999 (actualised 2002). The energy audits are to be financed by the investor.

The expenditures of this fund are increasing year by year and have reached almost € 25 mln by 2006. There are no threats for this fund till now. There are 22 commercial banks involved in the system, but only 2 of them make 80% of total financing in country. Till the end 2005 over 4000

multifamily buildings have used this scheme for financing thermo-renovation measures. This is app. 0.5% of all eligible buildings. The demand for the Fund in 2006 was twice as high. At the end of May 2006 100% of the yearly budget of the Thermorenovation Fund was used.

There is a special guarantee fund established in 2006 by the Global Environmental Facility (GEF) for energy efficiency projects in refurbished buildings and it is not difficult for housing cooperatives/housing owners to receive a credit guarantee. The guarantee can reduce the interest by 1-2 points, where the cost of guarantee reaches 0.5-2%.

2.6.4 Private sector initiatives

There are about ten ESCOs (energy service companies) in Poland. They offer usually increase of boiler efficiency, based on suppliers loan where the repayment is calculated in constant rates. The calculation of rates happens at the beginning of the refurbishment process.

The most known project in Poland, defined as ESCO, was launched in 2001 in Krakow in co-operation with the World Bank. The company was founded by the district heating company belonging to the city of Krakow. The ESCO has prepared over 100 projects till now, where the role of company was construction or refurbishment of boilers (7), heat stations and networks (5) or buildings (9) with or without providing of soft loan or guarantee for another loan from the World Bank for investment projects. The remaining projects were energy audits, feasibility studies and technical documentation.

There are a number of soft loans available for social housing sector, which allow owners of buildings a slight reduction of financial cost of refurbishment in comparison to ESCO offers. Installation companies or utilities do not usually offer energy services. For utilities, the profit made on ESCO investment can not be accepted by Energy Regulatory Authority as the so called 'justified cost' covered by the relevant heat or electricity tariff.

2.7 Latvia

As overall statistical data about division of housing stock in the country are very poor and most of data are not available, calculations were made by Ekodoma (Blumberga *et al*, 2006) and results are summarised in Table 2.6. Data used for calculations were taken from different sources such as statistical yearbooks; housing agencies as well as several assumptions were made.

Table 2.6 *Housing stock in Latvia*

Ownership	Number of dwellings	Number of buildings	Area [m ²]
State*	52 190	5 068	3 507 885
Municipalities*	444 533	24 584	29 878 721
Denationalised	78 000	10 300	5 242 671
Share**	37 900	1 390	2 547 400
Old housing-cooperative**	4 000	80	268 855
One family houses	179 100	179 100	12 037 979
Total	795 723	220 522	53 483 510

* *Privatised and not privatised state and municipalities' property, including buildings with recently established cooperatives or other housing management organisations (around 2650 buildings).*

** *Buildings that are having still the old kind of housing management organisation from Soviet period.*

The Law on Social Apartments and Social Houses in Latvia defines a social house as a house which belongs to municipality and which rents apartments in this house to low-income people. If we take this official Latvian definition than only approx. 35 to 40 buildings are considered to

be social housing and it represents very small part of all housing stock. Therefore it was decided to use the InoFin definition and include all housing that was built after 1945 because almost in every house there is at least one low-income family renting a dwelling from their municipality.

Due to the poor availability of statistical data in the country, apartment dwelling characteristics per period of construction are not available. Based on assumptions and different information sources, following data were gathered:

- Average floor area per dwelling - 57 m².
- Average energy demand for space heating in apartment dwellings built after 1945 is 150 kWh/m² year (hot water is accounted separately from heating and is not included).
- The total consumption of heat energy in all households in Latvia was 5,033 GWh (2004).

There are basically two types of heating systems used in dwellings in Latvia, district heating and local heating from boilers. According to statistics, 84% of all apartments (separate data for dwelling stock not available) are supplied with heat by centralised heating that includes either district heating or local boiler heating (local boilers are boilers in housing blocks)²³. Other heating methods include stove heating (individual apartment and room heating) and electricity.

Energy related costs

The average energy costs per household in Latvia are about 12.5% (50 €/month) of the total household budget. In the majority of households the heating bills are paid according to real consumption and vary per month. In case there are no heat meters in the dwellings, heating costs are distributed evenly through the year.

The costs of energy carriers largely depend on the types of fuel used. The cheapest are wood and wood fired stoves or boilers followed by natural gas and district heating. Electricity used for heating is the most expensive.

As a relatively large share of the household budget is spent on energy costs, energy poverty can be considered as a major problem. About 25% of the households (in the lowest income group) with an average income of € 84/month spend 13% of their budget on energy and housing maintenance.

Part of the energy costs for low-income households that cannot pay their energy bill is covered by the municipalities' social budget. Data are not available on shares of household consumers who receive social support and subsidies from municipalities.

2.7.1 Regulatory framework

The development of housing policy was initiated through the Housing Policy Framework Document, published in 1996. Its main objectives are to:

- Manage the housing stock in a financial solid way, this way ensuring profitability and regular return of investments necessary for further housing development.
- Increase the share of constructive energy saving solutions by reconstruction of buildings, including insulation of the envelope and using energy efficient construction materials for new houses.
- Introduce water, heat and gas consumption metering and de-centralised control of the housing energy consumption.
- Reconstructing the existing housing estates.

²³ More specific data such as split between district heating and central heating not available.

The same document also includes an ambitious social goal, leading to structural changes in the housing stock, increasing the share of family houses and owner-occupied dwellings. For low-income families, social housing should be provided.

The National Building Program is a long-term set of activities, accomplished by the government, in the area of residential buildings adopted in 2002. The main goals are to improve construction quality, legislative situation, provision of education and trainings, to intensify and re-orientate construction research and development.

One of its sub-programs is Energy Efficiency in Buildings. The objective of this sub-program is to analyse the existing general situation in Latvia in the area of heat retention, provide information on efficiency of heat insulation and heat opportunities and on activities of optimisation. It includes characterisation of the existing situation, more accurate specification of opportunities to save energy resources in (residential) buildings, analyses of the necessary financial resources for raising energy efficiency in buildings and pay-off period of the investment.

Housing regulation

Legal provisions for relations between tenant and landlord or property owner are provided in the *Civil Law*, but the most detailed provisions are given in the *Law on Rent of Residential Space*. This rental law provides legal provisions for relations between tenant and landlord (property owner) and provides obligations and rights of both parties. According to the law, rental prices include maintenance costs for building divided proportionally to rented space, plus profit for the landlord. Maintenance includes costs for refurbishment.

The *Law on Apartment Ownership* defines that all owners of dwellings in apartment buildings are obliged to take part in management and maintenance of the common parts of the building.

Normative and maximal heat transfer values (U-values) for the buildings are given in the *Latvian Building Code*. These standard values apply both for new and renovated buildings and do not differ too much from the standard values of other European countries (like e.g. Austria). There are no provisions for social housing in energy standards for buildings.

Every renovation and reconstruction of existing buildings shall be performed in compliance with the *Building Law*, the *Latvian Building Code* and other secondary legislation acts. Every activity related to renovation and reconstruction of building shall be confirmed by regional Building Board that is in charge for all building activities in the region.

Heat cost regulation

District heating cost regulation is implemented according two types of schemes:

- Regulation through regional public service regulatory institutions - all district heating tariffs from boiler houses.
- Regulation through State public service regulatory institution - all district heating tariffs from cogeneration plants.

In the first scheme district heating tariffs are calculated by the heat supplier according to the methodology confirmed by the Cabinet of Ministers in 2001. Tariffs are calculated for three separate services, heat energy production, distribution and realisation.

In the second scheme district heating tariffs are calculated by enterprise of heat and electricity generation according to methodology confirmed by State public service regulation institution in 2004 for heat generation.

District heat costs in Latvia are calculated in two different ways:

- If a heat meter is available, they are based on real consumption.

- When no meter is installed a so-called two-tier heat tariff is applied. This two-tier tariff includes fixed costs (capital costs of DH company) and variable costs (based on total heat consumption). Consumers pay for both depending on the surface area of their apartment. This two-tier tariff is criticised for its low transparency as it gives heating company the possibility to push up energy consumption.

Municipal energy plans

All large municipalities have municipal energy conceptions or strategies or plans, which include development of district heating systems. Two municipalities, Valmiera and Ventspils, prepared demand side management programmes that proposed implementation of energy efficiency measures in the residential sector.

EPBD implementation

- The draft Law on Energy Efficiency was submitted to the Cabinet of Ministers at the end of 2005 and is discussed among ministries.
- The Latvian Building Code LBN 002-01 (Heat Engineering of the Envelope of Buildings) has been adopted with required normative and maximum level of calculated energy losses for new and renovated buildings. The requirements for new and renovated buildings need to be applied from 2003 onwards. The Code requirements may be applied to reconstruction of buildings in order to increase the thermal performance of buildings.
- Normative and maximal heat transfer values (U-values) for the buildings are also given in the Latvian Building Code. These standard values do not differ too much from the standard values of other European countries.

2.7.2 Institutional framework

The Ministry of Municipalities and Regional Development is responsible for housing policy while the Department of Building of the Ministry of Economy is responsible for the building sector.

The State Housing Agency (former Residential Buildings Privatization Commission) is dealing with housing issues in the country. One of the main tasks is to promote and to help to develop entities that join together owners of flats and apartments that were privatized after 1990. Energy efficiency promotion in the residential dwelling sector is among the agency's tasks.

The role of municipalities is the following:

- The *Law on Municipalities* (09.06.1994) defines that municipalities should give support to inhabitants in dealing with apartment problems. The board of the municipality can set the rental price for real estate that belongs to the municipality.
- The *Law on Support to Tackle Problems with Apartments* states that the municipality board has rights to define categories of inhabitants that can get one-off financial support for residential property that they own or rent.
- Municipalities own part of the social housing stock and they are responsible to pay the refurbishment if the majority of apartment/dwelling owners decide to do refurbishment or if the main owner of the building is municipality. If the whole house is owned by the municipality, the municipality takes decision for refurbishment but if at least one of flats is owned by someone else municipality needs to get approval from other owners.
- Municipalities' social budgets cover part of energy costs of low-income people.

There are several national associations representing apartment and building owners:

- Association of Apartment Owners Cooperatives - represents interests of 'old' and new cooperatives.
- Latvian Association of Building Owners - mainly represents owners of denationalized residential buildings.

- Union of Riga Apartment Tenants and Owners 'Mītne' - mainly representing tenants of denationalized residential buildings.

2.7.3 Financial framework

Up to now there are no national/regional subsidy/grant schemes available for (social) housing refurbishment in Latvia. The only state support that has been provided is for energy audits. It is managed by the State Housing Agency.

There is only one exception - Valmiera city council provides non-interest loans for dwelling buildings to improve energy efficiency. Max amount of loan is € 7,000 and max length of loan is 3 years. These non-interest loans are financed from the Privatisation Funds of the municipality. All other energy efficiency projects are only financed through commercial loans taken in commercial banks.

2.7.4 Private sector initiatives

In Latvia a number of companies (ESCOs) are active in the field of energy performance contracting (EPC - financing energy efficiency investments through realised energy savings) and energy performance delivery (EDC - operation of a power or heat plant based on a long-term agreement). Projects realised through these forms are, however, not related to housing refurbishment. In the absence of state support or loans for housing refurbishment, a commercial loan system is available with attractive conditions. Up to now, however, not many housing owners/cooperatives take loans due to social/cultural barriers.

2.8 Bulgaria

In December 2003 the total number of inhabitants in Bulgaria amounted to 7,801,300. At the same time the housing stock in Bulgaria amounted to 3,688,802 dwellings from which 328,726 in buildings for temporarily habitation (rest houses, villas, etc.) and 7,851 are primitive dwellings. The amount of the other dwellings is 3,352,225. The uninhabited housings represent 15.9% of the whole dwelling stock; this is mainly due to the decrease of the population (from 1992 to 2001 the Bulgarian population has decreased by 554,333 people).

There is no definition of social housing in Bulgaria. The municipalities offer rental dwellings to people that are categorised according to the legislation. This categorisation is not based on income, the requirements concern the social status of the applicants (married, with children, etc.) and they should not have another estate property. The InoFin definition of social housing describes the typical situation in Bulgaria, as many owners of flats are with low income. These people live in most cases (approx. 90%) in buildings erected with concrete panels or in old houses in the villages. There is no statistical data about these dwellings. In the following table is given the structure of the housing stock by type of ownership.

The total amount of municipality and state dwellings is 109,068. Of these dwellings 95,802 are in towns, 82,563 of them are permanently occupied and most of them are in blocks of flats erected with prefabricated concrete panels. 13,266 dwellings are located in villages, most of them are very old and cannot ensure any comfort. The number of dwellings owned by municipalities decreases constantly. This is due to the lack of funds for the erection of new dwellings and the trend to sell the dwellings to the tenants. 12,773 dwellings are owned by corporations (companies, institutes, etc.), which rent them to their staff.

According to the current legislation in Bulgaria, the tenants can apply to buy the dwelling that they rent from the municipality after 10 years of occupancy and most people take this opportunity. Currently there is a discussion among the municipalities and the policy makers about this

issue. It is expected that in the following years new legislation will be developed and municipality owned flats will not more be sold.

Energy performance data

The energy consumption in social housing apartments depends on the type of the building, not on the year of construction. Older dwellings have 42 cm thick brick walls and massive wooden windows, the average (building-related) energy demand is 170 kWh/m² year while for buildings erected with prefabricated concrete panels this figure is about 200 kWh/m² per year.

About 20% of the dwellings are heated through district heating systems (90% is natural gas based). The remaining 80% consists almost completely of single heaters (coal and biomass based, but also electricity).

Energy costs and prices

The average energy costs for households include about 12% of the household budget and 14 €/month²⁴. Electricity and fuel oil are the most expensive energy carriers, followed by natural gas and district heating. Because of these huge differences in the prices of energy carriers many people, mainly in the countryside, use wood (wood waste from the industry) or coal for heating, hot water preparation and even cooking.

Energy poverty is a significant problem in Bulgaria. There are no exact data concerning the number of households that are not able to pay their energy bills but it is estimated that more than 40% of the dwellings are not normally heated during the winter season. In many cases only one room is heated, in the other rooms the temperature often do not exceed 14°C, this means that about 40% of the households cannot afford the costs of normal heating (Stoykova, 2006). Very few consumers are regularly disconnected from electricity and DH networks, this figure is not higher than 2%, this is because the district heating and electricity supplying companies are very flexible and offer options for payment in instalments.

The municipalities grant subsidies for heating for low-income households. More than 10% of the households in Bulgaria receive such subsidies. These subsidies are distributed during the heating period October-April and amount up to 18 €/month.

2.8.1 Regulatory framework

In Bulgaria there are no special laws, norms or other requirements concerning state or municipality owned dwellings. As 97% of the dwelling stock is privately owned, the main laws concern the dwellings in blocks of flats.

The management and the maintenance of blocks of flats is realized in accordance with:

- The 'Law for ownership'.
- The 'Rules for management, order and control in the blocks of flats'.

The owners have the obligation to maintain and to refurbish their individual parts of the building. In practise this means that each owner has the obligation to share the costs needed for the maintenance and the refurbishment of the building according to (the size of) his part.

In cases when different parts of the building are owned by different persons, common spaces are: land over which the building is erected, foundations, external walls, internal walls that separate the different parts of the building, roofs, main lines of all installations, etc.

²⁴ Based on a twelve month average.

Municipalities should provide social housing for people with low income and vulnerable groups, but because of their very insufficient budget very few new social housing has been erected during the last 15 years.

Experts from the Ministry of Regional Development and Public Works have elaborated a proposal for a new '*Law for ownership*' since February 2006. It is expected that this law will be adopted till the end of 2006. The proposed law includes among others:

- To settle the public relations in which separated flats of part of the building belong to different owners.
- The formation of Associations of Owners for managing the common parts in the residential buildings. The law explicitly states what rights and duties this Association will have. E.g. the Association can set up and maintain a Reserve Fund to raise money for refurbishments (with mandatory instalments for all owners).

There is a regulation for the calculation of rent of municipality owned dwellings. The rent depends on the type of dwelling (flat, house), its location, condition, etc. The prices of rent are calculated also depending on the minimal amount of salary fixed by the government. These prices are further calculated with different coefficients for location, availability of utilities, condition and age of the building, etc.

With the Regulations to the Energy Efficiency Act are implemented all elements of the EU Directive on Energy Performance in Buildings. The regulations are in force since March 2005. According to them all buildings after major refurbishment should meet the new, higher, energy characteristics. These buildings are subject to energy audits before and after the refurbishment and to energy certification.

2.8.2 Institutional framework

In Bulgaria, the Ministry of Regional Development and Public Works is responsible for housing policy and city development.

The municipalities still own part of the housing stock in the country (3%) and they are responsible for the refurbishment of these dwellings. In general, municipalities should elaborate programmes for implementation of energy saving measures in municipalities' buildings. This should also concern rented social dwellings, but as the municipalities own only a small part of the dwellings in most residential buildings, the problem of the refurbishment and the energy conservation should be solved in partnership with all owners. To agree upon refurbishment has until now been difficult as no (national) associations of building owners exist.

The current legislation gives opportunities to the owners of flats in a building to set up their own association, but there are very few of such associations (less than 20 in the whole country). One of the aims of the new '*Law for Ownership*' is to stimulate setting up of such associations.

2.8.3 Financial framework

In Bulgaria there are currently two grant schemes available for housing refurbishment. The grants/loans are provided by:

1. The Energy Efficiency Fund (EEFB) - assisting energy efficiency investments, managed as a public-private partnership. The EEFB offers:
 - Private guarantees on credits: financial guarantees up to 500,000 USD per project for trade banks that grant loans for execution of energy efficiency projects.
 - Loans: loans for projects for energy efficiency with a value between 19,000 USD and 1,900,000 USD with interests lower than these on the market.

Examples of projects the EEFB finances are the refurbishment of buildings, improvement of district heating systems etc.

2. The Residential Energy Efficiency Credit Line (REECL), established by the European Bank for Reconstruction and Development. The REECL facility aims to give households across Bulgaria an opportunity to realize the benefits of energy efficiency home improvements by providing them with loans and incentive grants through local participating banks. Eligible sub-projects include energy efficiency improvements such as thermal insulation, energy efficient windows, efficient (gas/biomass) boilers and solar water heaters. Households can obtain incentive grants from € 200 to € 850. In case they comply with the terms and conditions of the REECL Programme, households are entitled for a refund of 20% of the investment costs afterwards. Through four Bulgarian banks the REECL Programme provides financing to Bulgarian households to tackle the inefficient use of energy and fuels in their residences.

The REECL has a relatively easy approach but has had limited success due to the following reasons:

- The interest rate of the loans offered in the framework of the programme is relatively high compared to the grant and therefore reduces user's motivation.
- The programme has an individual household approach, leading to partial implementation of saving measures that are inadequate for the entire building.

The recently adopted National Programme for Refurbishment of Dwelling Buildings in Bulgaria foresees also grants for refurbishment of dwelling buildings. A grant budget for 2006 was not adopted, but it is expected that the programme will start in 2007. This new Programme foresees in a direct state subsidy amounting to 20% of a basic package of measures necessary for refurbishment.

For the realization of refurbishment, it is required that a technical study is executed on every building by a qualified team. This study is shaped up in a statement with conclusions, evaluations and recommendations. This study should be executed according to the regulations for building certification. After the refurbishment the building should meet the new requirements stated in the regulations (as U-values of external elements of the building envelope).

2.8.4 Private sector initiatives

The process of refurbishment of residential buildings in Bulgaria is also determined by the specific structure of the ownership - 97% private. Following this, the decision for refurbishment depends on private initiative. Many buildings have been refurbished during the last 10 years and the trend is increasing. The decision for refurbishment and the implemented energy saving measures depend on the interests of the owners.

However, only a few multi-family dwelling buildings are completely refurbished. Most of these buildings are refurbished in the framework of pilot projects or other state or EC supported programmes. The problem with the whole refurbishment of these buildings is the diverse social status of the owners of flats. Because of this, it is very difficult to bring all owners together and to find a solution that is suitable for all of them. Therefore, often single dwellings in multifamily buildings are refurbished by their owners. The financing is either through own funds or through loans (including from the EBRD credit line). Unfortunately, this type of refurbishment leads to further problems as the building envelope is only partially insulated.

There are several attempts to carry out refurbishment of multi-dwelling buildings following the ESCO scheme. The problem is that many dwellings are not sufficiently heated, especially during the winter season. Under these circumstances it is not possible to apply the scheme with

guaranteed energy saving results, as after the implementation of the energy saving measures the dwellers will try to increase room temperature in their dwellings to acceptable levels, thereby using often as much energy (or only slightly less) as before refurbishment.

Energy performance contracting (through ESCOs) is applied for energy efficiency projects in municipal buildings (hospitals, schools, office buildings). These projects are quite successful; the energy savings are between 27% and 49%. The main barrier for these projects in the social housing sector is the lack of housing associations and the mixed ownership of flats.

It is difficult to receive a credit guarantee for refurbishment of a whole multi-dwelling building as the banks decline negotiations with many owners and ask for one legal representative. This means that the owners of flats in this building should register an association. The credit will depend on the value of the whole building and the average income of the owners.

3. Comparison of the (social) housing sector

3.1 Developments in the social housing stock

The review of the eight countries in the previous chapter shows that old EU Member States like Denmark, Germany and the Netherlands have a relatively large and well-defined social housing sector. Although not always defined by law (e.g. Netherlands), it is relatively easy to divide the (rental) social housing sector from the owner occupied sector. In all three countries, housing cooperatives are the main (in the Netherlands the only) owner of social housing.

There are official and less official definitions of social housing in these countries:

- Denmark: Rental accommodations that have received state support for either establishment or renovation or is owned by a municipality.
- The Netherlands: Houses in possession of social housing cooperatives.
- Germany: Social housing involves the construction of housing with the use of public funds and is intended for socially disadvantaged groups.

In the new EU Member States (Czech Republic, Slovakia, Poland, Latvia and Bulgaria) however, a specific social housing sector cannot be easily defined. This is due to the rapidly changing ownership structure during the economic transition in the nineties.

3.1.1 Housing stock privatisation

In most of the new Member States rental houses were owned by the state until the end of the eighties. Private ownership included mainly single-family houses and in a number of countries, such as the Czech Republic and Slovakia, also a type of cooperative ownership of multifamily buildings existed. Here each owner obtained a mortgage for their single flat that they had to pay off during 20 or 30 years. After that they became the owner of the dwelling but the common spaces remained in ownership of the cooperative.

After the fall of communism, the new governments transferred the state-owned housing stock to municipal authorities. As most municipalities did not have the capacity or the financial means to take care of the building stock, large shares of rental houses owned by municipalities have been privatised. This means that they have been sold against attractive prices to the occupants. However, for the majority of dwellings this has been done before any refurbishment of the flats had taken place. As a result, refurbishment of flats remains a necessity, but has become more complex to organise due to the current ownership structure and the fact that low-income groups do not necessarily live in rental flats.

This creation of mass home ownership has been the most profound in Bulgaria where nowadays almost 97% of all dwellings are privately owned. But also in the Czech Republic, Poland and Slovakia, large-scale privatisation has taken place. Only in Latvia, more than 50% of all dwellings remain in municipal ownership. In the Czech Republic, the majority of dwellings is privately owned, but a relatively large rental sector with around 20% of dwellings in municipal ownership remains. Here also a large share of dwellings is owned by housing cooperatives, many of them established already in communist times ('cooperative ownership'). These housing cooperatives have a different structure than those in the Netherlands and Denmark. They are comparable to homeowner associations where all occupiers are obliged to pay a fixed amount each month for housing maintenance. This form of housing ownership is also common in Slovakia and Poland.

Due to these different kinds of ownership structures, the target group for social housing refurbishment is therefore not so easy to define. Rental dwellings, and especially rental dwellings occupied by weak social groups form a very limited share of the housing stock and therefore we cannot say that only this selected category encompasses the social housing stock. Generally, the prefabricated housing blocks in the new Member States (built after WW II until approx. the end of the 80-ties) are those that are in the largest need of refurbishment.

Because of these different kinds of ownership structures it was necessary to create a broader definition of social housing within the InoFin project. Social housing has therefore been defined as “*accommodation for lower income groups including recently privatised housing stock as well as accommodation for vulnerable social groups*”. This definition covers the broad sector of housing that can be specified as ‘social’ for all the countries participating in InoFin.

3.1.2 Housing stock data

Social housing stock

The data in Table 3.1 give the number of houses that, according to the project team, belong to the social housing sector as defined in InoFin. As shown in the table, the share of housing stock that falls under the InoFin definition is significant. For some countries (e.g. Bulgaria), the category of social housing is defined as housing in panel buildings. But a far larger part of privatised housing stock could fall within the social housing sector.

Table 3.1 *Shares of social housing in the housing stock*

	No. of social dwellings	Total No. of dwellings	Social dwellings [%]
Denmark	522,000	2,443,806	21
Germany	20,600,000*	35,800,000	58
Netherlands	2,362,000	6,800,000	35
Bulgaria	707,441**	3,352,255	21
Czech Republic	1,165,000**	4,302,084	27
Latvia	444,533***	795,723	56
Poland	7,046,746**	12,596,000	56
Slovakia	778,000**	1,655,536	47

* in rental flats

** in panel buildings

*** in municipal flats

Energy performance

The energy performance of the housing stock has changed very rapidly since WW II in all countries. In all countries there is a decreasing trend towards less energy use, although this is only very limited in the new Member States. Table 3.2 shows that Denmark and the Netherlands have significantly reduced the energy performance of new buildings. The energy performance of the dwellings in the new Member States has improved very little during the 2nd half of the 20th century and therefore lags behind (and is in most cases at least twice as high as in old EU Member States).

As energy consumption calculations are not carried out in the same way in each country, they should not be viewed as an exact comparison. Another point is that domestic hot water is not always included, making comparison difficult. Some preliminary conclusions can be made however:

- When comparing Denmark and the Netherlands, we see that Denmark was initially lagging in energy performance, but that energy performance for new houses is nowadays comparable in both countries.

- In some of the new Member States, (panel) houses built between 1960 and 1990 have higher energy intensity than the ones built before 1960 (e.g. in Bulgaria or the Czech Republic). This shows that the quality of these dwellings from an energy efficiency viewpoint is very low.

Table 3.2 *Energy performance of housing stock (kWh/m² year per period of construction) including space heating and DHW*

	Before 1945	1946-1960	1961-1970	1971-1980	1981-1990	Since 1990
Denmark	161	140	119	106	89	64
Netherlands ***	100	87		86	66*	50**
Bulgaria		170		200		180
Czech Republic	170	160	200	240	180	150
Latvia (excl. DHW)	n.a.			150		
Poland (excl. DHW)		250-380			160-200	120-160
Slovakia (excl. DHW)	182	179		170	159	128

* 1981-1995

** since 1995

*** apartments only

3.2 Energy cost data

Price levels of the main energy carriers form an important driver to energy efficiency measures and are therefore included in the InoFin survey. Energy costs for households show large differences between the countries considered. Table 3.3 shows the prices of the main energy carriers. Prices are without VAT and any other taxes to make a comparison possible. Prices of electricity and natural gas are much higher in Denmark and the Netherlands as in the new Member States. Among the new Member States there is a significant difference in electricity prices, but for natural gas, prices are comparable (except for Latvia where prices are lower).

Table 3.3 *Prices of the main energy carriers (2006)*

Energy carrier [€/kWh]	DK	NL	CZ	SK	PL	LT	BG
Electricity	0.194	0.180	0.071	0.100	0.098	0.055	0.070
District heat	0.057	0.160	0.044	0.050	0.035	0.032	0.028
Natural gas	0.086	0.150	0.034	0.032	0.032	0.021	0.034
Fuel oil	0.087	-	0.044	0.049	0.068	-	0.097
Hard coal	-	-	0.015	0.009	0.028	-	0.025
Wood	-	-	0.028	-	0.023	-	0.020

As the average income level in the new EU Member States is substantially lower than in the old ones, the shares of the energy costs in household budgets shows a completely other picture. Table 3.4 shows that the shares in the new Member States are significantly higher than in the old ones.

Table 3.4 *Share of energy costs in household budget*

	[%] of household budget	VAT rate [%]
Denmark	7.5	25
	4.4 (heating only)	
Netherlands	4 (2000 data), now \pm 6	19
Bulgaria	12 (heating only)	20
Czech Republic	\pm 10	19 (5 for DH)
Latvia	12.6	18 (9 for DH)
Poland	6 (heating only)	22
Slovakia	16.9	19

Note that these data give year-round country averages and energy costs for vulnerable social groups can be far higher, especially in winter. A problem is that in e.g. Bulgaria a large number of households cannot afford to pay the energy bill and therefore a large number of dwellings are not normally heated (estimates show numbers as high as 40%). This means that actual heating costs are lower than they would have been in case the dwelling would be properly heated.

In Latvia and in Bulgaria subsidies are available for covering part of the energy costs for vulnerable social groups. In Bulgaria, 10% of the households receive such type of subsidies during the heating season (October to April).

Even more important than just this comparison is the fact that energy costs have increased significantly during the last few years in all countries concerned. For this purpose we can compare the electricity and natural gas prices in 2003 and 2006 for all InoFin countries (other energy carriers are not used in all countries so comparison is not possible).

Table 3.5 *Developments of electricity and gas prices between 2003 and 2006*

		2003 [€/kWh]	2006 [€/kWh]	Increase [%]
Denmark	Electricity	0.177	0.194	10
	Natural gas	0.055	0.086	56
The Netherlands	Electricity	0.140	0.180	29
	Natural gas	0.100	0.150	50
Bulgaria	Electricity	0.048	0.070	46
	Natural gas	0.027	0.034	26
Czech Republic	Electricity	0.044	0.071	61
	Natural gas	0.019	0.034	79
Latvia	Electricity	0.047	0.055	17
	Natural gas	0.014	0.021	53
Poland	Electricity	0.090	0.098	9
	Natural gas	0.021	0.032	52
Slovakia	Electricity	0.086	0.100	16
	Natural gas	0.021	0.032	52

We can conclude from this table that prices of both gas and electricity increased significantly between 2003 and 2006, and for almost all countries (except Bulgaria) gas price increase (average around 50%) is much larger than electricity price increase (average 10-20%). In the Czech Republic the increase of electricity prices is the largest and they increased almost as fast as natural gas prices between 2003 and 2006.

4. Comparison of the regulatory and institutional framework

4.1.1 Social housing regulations

In Denmark, Germany and the Netherlands a separate social housing sector is covered in the regulatory framework. All three countries have in place:

- Acts regulating the rent of dwellings.
- Acts specifically regulating the rents of social dwellings.
- Acts/decrees regulating rental subsidies for low-income groups.

The situation in the five new Member States is less organised, partly due to dramatically changing ownership structures after the economic transition. A regulatory framework for (social) housing has been developed in recent years in many new Member States. Examples are rental laws declaring the relationship between tenants and owners and maximum rent increase for specific parts of the housing stock. The problem is that in many cases, housing and rental laws are still outdated. This leads to the following problems:

- In rental dwellings the rental incomes are not sufficient, partly because rent increases of (part of) the rental housing stock remains strictly regulated.
- In flats with homeowners there is usually the condition that 75% or more of homeowners should agree on any refurbishment undertaken. This presents a problem when there is a mix of higher and lower income people in a flat.

Examples of the regulatory framework of rental housing are the following:

- Rental laws are in place in Latvia and Poland and are just being prepared in the Czech Republic. In Slovakia and Bulgaria no rental law yet exists.
- Other specific rental regulations in place are:
 - In the Czech Republic, rental contracts agreed before 1995 have strictly regulated rents, also those contracts agreed in the private sector. No regulation exists for newer contracts.
 - Poland has a law in place on the security of tenants (stating maximum rent per dwelling).
 - In Slovakia, national government formulates maximum rent increase for publicly owned houses (only 4% per year). Prices will be deregulated from July 2007 onwards.
 - In Latvia, rental prices comprise maintenance costs for building divided proportionally to rented space and profit of landlord or property owner.
- Housing policy documents have been developed or are being developed to date. In e.g. the Czech Republic also large municipalities are obliged to develop their own housing concept.
- Rental subsidies do exist in the Czech Republic for low-income people.
- In Poland, rents of a limited share of social housing stock cannot exceed 50% of rents related to municipal housing stock. However, this only holds for a limited group of apartments for vulnerable social groups (32,000).
- In Bulgaria, rental regulation has little influence on the housing stock given the 97% private ownership. Until today, there was no legal possibility to establish homeowner associations; the draft Law for Ownership is expected to change this. This law is expected to come into force during early 2007.

4.1.2 Social housing institutions

In Denmark, Germany and the Netherlands, housing cooperatives and municipalities own the complete social housing stock. In the Netherlands, housing cooperatives are practically the only

owners, in Denmark and Germany, both municipalities and housing cooperatives own social housing.

What part of the housing stock has been transferred to private ownership differs per country, see also Table 4.1:

- In Poland, the Czech Republic and Slovakia housing cooperatives exist owning a substantial part of the housing stock, 29%, 17% and 12% respectively. Housing cooperatives in these countries have, however, a different status and form practically homeowner associations (very often the occupants are the owners) with shared ownership of the common parts of multifamily buildings.
- In the Czech Republic, municipalities also own still about 17% of the housing stock, in Poland this percentage is about 12%. In Slovakia and Bulgaria this is a very limited percentage (below 5%).
- In Latvia, municipalities own more than half of the housing stock.
- In Bulgaria, 97% of all dwellings are privately owned (almost all municipal dwellings have been privatised).

Table 4.1 *Shares of housing ownership per country*

[%]	Private ownership	Private rental	Public rental	Housing cooperative	Other
Denmark	51	20	7	21	-
Germany	43		57		-
Netherlands	54	11		35	-
Bulgaria	97	-	3	-	-
Czech Republic	47	16	17	17	3
Latvia	40	-	5	2	-
Poland	55	-	12	29	4
Slovakia	55	-	4	12	29*

* This mainly includes combined ownership.

This decreasing share of municipal/social rental housing is the main reason that there is little involvement of municipalities in housing, including the improvement of city quarters.

4.1.3 Energy/heat supply regulation

Prices of the main energy carriers (electricity and natural gas) are not regulated anymore due to the liberalisation of the energy markets. A different situation exists with district heat supply. As for heat supply consumers are dependent on one supplier, a heat supplier practically has a monopoly. Because of that and the fact that district heating is a very important source for heating of households, heat price regulation is in place in most of the InoFin countries.

- In the Netherlands since the 1980's an informal heat cost regulation system is in use. At the time the public energy suppliers decided to base heat cost rates on the total costs a comparable household would make for heating with an individual central heating system on natural gas. This Not More Than Usual (NMDA) principle is normative for most district heating in the Netherlands. To protect heat consumers, the Dutch parliament is discussing an act to regulate heat costs. According to this act district heating costs from individual heating systems must be based on real costs made by the energy-supplier raised by a reasonable profit. Despite these cost-based rates the total heat costs for household are limited to the level of costs for individual heating systems. Therefore, the act formalises the NMDA principle. A transparent and reasonable NMDA should fix the maximum heat costs.
- The Danish Energy Authority has set the general conditions for the establishment and operation of district heating and ensures fair conditions and prices for the consumers hereunder for tenants in social housing. For this reason the Danish Energy Regulatory Author-

ity²⁵ and the Energy Supply Complaint Board monitor the district heating sector and handle complaints regarding prices and conditions.

- In Germany heat prices are not regulated. Prices are negotiated between supplier, usually the municipal supplier, and (large) consumers. Increases in prices are handled through changes allowed for in price clauses in the heat supply contract.
- In the Czech Republic the price of heat supplied to all customers is regulated in the way of cost-plus regulation. The price may only include eligible costs, fair profit and VAT. A fair profit means usual level of profit, which can be reached in similar economic activities, and which secures an adequate profit margin in adequate time horizon according to a special Decree directly related to the heat supply.
- In Slovakia, heat costs are regulated in the Act on the Heat Energy Sector. This act includes heat cost calculation and maximum prices. The Regulatory Office for Network Industries carries out the heat price regulation.
- In Poland heat costs are based on a cost plus system and controlled by Ministry of Economy. Heat costs may include max 3% profit and the fixed costs max 30% of delivery price. Justified costs may also include certain energy saving measure costs undertaken by the supplier in the customers' area.
- In Latvia, 84% of households are supplied by district heating and therefore an extensive system of heat cost calculation exists. Heat costs are regulated through a ministry regulation:
 - Based on real consumption if a heat meter is available.
 - Two-tier heat tariffs when no meter is installed.
- In Bulgaria, prices of district heating are regulated by the State Commission on Energy and Water Regulation.

²⁵ The Danish Energy Regulatory Authority (DERA) monitors the district-heating sector and handles complaints of a general nature. All district-heating and co-generation plants are obliged to keep the DERA informed about consumer prices and conditions so that it is able to handle any complaints or objections. The DERA usually deals with general questions such as those regarding tariffs and delivery conditions.

5. Comparison of the financial framework

5.1 Public financing of social housing refurbishment

In all of the eight InoFin countries some form of support is provided to social housing refurbishment. There is a large diversity with regards to available budgets and form of support provided; both grants and soft loans are common (see Table 5.1). Different types of financing schemes can be distinguished:

- Grants - grants have been very useful in promoting new technologies with relatively high purchase prices that prevent their massive introduction. Examples of successful projects are the Dutch National Insulation Programme carried out in the 1980s and the Dutch energy premium scheme of the first years of this century. Through these programmes a number of technologies were massively applied, first wall insulation, later also condensing boilers, double glazing etc. Although grants can be effective in promoting certain technologies, there remains a risk of free-rider effects.
- Soft loans - The provision of loans with lower interest rates than commercial loans helps to overcome the financial barrier for larger investments that are on the brink of feasibility with a commercial loan. Soft loans are applied in Germany under the KfW programme and have also been introduced in new Member States like the Czech Republic.
- Credit guarantees - Some refurbishment projects are practically feasible but especially when it concerns small-scale housing refurbishment projects, banks view these projects as relatively risky. As a result they charge high interest rates, making the projects less attractive. When a large institution (e.g. government agency) provides a guarantee banks will charge lower interest rates, making these projects more attractive. This is a good option when access to capital is major barrier and not the economic feasibility of the project.

Some countries use mixes of schemes:

- Loans combined with grants - A good example is the Polish Thermo-modernisation Fund where loans taken at certain banks for modernisation of heating systems and insulation measures are combined with a grant of 25%. In Bulgaria, the Residential Energy Efficiency Credit Line is based on the same principle. The advantage of providing a loan in combination with a grant is that people applying under this system are usually committed to carry out a refurbishment and are not just applying for a grant because of its availability.

Table 5.1 *Overview of existing public financing schemes*

	Program	Type	Target group
Denmark	National Building Fund	Self-financing + contribution of municipal authorities	Social housing cooperatives
Germany	KfW (Reconstruction Loan Corporation) - CO ₂ reduction programme (East Germany) Heat insulation in apartment houses (Hamburg)	Soft loans, measure packages for renovation of heating systems and insulation Grants	Housing cooperatives, private owners
Netherlands	Energy premium scheme TELI programme Green Funds Scheme	Grants (2000 - 2004) Grants Soft loans	Private owners Low-income households Housing cooperatives, private owners
Bulgaria	Energy Efficiency Fund Residential Energy Efficiency Credit Line (EBRD + Bulgarian banks) National Programme for Refurbishment of Dwelling Buildings (<i>starting 2007</i>)	Credit guarantees/soft loans Loan combined with 20% grant Grants	Private owners, municipalities Private owners Private owners
Czech Republic	Housing Support Programme Support for mortgage loans State Housing Development Fund	Grants, refurbishment of panel houses Soft mortgage loans Soft loans	Private owners, also depending on People up to 36 years of age Depending on subprogramme, municipalities, young people
Latvia	Loan programme for housing refurbishment (Valmiera city)	Non-interest loans	Private owners, municipalities
Poland	Thermorenovation Fund	25% grant to a loan taken	Private multi-single family dwelling owners
Slovakia	State Fund for Housing Development Building Savings Programme State Support Programme for Housing Stock Renewal	Grants, housing for lower income groups, removal of systematic defects 5-15% grant to loan taken State Guarantees for Credits, refurbishment and energy efficiency investments	Private owners, corporate body including municipalities, NGOs and associations of owners Individuals, associations of owners and administrators of flat houses Legal entity having a registered contract ('Association of Owners'), Administrator, i.e. a natural person or and legal entity, performing the flat-administration for the flat owners

The overview in Table 5.1 does not include future programmes and possible financial sources that can be gained from EU Structural Funds.

The existing refurbishment programmes in the new Member States provide important support for refurbishments of the old (high-rise) panel buildings. Simple calculations show, however, that existing programmes will only be able to refurbish a very small part of the existing housing stock. The need of additional/innovative financing is therefore clear. This can be shown with the Polish Thermo modernisation Fund as an example. This fund provides 25% grant support for thermo-modernisation measures. Until the end of 2005, 4000 multifamily buildings have been retrofitted (most of them in the last three years). In absolute terms, this may seem to be a large amount, but on a total of 600,000 multifamily buildings (most of them in need of some form of refurbishment) in the social housing sector it has had very little influence yet on a national scale.

Examples from grant programmes in the Netherlands show the large amounts of financial resources spent on energy saving measures:

- In the framework of the National Insulation Programme about 1.8 million dwellings have been insulated and/or equipped with condensing boilers in the Netherlands. Within this programme, € 750 million was spent.
- The Energy Premium Scheme set up at the end of the nineties provided grants for energy efficiency measures and technologies such as double-glazing, insulation, condensing boilers, solar collectors for hot water and even PV-panels. In the years 2000, 2001 and 2002 a total amount of € 350 million was spend in the framework of this programme.

It is difficult to conclude how effectively this money was spent, but the total amounts give an indication of the total sums needed to create a substantial impact with grant money only. Government funding can therefore not be the only way to carry out refurbishments and assistance of the private sector is required.

There are other differences between housing refurbishment undertaken in Denmark, Netherlands and Germany on one hand and the new Member States on the other:

- The role of housing cooperatives is leading in Denmark, the Netherlands and Germany, in the new Member States much of the programmes are aimed at single households (with the Czech Republic as exception where programmes are often aimed at housing cooperatives).
- Refurbishments in the new Member States are mainly aimed at the technical infrastructure, improving buildings in bad technical state. Programmes in the Netherlands and Germany look at refurbishment of whole city quarters, improving the liveability of quarters. So far, little financial means in new Member States are allocated for these kinds of programmes.

5.2 Private initiatives in social housing refurbishment

Private sector initiatives in the field of housing refurbishment are increasing in both old and new Member States.

In the Netherlands, housing cooperatives are looking for different ways how to finance the refurbishment of social housing. The traditional ways of financing, through increasing the rent is not always possible through regulated rent increases and it also often leads to protests of tenants. Therefore, other possible financial constructions can be applied such as:

- Energy supply contracts with energy suppliers. Here an energy supply company manages the energy supply of a whole building block, leases boilers to the tenants and takes care of energy management.
- Energy performance contract. A contract between tenants, housing cooperative and an external party about (collective) energy supply with a certain percentage of realised savings.

- A living expenses guarantee - the housing cooperative guarantees that the total living expenses (rent + energy expenses) will not increase after refurbishment, or increased by a very limited amount only.

A relatively new approach is financing energy efficiency investments through the mortgage. One example in the Netherlands shows that this option enables private persons to borrow an additional amount of money specifically aimed at investments in energy efficiency (see also Section 2.2.4). Leasing of equipment (solar boilers etc.) is another way of financing energy efficiency measures that is applied by energy suppliers and several banks.

In the Czech Republic, Slovakia and Latvia, private banks started to develop specific loan programmes for private owners and housing cooperatives. Interesting is the situation in Latvia. As practically no government funded grant programmes exist, the loan programme in Valmiera is the only exception, and banks offer commercial loans for energy efficiency and general refurbishment projects in apartment dwellings.

6. Drivers and barriers to social housing refurbishment

This chapter gives an overview of the main barriers and drivers to housing refurbishment identified in the InoFin countries. These barriers and drivers have been identified by each of the eight InoFin partners in their national reports. Table 6.1 first gives an overview of the main barriers, divided into legal, institutional, financial, technical and other barriers. Then Table 6.2 gives an overview of the main drivers, divided into the same categories.

Table 6.1 *Overview of barriers to housing refurbishment*

	Legal	Institutional	Financial	Technical	Other
Denmark		District heat saving measures not prioritised (waste product, less motivation to save energy)	Rent has to be low in social housing sector		Unoccupied dwellings Very democratic decision making in social housing sector (time-consuming)
Germany			No more structural funding expected	Little integrated projects (renovation and energy supply combined)	
Netherlands	Uncertainty with implementation of EPBD and grant schemes, many changes in government policy		Rent increase after refurbishment lowers support (rent subsidies) Government grant budget lowered	Bad experiences with insulation technology in 1980s because of worsened ventilation causing moisture and mould problems	Prejudice against certain technologies (e.g. solar systems) due to lack of information
Bulgaria	Outdated law on ownership, it requires agreement of <i>all</i> owners (100%) for refurbishment	Owners of flats not organised in home-owner associations No housing cooperative for social housing	Low-income people cannot afford loans Banks only grant loans to organised group (association) of owners (often not existing)	Possibility to measure and monitor energy consumption, availability of technical data, ability to carry out energy audits	Mixed ownership of dwellings Mix of low- and high income people in housing blocks
Czech Republic	Social housing not officially defined	No institution or special programme dealing with social housing Existing refurbishment programmes not coordinated	No possibility to increase rents after refurbishment of housing owned by municipalities	Lack of awareness on new technology (e.g. use waste heat and RES in buildings)	Lack of awareness on financing possibilities

	Legal	Institutional	Financial	Technical	Other
Latvia	>75% of apartment owners to vote for renovation		Practically no government support for refurbishment Relatively low income level		Fear of inhabitants of taking loans
Poland		Lack of promotion from the state	Long payback time of projects State support remains limited	Housing cooperatives not technically skilled	Inhabitants avoiding loans (preferring state support)
Slovakia	>75% of apartment owners to vote for renovation	Lack of capacity at government agencies Unsuccessful energy planning at local/regional level Ongoing transfer of ownership	Limited access to capital Low utilisation of grant schemes (too restrictive)	Short-sight view (extending lifetime of panel building not seen as priority yet)	Lack of awareness on possibilities for refurbishment

Table 6.2 *Overview of drivers to housing refurbishment*

	Legal/Institutional	Financial	Technical	Other
Denmark	Legal & institutional setup around EPBD adoption, energy certification	Increasing no. of unoccupied dwellings (energy efficient dwelling attractive)	Social housing of 1960-70s in bad condition, need for reconstruction	Competition on energy performance among housing cooperatives
Germany		CO ₂ reduction grant scheme		Many good examples and model concepts Dissemination of good project experience (e.g. by SenterNovem)
Netherlands	Adoption national and EU legislation	Rising energy prices, extending lifetime of S.H. (rent income for more years ahead from same building)		
Bulgaria	Implementation of EPBD Adoption of Law on Ownership	Rising energy prices, energy poverty, grant programme recently available (National Programme for Dwelling Building Refurbishment)	Aging and deteriorating housing stock	Improved comfort and ability to 'normally' heat apartments
Czech Republic	Privatisation of housing stock (occupants will be more responsible for own dwelling)	Rapidly increasing energy prices Variety of programmes for housing refurbishment introduced VAT rate for social housing construction and refurbishment remains at 5% (instead of 19%)	Aging and deteriorating housing stock	Need to extend lifetime of current housing stock, cheaper than building new housing stock

	Legal/Institutional	Financial	Technical	Other
Latvia		Decrease energy bill (and rising energy prices) Increase of value of real estate after refurbishment (two to four times) Well established commercial loan system	Most buildings have never been refurbished before	Improved comfort and appearance of buildings.
Poland		Rising energy prices	Aging and deteriorating housing stock	
Slovakia		Rising energy prices, energy poverty Increasing prices of real estate	Aging and deteriorating housing stock Large energy saving potential	Increasing value of older housing stock, increasing competitiveness to newly built housing. Motivation of municipalities to increase the share of rental housing sector

Based on the overview above we can conclude that there is a complex set of *barriers to housing refurbishment*. The most important barriers identified are:

- Lack of suitable financial mechanisms - Given the enormous amount of houses that need to be refurbished, the available public financial sources and programmes are limited. This is especially the case for grant schemes, some of which have also very restrictive rules.
- Refurbishment programmes (at least the state support programmes) are aimed at housing stock in bad technical condition. As a result, little remains for energy efficiency itself.
- Transfer of ownership and resulting problems with decision-making about refurbishment - The privatisation of the housing stock in the new Member States leads to complex decision-making processes among the new home-owners. Transfer of ownership has its benefits, as the occupants feel more committed to undertake repairs or complete refurbishments of their own dwelling. At the same time, it creates a lot of problems also. These dwellings are inhabited by people of all income levels and in some cases only part of the flats are owner occupied, creating mixed ownership. This greatly inhibits the possibility of complete refurbishment of flats. Even in the case that all flats are owner-occupied, a certain percentage (50 - 75%) of all owners have to agree on the renovation. The situation is especially difficult in Bulgaria where currently all owners (100%) have to agree on a refurbishment project.
- Access to capital is improving, but as most countries do not have much experience with mortgages and other loans yet, conditions remain relatively restricted and a large part of the population does not qualify for loans. Furthermore, an important psychological barrier is that people are not yet used to take loans with accompanied risks and for a longer period of time.
- An important barrier to social housing refurbishment in the Netherlands and Denmark is the limited possibility for rent increase after refurbishment. This is a barrier that may also be in place in other countries with a relatively large rental sector (Latvia, Czech Republic).
- The lack of awareness towards new technologies is a barrier that can be noticed in both old and new EU Member States. Sometimes this is because of bad experiences people had with an often not correctly applied technology (e.g. insulation in the Netherlands) or the lack of awareness of the applicability of new technologies and approaches in general.
- Apart from technological awareness, residents have usually little knowledge of and experience with the preparation of a housing refurbishment project. In the new Member states this problem is more significant as there are little independent agencies residents can turn to for technical or practical advice.

When we look at the *drivers towards housing refurbishment* we can conclude that there are two major drivers that are important in practically all countries:

- Rapidly increasing prices of the main energy carriers, natural gas and electricity, providing a strong motivation towards improving the energy performance of the housing stock.
- The aging and deteriorating housing stock increases the need for refurbishment and could at the same time be used for increasing the energy performance. As the demand for housing is not expected to decrease, extending the lifetime of the existing housing stock represents a far cheaper option than building new houses.

Apart from these two, the following drivers may also assist in creating a beneficial environment for housing refurbishment:

- Increasing possibilities to take loans from commercial financial institutions for housing refurbishment projects.
- The issue of energy poverty and the inability of many households in countries like Bulgaria to properly heat the dwelling is another (social) driver to housing refurbishment. This problem may be overcome by targeted support for energy efficiency measures for low-income households.
- In the rental sector of mainly the Netherlands and Denmark, housing refurbishment and increasing the energy performance will make the housing stock of housing cooperatives more attractive. This is especially important in regions where there is less demand for rental hous-

ing and people can chose between different qualities of housing. (In the more populous parts of Denmark and the Netherlands this is not the case as there is too little housing for the existing demand).

- In countries where owner-occupied dwellings are the majority, owners will see the value of their real estate increase. This is especially attractive when still a large part of the housing stock has a very unfavourable energy performance.
- A major driver that should not be underestimated is the dissemination of good housing refurbishment examples by independent agencies as can be seen in Germany and in the Netherlands. This gives target groups, such as homeowner associations and housing cooperatives, the possibility to (I) learn from successful projects and (II) ask for advice for their own projects from independent agencies with regards to technologies and financing possibilities.

7. Conclusions and recommendations

This report has extracted experiences from three Western European countries, Denmark, Germany and the Netherlands, complemented with recent developments in five new Member States to provide recommendations for accelerating social housing refurbishments in the new Member States.

When comparing the housing situation in the three Western European Countries with that in Bulgaria, the Czech Republic, Latvia, Poland and Slovakia, large differences can be noticed in the point of departure as well as in the developments of recent years. As a result, Western European experiences are not always applicable in the new Member States:

- Denmark, Germany and the Netherlands have a large and clearly defined social housing sector, including rental housing for low- and average income people. Part of this housing stock is owned by municipalities and part by (non-profit) housing cooperatives. Therefore, the complete social housing stock consists of rental housing and refurbishments are therefore usually initiated by the owner (municipality or housing cooperative).
- In the five new Member States, ownership structures have rapidly changed during the last 15 years. Although the situation in each country is specific, part of the social housing stock has been transferred into private ownership. This means that low-income groups often possess their own dwelling and are responsible for refurbishments and regular maintenance.
- Private or sometimes mixed ownership of housing blocks severely complicates decision-making surrounding housing refurbishment. In countries that have established homeowner associations, the decision-making process is easier (e.g. Czech Republic, Poland) than when such organisations have not been established (e.g. Bulgaria).
- Denmark, Germany and the Netherlands have introduced extensive grant programmes for housing refurbishment up to the present day. This has led to a significant improvement of the energy performance of the building stock. However, this required enormous amounts of public money for refurbishment and these might not have always been cost-effective investments.
- When looking at the support programmes available in the new Member States, especially compared to the refurbishment needs, one has to conclude that these financial means are not sufficient for the current housing stock.
- Both in the new and old Member States, there is now more attention for alternative financing schemes using private money. Reasons are twofold; first, grants in both the old and new Member States are limited compared to the refurbishment needs. Second, private financial institutions are more and more willing to provide loans or mortgages for housing (refurbishment) projects.

7.1 Recommendations

Based on the country reports and the overview of drivers and barriers a number of recommendations can be made to accelerate social housing refurbishments in the new Member States. These recommendations are related to strengthening institutional structures, coordinating grant programmes, facilitate access to private financing and providing independent advice to residents.

Improve institutional structures

Due to major changes in ownership structures between 1990 and present, the new Member States have become countries of homeowners. Therefore, setting up institutional structures among homeowners of flats in multifamily buildings is of major importance to undertake regular maintenance and major refurbishments. It is necessary to:

- Oblige homeowners to form homeowner associations.

- Give homeowner associations a legal status, able to represent homeowners.
- Oblige homeowners to pay a certain amount each year into a 'renovation fund' from which regular maintenance and refurbishments are paid (this happens already in some countries, e.g. in Slovakia).

Improve access to private financing

Due to limited government budgets for housing refurbishment (both in the Western and Eastern Europe) a lot of financial means for housing refurbishments will have to come from (private) banks. As a large number of refurbishment projects are cost-effective in the long-term as they lead to decreased energy costs and improving indoor comfort, finally increasing the value of real estate. Therefore homeowner associations and housing cooperatives should have the possibility to apply for loans at acceptable conditions:

- Small-sized loans should be offered against acceptable interest rates.
- Possibility to take loans with longer duration periods (10 years and more).
- External organisation (government or foreign housing cooperative) could provide guarantees for loans so that interest rates are lower.

Other ways of financing housing refurbishment or refurbishment grant programmes are:

- Use income from sold housing stock income for refurbishment of housing stock.
- Combine revenues from sale of new housing with refurbishment of existing housing stock.

Coordination of grant programmes and other government support

There is urgent need of coordination of the different support programmes that are now in place for housing refurbishments. A number of countries have introduced different grant or soft-loan schemes with very different criteria that could be better integrated.

Furthermore, as grant programmes are dependent on limited government budgets, they should be focused on limited types of projects instead of providing generic support. Examples are:

- Use grant schemes only for complete refurbishments or for combinations of technologies (e.g. combining insulation with installation of condensing boilers) or for new less conventional technologies that are less accessible due to their high purchase price (e.g. heat pumps, solar boilers, PV panels).
- Use grant support for project preparation. Preparation of refurbishment projects usually means a lot of work and not all residents are able to prepare a well-prepared refurbishment project for their dwelling. Providing grants for energy audits or project preparation activities could greatly overcome the knowledge barrier among residents.
- Design grant or soft loan programmes for weaker social groups (as far as they are homeowners, as in Bulgaria). These groups have often little financial possibility to finance refurbishment and are also heavily affected by increasing energy prices.

For the coming years there is a need to coordinate national grant and soft loan programmes with EU structural funds, especially in the new Member States, as Structural Funds may come available for housing refurbishment projects.

Provision of independent information

As there have been both good as well as less good examples of housing refurbishment projects it is of major importance to disseminate these project examples. Lessons learned from both more and less successful projects should be disseminated as well in order to avoid making the same mistakes in the future. This can lead to increased awareness among residents in non-refurbished dwellings so that they become aware of the technical and financial possibilities of housing refurbishment as well as learn from mistakes made by others. A standard evaluation of existing refurbishment projects could be an important tool in the dissemination of project examples.

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Appendix A Examples of refurbishment projects

This annex includes 3 examples of successful refurbishment projects carried out in three of the InoFin countries, the Netherlands, the Czech Republic and Latvia.

A.1 The Netherlands - Veenendaal

Between July 2000 and March 2002 Patrimonium Woonstichting, a Dutch housing cooperative in the town of Veenendaal (30 km east of Utrecht), refurbished two apartment buildings at the location Tarweveld/Gersteveld, each containing 75 dwellings with a floor area of 95-100 m².

With this refurbishment they had three goals in mind.

1. Replacement of an out-of-date heating system.
2. Lengthen the life span of the buildings with 15 years.
3. Accomplish major energy savings.

The refurbishment plan originates in the need to replace the worn out collective heating boiler. Instead of simply replacing the old boiler for a new one, the housing cooperative made use of this change to combine it with several other improvements.

The refurbishment project

The project started with the replacement of the old boilers with new, very efficient condensing boilers. The old heating pipe system and radiators were not well suited for these new boilers. To improve energy savings, new piping and radiators, adjusted for the new heat capacity, were installed. The hot tap water supply was also changed. Electric boilers and geysers were replaced with a collective system combined with individual solar water heaters (2.25 m² each) for every apartment. A universal control unit was installed. This unit controls the room temperature (room thermostat) and minimal tap water temperature. It also monitors the heat obtained per apartment for individual payment. To improve living conditions, a balanced mechanical ventilation system was installed in all dwellings. The housing cooperative gave tenants the opportunity to suggest other improvements in their apartment, such as a new kitchen unit, so these could be combined with the other construction works.

Before and after refurbishment, space heating was and is based on a collective system, maintained by the housing cooperative. They were and are responsible for charging the heat taken by the tenants. This requires a good monitoring system. Because of this, the cooperative has good insight to the effects of the energy saving measures. The use of natural gas before refurbishment was about 1450 m³ on average per dwelling.²⁶ Because of the measures taken this has decreased by about 30%. In kWh/m² year; this means about 125 kWh/m² before and 90 kWh/m² after refurbishment.

Financial aspects of the project

The total costs for the project were € 1.24 million. This means that the average costs per apartment were € 8,327 (excl. VAT about € 85/m²). An amount of € 1,044 per apartment was subsidized because of the use of solar energy. The remaining investments were done by the housing cooperative. Their benefit from the refurbishment is mainly the lifetime extension of about 15 years. This means revenues from rents for an additional 15 years. Because of this integral approach, no rent increase was necessary to finance the refurbishment.

²⁶ Before the refurbishment, in some apartments, hot tap water was made with an electric boiler. The electricity, expressed in gas equivalents, is included in the average gas consumption. Cooking gas is also included.

Creating support to the tenants

At first, the tenants were not enthusiastic about large-scale refurbishments. They were satisfied with their apartments, their neighbourhood and their comfort. Plans for refurbishment came as a surprise for some tenants. Intensive consultation with tenant representatives showed them the comfort improvement and financial benefits of the project. Comfort is improved because of: a more optimal space heating with smaller radiators, better measure and control equipment, more living space in the kitchen without boiler or geyser, no toxic emissions from a geyser in kitchen, unlimited hot tap water and better air quality because of ventilation. Financial benefits came from a decrease in gas use and no electricity use for hot tap water. Tenants have to pay their heat in advance. The cooperative promised beforehand they would charge less in advance directly after the refurbishment. This convinced people that the project would really be beneficial for them. To limit the nuisance from construction works, all construction work inside a single apartment was concentrated in two days. To achieve this, the new heating pipes were not build inside apartments or boxrooms, but on top of the building roofs. With this method, a large part of the heating system could be constructed without any discomfort for the tenants.

Main drivers leading to success

The integral and strategic approach is the main driver for success in this project. Energy saving is seen as part of a broader goal to lengthen the life span of buildings. This generates income and saves investments on the long term, which can be used to finance the improvements. This Quality profile approach is becoming more common by housing cooperatives in the Netherlands. Creating support with tenants is another driver for success. This support was obtained with a considered approach and good information supply. An additional advantage is that demolition costs were avoided as well.

Re-applicability

All technical installations are well available and conventional. The implementation differs on some points from conventional methods, for instance the two-day approach and the choice to improve already satisfactory apartments. But both the technical installation as well as the implementation can be copied in other projects, in the Netherlands or abroad, without major problems. Lengthening the exploitation of buildings can be a good approach to generate money for energy-saving investments.



Figure A.1 Solar water heating system in apartment building in Veenendaal (NL)

A.2 The Czech Republic - Rumburk

The town of Rumburk is located on the Northern border of the Czech Republic. Due to cold winds blowing from the north, there is a colder climate than it would be expected for such altitude. The number of degree-days of 3700 is slightly higher than the average of the Czech Republic (3500) and the average heating period is 244 days.

The social dwellings refurbished here consist of two houses with a flat roof and four floors and 66 flats. The house was built in 1978 using common technology of concrete panels for the outside façade and load bearing structure while partitions were built using porous concrete panels. The owner of the house is the municipality of Rumburk.

In the year 1997 the Czech Energy Agency provided a grant to demonstrate possible improvement of energy characteristics of the house. In addition, a double-sloping roof with an additional floor of new flats replaced the flat roof.

Technology implemented

The pilot project included the following items:

- Outside walls - Thermal insulation of frontal and gable walls were insulated using 70 mm thick polystyrene boards.
- Doors and windows - Old windows were replaced by new plastic ones with $U = 2,1 \text{ W.m}^{-2}.\text{K}^{-1}$, with silicon EUROSTRIP sealing, doors having brush insulation.
- Roof - Old flat roof was replaced by double-sloping roof with an additional floor of new flats built in. The thermal insulation was done using 150 mm thick polystyrene boards.
- Inner space - the floor above not heated with underground space was insulated using 50 mm thick polystyrene boards.

Financing

Basic data on rehabilitation of social house in Rumburk are presented in the following table. Total investment costs were CZK 9 million (€ 300,000) of which about one third was covered by the Czech Energy Agency grant and the rest came from the municipality budget. This amount corresponds to CZK 135,000 per dwelling (€ 4,500).

Saving achieved

The implementation of energy saving measures resulted in reduction of specific energy consumption per unit of floor area by about 45%. Nevertheless specific consumption for space heating is still 95 kWh/m².

Table A.1 *Refurbishment data of the project in Rumburk, CZ*

		Data before rehabilitation	Data after rehabilitation	Difference
Heated living area	[m ²]	2,979.8	.	.
Heated total area	[m ²]	3,611.9	5,417.9	1,806.0
Number of flats		66	84	18
Energy consumption for space heating	[GJ/yr]	2,258.6	1,859.6	1,085.0
Specific consumption for space heating	[kWh/m ²]	174	95	79
Specific consumption for space heating	[%]	100	55	45

Replication potential

Combination of house rehabilitation with building additional floor of flats under the roof gives very good economic results and can be recommended.



Figure A.2 *Refurbished panel building in Rumburk (CZ)*

A.3 Latvia - Valmiera

Successful examples of housing refurbishment in municipalities can be found in the town of Valmiera. Here the municipality gives financial support to energy efficiency measures in apartment buildings and energy efficiency measures have been implemented in several buildings.

In 2005 in Darza street 13, Valmiera, the following energy efficiency measures were performed:

- insulation of walls
- insulation of basement ceiling
- insulation of attic
- closing of unused waste pipes
- change of heat insulation of main heating system pipes.

The total investment was 75,116 Ls (€ 107,300) and 28.2 €/m² and this was financed by a commercial bank loan. At the present level heat tariff (2005/2006) of 19.81 Ls/MWh (28.30 €/MWh), the simple payback time is 21.9 years.

Before renovation an energy audit was performed. Data from the energy audit and data gathered after energy efficiency measures have been applied can be seen in Table A.2.

Table A.2 *Refurbishment data of the project in Valmiera, LV*

		Before renovation (data from energy audit)	After renovation
Average energy consumption for heating demand recalculated to standard year*	[MWh/yr]	587.88	414.64**
Specific heat consumption	[kWh/m ² yr]	166	117
Average room temperature	[°C]	20	21

* number of heating days: 203; outdoor temperature in heating season: 0°C, average room temperature: +18°C.

** provisional data as data were gathered during the last month of heating season 2005/2006.

As the data in Table A.2 show, heat energy consumption has decreased by 173.2 MWh/yr, which presents energy savings of 30%.



Figure A.3 *Refurbished panel buildings in Valmiera (LV)*

A.4 Poland - Warsaw

This project concerns the process of energy efficiency refurbishment of a building owned by a housing cooperative, located at Bukietowa Street 8 in Warsaw. The building described was constructed in 1963 with typical panel technology. It has 48 dwellings, 2400 m² usable area and is occupied by 98 persons (most pensioners and low income families). For the refurbishment, use has been made of funds from the Polish Thermo-modernisation Fund.



Figure A.4 *The building in Bukietowa street (Warsaw, PL) before refurbishment, April 2003*

This formerly municipally owned building was transferred to cooperative ownership in 1994 after introduction of the Law on Ownership of Dwellings. This law states that the housing cooperative is created automatically after sale of dwellings in municipally owned buildings. The building was managed by the municipal housing management, which limited its activity to control the existing installations and carrying out small repairs.

Since the activity of the municipal management was not satisfactory to most of the dwelling owners, and the charges collected from them covered more administration than maintenance cost, the assembly of dwelling owners took a decision (by majority of votes) in 2002 to replace the municipal management by a private licensed manager. At this moment the share of private ownership of dwellings in the building was app. 60%. The remaining dwellings belonged to the municipality and were occupied by low-income families.

Project approach

Under leadership of the private manager of the building a 5 years investment plan for the building was prepared, where one of the main subjects was energy efficient refurbishment.

The total cost of the refurbishment project was app. € 96,000 and was covered in the following manner: € 20,000 was collected by the association prior to loan application, the BISE Bank issued a loan of € 76,000 for 5 years, the BGK reduced the loan by 25% = € 41,800 the remaining part of the loan in amount of € 57,000 + interest was repaid to the BISE Bank till end of 2005.

This project was one of the first performed by housing cooperatives under the state system of support to energy efficient retrofitting of buildings. Till mid 2006 app. 2000 buildings of housing cooperatives in Poland have used the system for their convenience.

Results

The building described was constructed in 1963 with typical panel technology. The calculated heat demand for heating purposes prior to refurbishment was 230 kWh/m²/yr. The scope of energy efficient refurbishment measures covered were:

- Replacement of central heating installation by new fully automated one (pipes, radiators, thermostatic valves).
- Insulation of external walls with 13 cm of styropoam.
- Insulation of windows above staircases with polycarbonate panel.
- Insulation of roof with 12 cm of mineral wool.

These refurbishments led to a decrease of the calculated heat demand to 110 kWh/m²/yr.

The yearly heating costs of the building prior to refurbishment was € 19,520 (€ 33.6 per household monthly, 0.67 €/m²/month) and after refurbishment it was 40% lower, e.g. € 11,520 (€ 20 per household monthly, 0.40 €/m²/month). It means that the difference in amount of 0,37 €/m²/month was the real cost savings, which was higher than the required monthly repayment rate of the loan set by the bank for 10-years loan (after deduction of bonus) to 0,24 €/m²/month.

One year after accomplishing the project the association decided to introduce a heat accounting system based on heat cost allocators installed on heat radiators and thanks to this a further 5% heat cost saving was achieved in the next heating season.

As the monthly charge for the renovation fund of one household (dwelling) was increased at the beginning of the process from 0.40 €/m²/month up to 1 €/m²/month it was possible to repay the loan in shorter time (1.5 years) and to reduce this charge to the level necessary to cover current maintenance cost e.g. 0.20 €/m²/month. The heat comforts in dwellings increased, meaning that the problems with under or over heating of spaces were removed.

According to real estate specialists the market value of dwellings in this building is higher by 10% than the market value in twinning buildings, which are not refurbished.



Figure A.5 *The building in Bukietowa street (Warsaw, PL) after refurbishment, Oct. 2003*

The ten years payback period of the investment is representative for energy efficient measures in multifamily buildings in Poland if the measures are designed in a complex manner. This project was replicated in 2000 cases in Poland and the system applied in Poland may be of interest in other Central and Eastern European countries.

Lessons learned

- The state has established a system of support to finance existing residential housing by flat-owners. It was not sure that it would be accepted at such a large scale. The system is transparent and affordable for all social groups including vulnerable households being under municipal care.
- The argument of high heat prices in connection with very bad technical conditions of buildings is sufficient to find consensus among the housing cooperative members on mobilization of own sources and taking the loan.
- The most important lesson is that the frameworks of any public aid should be established in a transparent and affordable manner.

A.5 Bulgaria - Zaharna Fabrica

The objectives of this project were to carry out a renovation and further maintenance of a multi-dwelling building in which the flats are owned by the inhabitants, overcoming the problems that arise from the low incomes of the owners and their different interests. The renovation also had to lead to a lower energy consumption and improvement of the living comfort of the flats.

The project included also a whole reconstruction of the roof. On the last floor (attic) there were two common premises that were transformed in small flats. The rent of these new flats helped in the reimbursement of the loan.

The project was initiated and realised by Bulgarian Housing Association in partnership with two Dutch Housing Cooperatives, De Nieuwe Unie - Rotterdam and Woondrecht - Dordrecht. Before the realisation of the project, an association of owners was established in the building.

The refurbishment has been financed by the owners through a 20-year loan from banks from the Netherlands as they offered lower interest rates. The monthly payment of the loan is 700 BGN (approximately € 350), but half of this amount is ensured by the rent of the two new flats erected in the attic.

The refurbishment of the building included: thermal insulation of external walls, new water proofing and thermal insulation of roof, installation of new double glazed windows with PVC frames, thermal insulation of basement ceiling, improvement of the heating system, whole reconstruction of the attic including transformation of two common premises into small flats.

An energy monitoring was done before and after the refurbishment. After the renovation the building received an energy certificate A. Integrated characteristic requirement for certificate A is 121.7 kWh/m² per year, the building reached a characteristic of 105.6 kWh/m² per year.

Table A.3 *Refurbishment data of the project in Zaharna Fabrica, BG*

Energy consumption before renovation [kWh/m ² per year]		Energy consumption after renovation [kWh/m ² per year]	
Heating	162.6	Heating	60.2
Hot water	30.5	Hot water	43.8
Integrated energy performance	194.1	Integrated energy performance	105.6
<i>Percentage of energy saved 46%</i>			



Figure A.6 *The building Zaharna Fabrica (BG) after refurbishment*

Main features and lessons learned

- The project can easily be replicated in the neighbouring buildings, as they are of the same type of construction.
- The inhabitants are satisfied with the results, the renovation lengthens the life span of the building with 40 years, the insulation of the external envelope leads to a better comfort and energy saving.
- For the realization of refurbishment of a multi-dwelling building it is necessary to involve all owners and to organise them in an association.
- The costs of refurbishment can be, at least partially, covered by an extension of the building. Most of the buildings could be extended with an additional floor.
- The financing institutions should be flexible when giving loans for such projects, most of the owners are of low or medium incomes and the banks should take this into account.