EXECUTIVE SUMMARY

Prior to independence in 1989, housing stock in Moldova was owned by the State. Following independence, privatisation of the housing sector commenced in accordance with the Law on Housing Stock Privatisation 1993; and between 1994 and 1997 individual apartments were transferred to homeowners but common parts of apartment blocks remained in State ownership. From 1997 onwards, the common parts started to be transferred into private ownership and presently approximately 50% of the common parts of apartment blocks remain in State ownership.

Under the Law on Housing Stock Privatisation, homeowners are required to set up Homeowner Associations (HOAs) to manage apartment blocks. HOAs have limited powers and cannot borrow to pay for the capital costs associated with energy efficient property refurbishment. Homeowners have been unwilling to set up Homeowner Associations.

The homeowners of privatised homes are responsible for carrying out and paying for the maintenance of their homes. Although in many cases, homeowners have not been willing to manage their properties and municipal entities have continued to carry out the maintenance on these privatised buildings. The cost of this maintenance has continued to be charged to the homeowners in accordance with a set tariff and the funds generated are not sufficient to keep properties in good repair. As a result, the maintenance is generally limited to emergency repairs and private properties have fallen into a state of disrepair. Furthermore, in many cases homeowners have not paid their statutory maintenance costs and large debts are owed to municipal enterprises by homeowners.

The Condominium Law 2000 was introduced to improve the management of private properties and address the issues identified above. The Condominium law provides for Private Homeowner Associations (PHOAs) to be set up and allows PHOAs to borrow to undertake refurbishment works. Homeowners are required to set up PHOAs and to manage their properties. However, few PHOAs have been created as homeowners are unwilling to take responsibility for property maintenance. As time passes, properties have fallen into a worse state of repair and this in turn deters homeowners for taking responsibility for property maintenance.

Municipalities will not transfer state owned common parts to homeowners until outstanding debt in respect of unpaid maintenance charges have been settled. Consequently, homeowners who are willing to take responsibility for property maintenance are unable to do so as they do not have funds to repay outstanding debts. Therefore, they are unable to take ownership of common parts and cannot set up PHOAs to manage their properties.

The Law on Housing Stock Privatisation law is a complex piece of legislation and since its promulgation in 1993 it has undergone over 90 amendments which were introduced by 14 legislative acts. In some cases, the privatisation process has not followed the requirements of the law. For example, common parts such as roofs, basements and outside spaces have been sold to third parties, not transferred to homeowners, resulting additional challenges to the efficient refurbishment of the properties.

In summary, the barriers to future energy efficient property refurbishment are both financial and legal (including the additional complication that some practices have not been kept up-to-date with the current legislative framework). The key issues associated with the current situation can be summarised as follows:

- Homeowners are not paying the full cost of the energy services and historical debts are owed to the municipal enterprises by homeowners;
- Housing stock is falling into disrepair and is energy inefficient;
- Billing for energy services by the companies is not transparent, metering is sporadic and there are cross subsidies between different customers; and
- Homeowners are prevented from taking over management of the common parts as such action would require them to pay the historical debts owed to the municipal entities and agencies.

The lack of an effective legal framework is considered a key barrier for financing energy efficiency projects in residential buildings, and to enabling energy saving potential to be realised. This report recommends reforms to the housing legislation to achieve the transfer of the common parts of
apartment blocks which are still in the ownership of municipal agencies and enterprises, to homeowners. It also recommends amendments to the Condominium Law to give homeowners the necessary powers to manage their properties and make energy efficiency refurbishments through efficiently managed PHOAs. Recommended amendments to the Condominium Law include:

- Allowing PHOAs to borrow on behalf of homeowners to fund energy efficiency refurbishments;
- Giving PHOAs the power to take liens over apartments as security for non-payment by homeowners for services and loan repayments;
- Imposing an obligation on homeowners to contribute towards a fund for refurbishment which will be held in a separate account in accordance with not-for-profit accounting rules; and,
- Structural changes to the management and voting rules of PHOAs to encourage homeowner participation in management and decision making.

Full details of recommended amendments to the Condominium law are set out in Section 4 of this report.

**Energy Efficiency**

Moldova’s housing sector consumes a significant percentage of total energy consumption. In 1997 the housing sector’s energy consumption was 35.4% of total consumption. This figure has increased slightly with the domestic market consuming 38% of total energy consumption in 2007. Energy use is greater in urban areas where people rely on district heating systems and gas and oil.

Energy prices for residential customers are no longer subsidised in Moldova and there have been significant price rises in recent years. The most recent price rises were in November 2010 and details of current tariffs and price rises are set out in the body of this report.

Improving energy efficiency in residential properties in Moldova presents significant opportunities to reduce energy and reduce the energy costs to homeowners. Moldova has little in the way of energy resources and there is high dependence on imported natural gas from Russia. Energy efficiency would therefore reduce dependence on energy imports. Moldova’s energy industry faces historical debts, out-dated electrical generation systems and inefficient energy and district heating distribution systems. Improved energy efficiency would help reduced the demand on these systems. Fuel poverty is part of a larger poverty problem in Moldova. The Country has the lowest GDP in Europe, ranking 131st in the IMF world list at $US 2,839 per capita in 2009. Those who are poor are least able to heat their homes and suffer from poor housing. Energy efficiency refurbishments would improve these conditions and reduce energy costs in the future.

While taking that the ‘whole house’ approach is the most effective in terms of energy efficiency improvements, this approach is not always possible due to financial constraints. In such circumstances, a step-by-step approach can be developed to achieve cost effective savings over time.

For the apartment blocks, the replacement of broken and badly fitting windows will create significant energy savings and improved living environments. As a general rule making such improvements to the whole apartment block is more effective than improvements carried out on an apartment by apartment basis. In our financial analysis we consider a range of measures and recommend financing structures.

**Business Support and Financing**

Notwithstanding the general poverty of Moldova and the perceived inability of consumers to engage in loans for energy efficiency improvements, there is a degree of willingness of apartment dwellers and homeowners to undertake such improvements. The banks are willing to develop a business supporting energy efficiency measures although they see the limitations created by the Condominium Law as a significant hurdle and would not be prepared to lend to Private Homeowner Associations until the Condominium Law has been reformed. Some banks are already making loans to individual homeowners.

The financing model used by EBRD in Slovakia and Bulgaria and for commercial loans in Moldova is successful and we recommend that it is replicated in the Moldovan residential market. This model
includes donor funded assistance to the banks and borrowers by the project implementation team consisting of international and local experts recruited by EBRD. Each team includes technical and financial experts to assist with project identification, preparation and verification and marketing experts to promote the facility as well as project management coordination and administrative expertise to structure, operate and monitor the facility

International Experience

We have seen from the experience of Slovakia that commercial lending combined with government grants was an effective mechanism to incentivise energy efficiency refurbishments and support the development of the commercial lending market. Our recommendations include consideration of these combined packages along with additional grants or allowances for those in fuel poverty. Targeted Grants (housing allowances, etc) will help the poorer occupants of apartment blocks contribute equally to the cost of refurbishments.

In preparing this study we have looked at how other selected countries in Europe have addressed energy efficiency in residential properties and considered the economic and social drivers that have brought about change. We have seen that the impetus for Germany’s leadership in the field of energy efficiency arose from its lack of natural resource and the poor thermal qualities of its housing stock. Its effective condominium law came about after World War II when there was pressure to house many homeless people in multi-family houses.

In Slovakia, the combination of loans from commercial banks and government grants was important in creating momentum. In particular, the granting of loans from the Slovak Guarantee and Development Bank was important for the support and development of commercial lending. Amendments to the Condominium Law created the right environment for lending. Savings were encouraged through the Construction Savings Bank and matching loans allowed homeowners to adopt a step-by-step approach to energy efficiency. These mechanisms along with the development of both a government Energy Efficiency Agency and a civil (NGO) Energy Institute which promoted energy efficiency through education and skills training, community outreach programmes, capacity building and research and a Housing Institute which developed similar programmes and skills in the field of housing management as well as financial support for the Union of HOAs raised awareness and encouraged a sense of responsibility among homeowners. This led to homeowners working together to refurbish their properties.

In the UK the transposition of the Energy Performance of Buildings Directive on a national level has brought about considerable improvements in energy efficiency. In 2006 building standards were 40% more energy efficient than for properties built in 2002 and 70% higher than those built in 1990.

Recommendations

Taking the lessons from our comparative study and considering them in the context of Moldova’s institutions and social and economic circumstances, we have prepared recommendations for institutional strengthening, capacity building, education and training. This report includes a strategy for implementation of these recommendations which is presented in Section 7. In summary, the key recommendations arising from this study include:

- Development of a new Law on Energy Performance of Buildings
- Amendments to the Condominium Law based on our recommendations
- Introducing consequential amendments to the Law on Housing Stock Privatisation 1993, the Housing Code 1883 and a number of government decisions including Government Decision 1224/1998 to ensure harmonisation with the principle of home ownership and management by homeowner.
- Implement capacity building measures to train bank staff to evaluate and process applications for energy efficiency loans
- The financing model for residential loans used by EBRD in Slovakia and Bulgaria and for commercial loans in Moldova is successful and should be replicated in the Moldovan residential market. This model includes donor funded assistance to the banks and borrowers by the project implementation team consisting of international and local experts recruited by EBRD.
Given the economies of scale for implementing energy efficiency measures in apartment buildings and the higher rates of return involved it is important that a sizeable component of the facility be used for these buildings rather than for individuals.
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1 INTRODUCTION

Residential buildings are currently the largest energy end-user in Moldova and consume more than 38% of all final national energy consumption. ¹ The majority of buildings are damp and not properly heated resulting in deterioration of the building fabric and poor living conditions. A market demand study conducted by the European Bank for Reconstruction and Development (EBRD) has assessed the current level of annual energy use in residential buildings to 129 kWh/m² compared to thermal comfort requirements of 179 kWh/m².

Following Moldova’s independence in 1989, there was significant reform in the housing sector. Perhaps the most significant was in 1994 when housing was transferred from the State to existing tenants free of charge or at a nominal fee, which resulted in 95% of multi-storey apartments being privatised.

Since this transfer of the housing sector into private ownership, there has been neglect and a lack of maintenance and investment. This is compounded by the fact that 50% of the housing in Chisinau is over 40 years old with as much as 70% constructed with panel construction which is poorly insulated.

Many of the properties are damp. These damp conditions are due partly to leaking infrastructure but other factors including fuel poverty contribute too. Poor heat supply to some apartments on the periphery of the district heating system also contributes to dampness.

The residential sector is estimated to have a 61% energy savings potential with investment opportunities of €3.85 billion.

A comprehensive regulatory framework is vital to support energy savings in the residential sector and the energy efficient refurbishment of existing housing stock. Moldova is undertaking a program of regulatory reform to harmonise its laws with those of the EU. This includes harmonisation with the EU’s Energy Performance of Buildings Directive (EPBD).

Significant work has already been undertaken by The Ministry of Construction and Regional Development to implement the EPBD. To complete this work, the Ministry of Construction and Regional Development has asked EBRD for assistance to develop primary and secondary legislation to support energy efficiency in the building sector, propose amendments to existing housing codes and provide assistance in identifying and addressing other sector deficiencies.

One of the biggest barriers to energy efficiency improvements in the residential sector is lack of financial support to fund capital costs. A comprehensive energy efficiency and housing law structure is necessary to facilitate commercial lending. In particular Moldova's Condominium law needs reform to facilitate effective property management by homeowners and to provide security for home loans from commercial lenders.

This study considers the legal, institutional and operational framework appropriate to the urban housing stock in Moldova. The study includes a review of the existing primary and secondary legislation on the building sector in Moldova and compares it with best practices in the EU, Germany, Slovakia and the UK. The aim of this is to identify opportunities for financing refurbishment of multi-story housing stock and making recommendations on how a support programme could be structured.

The circumstances of homeowners, the condition of buildings and the technical specifications of buildings will determine what type of energy efficiency measures are taken and the speed with which works are conducted. While experts agree that the ‘whole house’ approach is the most efficient, this may not be possible in many cases. Works may need to be phased over a period of years with decisions to be made about how best to spend limited funds.

When properties have fallen into disrepair, experience and technical assessments indicates that basic repairs, such as the repair and draft proofing of broken windows, can result in significant energy savings and improve ambient temperatures. Other modest measure such as installing doors on corridors and in common parts can also create significant improvements. We have considered these measures and others such as the installation of heat meters and the regulation of heat flow within

¹ IEA statistics 2007; note this does not cover energy use in rural areas.
apartment blocks to develop funding models and propose funding structures. We have also considered more comprehensive works such as the installation of new windows, roof insulation and the application of insulation to the outside of buildings.

Finally, we have set out a strategy for regulatory and institutional reform to support energy efficiency refurbishments of residential properties in Moldova.

The remit of our study does not extend outside residential properties and we express no opinion on national energy policy.

2 EU ENERGY EFFICIENCY LAW AND POLICY

2.1 INTRODUCTION

This Section presents a brief review of the primary pieces of EU legislation driving energy efficiency in residential buildings. This EU legislation creates a common framework to promote energy efficiency in buildings across Europe, Section 5 of this report presents an analysis of the implementation of the relevant EU legislation in Germany, the Slovak Republic and the United Kingdom and draws conclusions on the positive experience in these countries.

Residential and commercial buildings are the largest user of energy and the largest CO₂ emitter in the EU, responsible for about 40% of the EU's total final energy consumption and CO₂ emissions. The sector has significant potential for cost-effective energy savings which are estimated to be equivalent of approximately 27% of energy used.

The EU has been working for decades to improve energy efficiency in Europe, the detail of which is beyond the remit of this report. The key actions of interest date from 19th October 2006 when the European Commission adopted a comprehensive Energy Efficiency Action Plan, which contained measures to achieve a goal of reducing its global primary energy use by 20% by 2020 compared to projections for 2020. If successful, the EU will use approximately 13% less energy in 2020 than in 2006, saving €100 billion and around 780 million tonnes of CO₂ each year. In order to achieve the targets in the Energy efficiency Action plan the EU is recasting much of its existing legislation, this includes a recast Energy Performance of Buildings Directive (EPBD) dated the 19 May 2010.

2.2 EU RESIDENTIAL ENERGY EFFICIENCY LEGISLATIVE AND POLICY TOOLS

The primary EU legislation associated with residential energy efficiency comprises:

- Energy End Use Efficiency and Energy Services Directive (ESD)

The EPBD and other relevant standards are discussed in more detail below.

2.2.1 Energy Performance of Buildings Directive

The EPBD is the main piece of EU legislation addressing energy efficiency in residential and commercial buildings and it is set out in Table 2.1. The EPBD's main objective is to promote the cost-effective improvement of the overall energy performance of buildings. This is achieved in the following ways:

- The creation of a single methodology that can be used to calculate the energy performance of buildings
- The application of minimum energy efficiency requirements for all new buildings and the major refurbishment of buildings with a floor area of more than 1,000m²:

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3 Directives 2005 32 EC, 2008/28/EC and 2009/125/EC
The preparation of energy performance certificates on the sale or letting of new and existing residential and commercial buildings
Regular inspection of air conditioning systems with outputs of more than 12 kilowatt (kW) and boilers of more than 20 kW and inspection every two years of boilers of more than 100 kW

The EPBD does not set EU-wide minimum energy efficiency levels, but requires Member States determine their own requirements taking into account factors such as outdoor climate and building traditions. However, the EPBD does require the following factors to be taken into account when calculating the energy performance of buildings:

- Thermal characteristics of the building (shell and internal partitions, etc.). These characteristics may also include
  - air-tightness;
  - heating installation and hot water supply, including their insulation characteristics;
  - air-conditioning installation;
  - ventilation;
  - built-in lighting installation (mainly the non-residential sector);
  - position and orientation of buildings, including outdoor climate;
  - passive solar systems and solar protection;
  - natural ventilation; and,
  - indoor climatic conditions, including the designed indoor climate.
- The positive influence of the following aspects should, where relevant, be taken into account in the energy performance calculation:
  - active solar systems and other heating and electricity systems based on renewable energy sources;
  - electricity produced by "combined heat and power" plants which produce both electricity and heat;
  - district or block heating and cooling systems; and,
  - natural lighting.

Table 2.1: Energy Performance of Buildings Directive

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<td><strong>Article 3</strong></td>
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<td><strong>Article 4</strong></td>
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<td><strong>Article 5</strong></td>
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<td>New Buildings</td>
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<td><strong>Article 6</strong></td>
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<td><strong>Article 7</strong></td>
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<td>Energy performance certificates</td>
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There is no one single method of calculating energy performance of buildings. However, to achieve a level of consistency, the International Standards Organisation (ISO) and the European Committee on
Standardisation (CEN) have developed standards (see Section 2.2.2) to assist with the implementation of the EPBD.

**Recast EPBD 2010/31/EU**

The EPBD was recast on 19th May 2010 to address some issues arising from the implementation at Member State level and to increase energy efficiency targets in the residential and commercial sector. The changes to the EPBD that are relevant to this Report are:

- The 1,000 m² exemption in the original EPBD had resulted in 72% of existing building stock in the EU being exempt from the requirements of the EPBD when renovated. The requirements have therefore been changed to so that all buildings undergoing renovations that cost more than 25% of their value, or that cover more than a quarter of the buildings surface, will be required to meet national energy efficiency requirements.
- In June 2011 the EU will introduce a methodology to be used by all Member States to assess the cost efficiency.
- Minimum energy performance requirements must now be set with a view to achieving cost optimal levels of performance.
- Minimum energy performance requirements to be set in respect of technical building systems, e.g. boilers, air-conditioning units etc.
- Commission to establish common principles for definition of low and zero carbon (LZC) buildings. The definition of LZC to be determined by Member States but it must be in accordance with the principles set by the commission.
- Requirement to set targets for increase in LZC buildings with separate targets for:
  - new and refurbished dwellings;
  - new and refurbished commercial buildings; and,
  - buildings occupied by public authorities;
- Member States to aim for cost optimal levels of energy performance of their buildings using a methodology developed by the Commission

**2.2.2 ISO and CEN Standards – Energy Performance of Buildings**

The EU gave a mandate to CEN to develop standards to support the Member States in implementing the EPBD in order to achieve transparency in implementation, provide access to reliable tools and promote a free market in energy savings services and products.

The ISO also produced international standards and works through Technical Committees to prepare standards. To assist with the implementation of the EPBD, ISO Technical Committee ISO/TC 163 Thermal performance and energy use in the built environment, produced a set of standards for buildings and building materials. As ISO had a mandate from the EU to develop standards, several of the committee’s standards were developed in close cooperation with CEN and were implemented as both CEN and ISO standards.

ISO EN 13790:2008, Building Energy Performance – Energy Use for Space Heating and Cooling, is one of the key standards for the EPBD. It sets out calculation methods for the key steps of evaluating the energy performance of buildings which are as follows:

ISO EN 13790:2008 is applicable to buildings at the design stage and to existing buildings. Specially designed software can be used to assist with the calculations necessary to determine the energy performance of a building.

Member States do have some flexibility in applying ISO EN 13790:2008. While most of the data used in calculations will be available from building specifications or the building itself, member states may choose in certain circumstances to allow other sources of information to be used. Where ISO 13790:2008 is being used to prepare an energy performance certificate, a protocol will be developed at national or regional level to specify the type and sources of additional information and the conditions when such information may be used.

Once the assessment and calculation is made, an energy performance certificate (see Section 2.2.3) can be issued for the building.
2.2.3 Energy Performance Certificates

The EPBD requires an Energy Performance Certificates (EPC) to be made available when a commercial or residential property is constructed, sold or let. The purpose of the EPC is to provide information to the purchaser or tenant. Certificates are valid for 10 years once issued.

Certification for apartments or units designed for separate use in blocks may be based:

- on a common certification of the whole building for blocks with a common heating system, or
- on the assessment of another representative apartment in the same block.

ISO EN 15603 sets out a General framework for the assessment of overall energy use in buildings. It is the "top" standard dealing with the energy performance of buildings. Calculations used under this standard are based on the outcomes of the application of other ISO EN standards dealing with (i) product standards within building; (ii) a building’s energy needs; and (iii) a building’s energy losses.

The comparative study of the UK in this report (Section 8.3) illustrates how the EPBD can be implemented at Member State Level.

Relevance to Moldova

Moldova has already made considerable progress towards implementing the EPBD and has prepared draft regulations on the methodology for calculating energy performance based on the ISO CEN standards. This includes, imposing minimum standards for energy efficiency in new and refurbished buildings; energy performance certificates based on ISO CEN standards and separate draft regulations on the inspection of boilers. Much of this work has taken into account changes to the EPBD contained in the 2010 Recast Directive. For example, there is no 1,000 m² threshold for refurbishments.

Additional laws and actions are required to create a complete legal and institutional framework for the implementation of the Directive and these additional actions are discussed further in Section 3.

2.2.4 Ecodesign (Energy Using Products) Directive (“EuP Directive”)

The EuP Directive is a framework directive which provides rules for setting ecodesign requirements for “energy-using products” taking a life-cycle approach. The 2005 EuP Directive was recast in 2009 and its scope enlarged to include “energy related products”4. Energy-related products are those products that have an impact on energy consumption during use. Examples are window frames, whose insulation properties influence the energy required for the heating and cooling of buildings, and water-using devices, whose water consumption influences the energy required for heating.

The EuP Directive does not set eco-design standards for products, but instead provides a legal framework for establishing minimum eco-design requirements for energy using products by defining conditions and criteria for setting such requirements through subsequent ‘implementing measures’. Implementing measures are targeted at individual energy using product groups such as white goods, motors, televisions, lighting equipment or, measures on specific functions of electrical products such as the ‘standby mode’. EuP implementing measures can take the form of EU Directives, Regulations, Commission Decisions or voluntary agreements if industry develops ecodesign standards ahead of EU implementing measures.

Implementing measures have been prepared for Standby Power Consumption, Simple Set Top Boxes, External Power Supplies, General and Tertiary Lighting, motors, televisions, circulators and domestic washing machines and refrigerators. The European Commission estimates that implementing measures brought forward under the Framework Directive to date have the potential to reduce EU energy consumption by around 10%.

All products covered by implementing measures must bear the CE Making (symbol ☛) to show that they are in compliance with the implementing measures before being placed on the market. The letters "CE" are the abbreviation of French phrase "Conformité Européenne" (or "European Conformity"). CE Marking on a product is a manufacturer’s declaration that the product complies with

4 Excluding transport which is covered by separate legislation
requirements of the EuP Directive, and is used by a number of other EU ‘Product Directives’ to signify compliance.

Products bearing the Community eco-label are presumed to comply with the eco design requirements stated in the applicable implementing measures. The Commission also has the power to decide whether other eco-labels are equivalent to the Community eco-label.

Manufacturers or importers of products are responsible for adapting products to meet “implementing measures” otherwise, you cannot attach the CE mark to the products and consequently cannot sell them on the European market.

Relevance to Moldova

Moldova is currently preparing to implement the EuP Directive and this will result in energy savings in the future as evidenced by the experience of other countries. For example in the UK EuP implementing measures have been shown to be a highly cost effective approach to improving the energy efficiency of products. It is estimated that the measures so far agreed could deliver estimated net benefits in the UK of over £900 million pa between now and 2020 and around 7 million tonnes of CO2 per annum by 2020. As in the case of all EU Member States, Moldova will benefit from Europe-wide implementation of the EuP Directive when goods manufactured in the EU in compliance with the EuP Directive are sold and used in Moldova. One major benefit of the EuP directive is that it delivers efficiencies in the performance of goods and does not require behavioural change to deliver savings.

2.2.5 Energy End Use Efficiency and Energy Services Directive (ESD)

The Energy Services Directive (ESD) imposes an obligation for the first time on Member States to place energy efficiency obligations on energy distributors and retailers.

Users of energy must be provided with individual metering wherever economically and technically feasible and informative billing must be introduced to show actual energy consumption. As far as possible, bills must be based on actual energy consumption and must include: current prices and consumption; a comparison of current consumption with consumption for the previous year; and the contact details of bodies providing information on improving energy efficiency.

Member State must produce Energy Efficiency Action Plans (EEAPs) on a three yearly basis from 2007 onwards as a means of planning for and reporting on progress towards achieving an indicative energy saving targets of 9% by 2016. EEAPs should be central to achieving the EU's energy saving objective.

The ESD will encourage the development of Energy Service Companies (ESCOS). Energy Services include a range of activities, such as energy analysis and audits, energy management, project design and implementation, maintenance and operation, monitoring and evaluation of savings, property / facility management, energy and/or equipment supply. There are a number of models for ESCOs and these include:

- the ‘Facilities Management’ or ‘Performance Contract’ model, which is the most advanced and generally provides services to the industrial sector. The legal structure of this type of ESCO is a funding model whereby performance guarantees are given by the ESCO for cost savings / energy savings. The savings are split between the ESCO and the client who could potentially invest the savings in more energy efficiency. There are two variations on this model the Shared Savings Model where the ESCO finances the project through its own funds or through borrowing and takes on the performance risk of the project and the Guaranteed Savings Model where the customer finances the project but the ESCO assumes the project risk;
- a Community Model, where decisions are taken by or on behalf of a group of customers in the same location (for example, a Community Heating scheme). Under this type of contract, the contractor charges agreed rates for providing energy services and has the freedom to install energy efficiency measures to reduce their own operating costs. These contracts typically have a time scale of 20-30 years and are useful when the customer wishes to

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5 Council of the European Union, Presidency Conclusions 19/20 June 2008 (11018/08).
outsource facilities services and investment. These contracts are often created in the form of a public-private partnership;

- **a household model**, as the name suggests, this model is targeted at the domestic market. Energy suppliers offer a range of services which range from a fixed fee maintenance contract which commits the supplier to fixing any faults in a domestic heating system within a specified period to home energy assessments which match energy savings with the cost of payment instalments on insulation or new heating appliances, but the supplier does not take the risk that savings will not be achieved. ) This is the hardest market for ESCOs to break into, as the transaction costs of servicing many small consumers is large compared to the savings.

**Relevance to Moldova**

Performance contracts entered into between ESCOs and customers guarantee savings to the customer and the ESCO is paid from the savings generated. For this model to work, billing must be transparent and payment must be based on the amount of energy used and cross subsidies must not occur in apartment blocks. Accurate metering is a pre-requisite as is the ability of customers to control the heat and energy entering their homes. These conditions are not widely available in apartment blocks in Moldova at present as discuss below, therefore this study does not consider the implementation of energy efficiency measures through ESCOs; although it is recognised that this could become important in the future. It should be noted that ESCOs are starting to emerge in Moldova and some engineering companies have worked on donor-financed energy efficiency contracts.

### 2.3 TECHNICAL AND FINANCIAL SUPPORT FOR IMPLEMENTATION

Various initiatives have been undertaken by the EU under the general umbrella of ‘Concerted Action EPBD’ which supports the exchange of ideas and best practice between member states to support implementation of the EPBD. These initiatives include:

- CEN the working group preparing new standards to harmonise implementation - [www.cen.eu](http://www.cen.eu).
- Build-up, which is a website for professional, municipalities and property occupants providing practical advice and sharing experience of others - [www.buildup.eu](http://www.buildup.eu).
- Intelligent Energy Europe [http://ec.europa.eu/energy/intelligent/index_en.html](http://ec.europa.eu/energy/intelligent/index_en.html) is the EU's funding mechanism to improve energy efficiency.

These reference materials on the CEN and Build-up websites provides a resource which is available to experts, property developers and residents in Moldova; providing useful guidance and practical advice.

### 3 ENERGY EFFICIENCY IN RESIDENTIAL BUILDINGS IN MOLDOVA

This section presents an overview of Moldova's housing sector, including energy supply, the cost of energy and an assessment of the mechanisms for improving energy efficiency in residential buildings. It provides a review of relevant legislation and suggests amendments to legislation to improve energy efficiency opportunities. The final part of this section includes a financial evaluation of energy efficiency opportunities and recommendations for private sector funding of residential energy efficiency.

#### 3.1 POPULATION, INCOME AND HOUSING DATA

Unless stated otherwise, the statistics used in this Section 3.1 are taken from the Statistical Year Book of Moldova 2009, published on the website of the Moldovan Office of National Statistics.

##### 3.1.1 Population

Moldova has a population of 3,563,700 which has reduced since January 2000 when the figure stood at 4,264,000. One factor contributing to the reduced population figures is population migration in

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6 2000 figures taken UNECE Country Profile on the Housing Sector in Moldova, 2002
search of employment. Migration has resulted in properties in the rural and urban areas being left vacant for long periods of time. This issue presents difficulties in terms of property management, especially in apartment blocks, for example in Chisinau it is estimated that up to 10% of apartments are empty.

Currently 41.2% of the population live in urban areas while 58.8% live in rural areas. Moldova’s rural population typically lives in large villages comprising between 2,000 and 10,000 inhabitants. Chisinau is the largest urban centre and has a population of 77,856.

3.1.2 Income and Expenditure on Housing

The average monthly income in 2008 was 2529.7 Lei, an increase on the 2001 monthly figure of 543.7 Lei. However incomes vary between rural communities and urban communities, and between the north and south of the country. Average monthly incomes in Chisinau represent 129% of the average income while those in the south earn 69.1%; those in the central region of the country earn 74.4%; and those in the north earn 82.6% of the average monthly income.

In recent years, the percentage of income spent on dwellings has increased in both rural and urban communities. The total expenditure on dwellings between 2007 and 2008 increased from 13.5% to 16.3% of income. Rural population expenditure increased from 14.9% to 17.1%, which is slightly more than the urban population’s expenditure which increased from 12.1% to 15.5%.

3.1.3 Housing Stock

Moldova’s housing stock is relatively new as much of Moldova’s housing stock was destroyed during the Second World War. Approximately 65% of housing stock dates back to 1970, and 84% to 1960. Urban housing stock comprises approximately 63% apartments, 25% detached family houses and 12% hostels which date back to the Soviet era and were used to house single professional people. Currently, these hostels house families.

The Soviet-era urban apartment blocks are either large prefabricated slab buildings (commonly referred to as ‘panel houses’, concrete in situ built buildings or stone buildings). Approximately 50% of apartment buildings in urban areas are in buildings of nine storeys or more.

### Table 3.1: Rural and Urban Housing Stock by Area

<table>
<thead>
<tr>
<th>Dwelling Stock (Million m²)</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>77.1</td>
<td>77.1</td>
<td>77.8</td>
<td>77.4</td>
</tr>
<tr>
<td>Urban</td>
<td>28.6</td>
<td>28.6</td>
<td>28.6</td>
<td>29.7</td>
</tr>
<tr>
<td>Rural</td>
<td>48.5</td>
<td>48.5</td>
<td>48.7</td>
<td>48.7</td>
</tr>
<tr>
<td>Ownership (Million m²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>3.5</td>
<td>3.5</td>
<td>3.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Private</td>
<td>73.4</td>
<td>73.5</td>
<td>74.3</td>
<td>75.9</td>
</tr>
</tbody>
</table>

### Table 3.2: Dwelling Stock by Forms of Ownership in Rural and Urban Locations 2009

<table>
<thead>
<tr>
<th>Dwelling Stock</th>
<th>Total area (1000 m²)</th>
<th>Living area</th>
<th>Per inhabitant (m²)</th>
<th>Number of buildings</th>
<th>Flats</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>78,853.80</td>
<td>54,512.80</td>
<td>22.1</td>
<td>460,318</td>
<td>N/A</td>
</tr>
<tr>
<td>Urban</td>
<td>30,100.60</td>
<td>19,217.00</td>
<td>20.4</td>
<td>7,965</td>
<td>228,703 (estimate)</td>
</tr>
<tr>
<td>Rural</td>
<td>48,753.20</td>
<td>35,295.80</td>
<td>23.4</td>
<td>452,349</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Assuming housing stock in urban areas comprises 30% single family homes and 70% apartments, there are 326,718 homes in urban areas, 228,703 of which are apartments and 98,015 of which are single family homes. There are no apartment blocks in rural areas and 452,349 single family homes.

In Chisinau 50% of the housing is 40 to 50 years old and was built in the wave of new construction in the 1960s, with much of this being of panel construction which is poorly insulated. While there is a lack of data on the housing stock in Chisinau, estimates suggest that approximately 70% of the housing stock in Chisinau is of panel construction. The lack of investment in existing housing stock is reflected in the prevalence of broken windows and leaking roofs. Many of the properties are damp due to a combination of factors including leaking infrastructure, fuel poverty; and poor heat supply to some apartments especially on the periphery of the district heating system. Similar conditions apply in urban housing stock in other towns and cities in Moldova.

Table 3.3: Availability of Amenities in Rural and Urban Locations

<table>
<thead>
<tr>
<th>Amenity</th>
<th>Urban (% of living area supplied by amenity)</th>
<th>Rural (% of living areas supplied by amenity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>77.2 79.0 79.8</td>
<td>9.8 11.3 13.1</td>
</tr>
<tr>
<td>Sewerage</td>
<td>76.3 77.9 78.7</td>
<td>5.2 6.0 8.2</td>
</tr>
<tr>
<td>Central heating*</td>
<td>74.5 73.8 75.0</td>
<td>1.5 3.2 5.0</td>
</tr>
<tr>
<td>Gas</td>
<td>91.2 92.1 93.1</td>
<td>78.9 81.6 83.1</td>
</tr>
<tr>
<td>Hot water</td>
<td>55.6 55.0 61.6</td>
<td>0.4 0.8 1.6</td>
</tr>
<tr>
<td>Electric Range</td>
<td>2.3 1.8 1.7</td>
<td>0.1 0.1 0.1</td>
</tr>
</tbody>
</table>

* This figure represents homes connected to the district heating system rather than homes receiving heat from the district heating system. Many homes no longer receive heat now that heating companies have stopped supplying heat.

In rural areas 97% of dwellings are detached single family houses comprising one or two storeys. There is a significant self-help building culture in rural communities, which is reflected in the fact that houses are often built using low quality materials and unskilled labour, resulting in poor quality housing. There is limited social and utility infrastructure although the number of rural homes connected to water supply and sanitation has increased over recent years as illustrated in Table 3.3.

Traditional Moldovan houses are built of clay bricks but more recently homes have been built from cut stone blocks.

3.1.4 New Construction and Renovation of Buildings

New housing construction is undertaken mostly by the private sector and is driven by market demand. In the 1990s the price of new construction increased 7.5 times more than the increase in the population's income resulting in between 1 and 2% of the population being able to afford new homes. The latest figures available for the amount of new construction are from 2007 which indicate that 419,000 m² of residential new build was constructed. To put this figure in context, the total floor area of residential property in Moldova in 2007 was 77.8 million m² gross floor area.

While the focus of this study is on existing apartment blocks, it is important to note that new residential properties continue to be built in Moldova. Most new building is financed privately with approximately 5% being financed by the public sector.

Data from the Annual Year Book of Moldova 2009 on capital repairs to buildings is set out in Table 3.4 below. It is apparent from these statistics that save for repairs carried out in 2007, the majority of repairs have been undertaken by entities other than municipalities. No data is available as to the percentage (if any) of capital repairs which comprise energy efficient refurbishment.

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7 Source: Statistical Year Book of Moldova 2009
Table 3.4: Capital Repairs to Buildings by Area\textsuperscript{8}

<table>
<thead>
<tr>
<th>Year</th>
<th>Total (thousand m\textsuperscript{2})</th>
<th>Of Which (thousand m\textsuperscript{2})</th>
<th>Municipal</th>
<th>Other Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>15.9</td>
<td>Nil</td>
<td>15.9</td>
<td>15.9</td>
</tr>
<tr>
<td>2004</td>
<td>23.4</td>
<td>5.7</td>
<td>17.7</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>14.7</td>
<td>0.5</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>34.8</td>
<td>16.7</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>304.3</td>
<td>279.7</td>
<td>24.6</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>28.5</td>
<td>18.2</td>
<td>10.2</td>
<td></td>
</tr>
</tbody>
</table>

3.1.5 Ownership of Housing Stock

Pre-1999

Until independence, housing was virtually a free asset with very low rents and running costs, as utilities such as heat and electricity were delivered almost free of charge. There were no limits on consumption or means of regulating supply, and residents were not aware of how much energy they were consuming.

1993 - The Law on Housing Stock Privatisation

Following independence, the Government started to privatise the housing stock with the objective of reducing state management of the housing system, increasing the role of private sector institutions and reducing public expenditure. The Law on Housing Stock Privatisation 1993 sets out the framework for housing stock privatisation which includes the following provisions:

- Homeowners are responsible for the maintenance and repair of their property and are required to set up Homeowner Associations (HOAs) to manage their properties;
- HOAs have limited powers and may not borrow money;
- HOAs operate as an interface between homeowners and municipal entities and other service providers and organise maintenance for homeowners.
- Municipal tenants in buildings are not required to be members of the HOA and are not responsible for property management.

In the first stage of the transfer process from 1993 to 1996 only apartments were transferred into private ownership with the common parts remaining on the balance sheet of the State. Currently common parts of approximately 50% of apartment blocks remain ownership of the State. The Law on Housing Stock Privatisation is a complex piece of legislation. Since its introduction it has undergone over 90 amendments introduced by 14 legislative acts. These changes have not been reviewed in detail by the consultants.

1997 Onwards

From 1997 onwards, the common parts of apartment blocks were transferred onto the balance sheet of HOAs when apartments were privatised, under this arrangement homeowners became co-owners of common parts.

Privatisation resulted in 225,300 out of a total of 263,000 apartments being transferred to householders free of charge or at a nominal fee by 1 January 1999.

Condominium Law 2000

Further reform was introduced in 2000 when the Condominium Law 2000 came into force. Under the Condominium Law, all homeowners including municipal tenants are required to join a Private

\textsuperscript{8} Source: Statistical Year Book of Moldova 2009
Homeowners Association (PHOA)\(^9\) for the joint management, maintenance and operation of the Condominium. Condominiums may comprise residential and commercial property and more than one apartment block. PHOAs have wider powers than HOAs and have a self-governing and decision making function. The Condominium Law has not been widely complied with in Moldova and only 44 PHOAs have been created. (The Condominium Law is reviewed in detail in Section 4).

**Public Ownership**

Approximately 38,000 apartments and rooms in hostels have remained in public ownership because either residents did not want to or could not afford to become homeowners or because of disagreements between householders. Approximately 17,600 apartments remained in public ownership in Chisinau as they were either in an unsatisfactory condition or ineligible for privatisation as they were hostels.

### 3.1.6 Management of Housing Stock

Local government is responsible for provision of public services including water supply, sewerage, and management and maintenance of the remaining publicly owned housing stock. These functions are carried out by 'Municipal Enterprises'. Municipal councils approve tariffs to cover the cost of property maintenance by Municipal Enterprises.

Since transfer of the housing stock into private ownership, there has been neglect and a lack of maintenance and investment in private housing stock. Municipal Enterprises continue to provide maintenance services to privatised housing including apartment blocks with HOAs and PHOAs. Municipal enterprises are entitled to carry out this function in accordance with Government Decision No 1224/1998. However, the Law on Housing Stock Privatisation requires homeowners to be responsible for the cost of maintenance which is calculated in accordance with floor area of apartments and the number of people living in an apartment. Our research indicates that residents pay Municipal Entities 1 Lei per square meter of floor area per month for maintenance. This sum is paid directly to the Municipal Entity by the homeowner. Our research indicates that this sum is insufficient to pay for the level of maintenance and repair needed to keep properties well maintained. Consequently, priority is given to emergency repairs.

Municipal entities have an effective monopoly over their territories and only provide services within those territories. They do not compete with each other. The municipal entities are concerned about change and the introduction of private competition as this may result in job losses as homeowners move to private suppliers.

There is no standard procedure for property management among PHOAs and HOAs and there is no limit on the size or composition of these organisations. Some HOAs comprise as many as 12,000 members and some PHOAs comprise commercial and residential property as well as single family homes and apartment blocks. Given the varying sizes of HOAs and PHOAs, it is not possible to easily quantify the percentage of residential property managed under these structures. 95% of the 212,103 apartments in Moldova are privatised but the common parts of approximately 50% of apartment blocks remain in state ownership. Approximately 1000 HOAs, PHOAs and cooperatives have been created in Moldova. It is therefore likely that many privatised apartment blocks have no homeowner management structure.

HOAs mostly liaise between service providers (including heat electricity and gas providers) and homeowners to ensure services are provided. While most properties managed by HOAs received property management services from municipal entities, some are starting to manage themselves and are obtaining repair and maintenance services from private suppliers.

Some PHOAs are managed by a condominium manager who is paid for their services. These managers may manage money and pay service providers on behalf of homeowners. They obtain payments from homeowners and pay service providers. There is no limit to the number of condominiums that can be managed by one condominium manager. Our research indicates that these managers pay for services for one building with funds from another to prevent services being withdrawn.

\(^9\) In this section 'HOA' is used for associations set up before 2000 and PHOA used for associations set up on accordance with the Condominium Law.
Where there is no HOA or PHOA, the Municipal Enterprise carries out property management and received payment under the tariff approved by the local public administration. This is the same management structure that operated before privatisation. Under Government Decision 1224/1998 tenants occupying state owned property are required to pay for utilities.

This mix of property type and multiple buildings within the same PHOA or HOA, results in conflicting priorities among members. Inequalities are also created by different sized properties within one building as there are inadequate procedures in place for allocating costs between homeowners based on use of services. Our interviews with condominium managers confirmed these problems.

There is a lack of transparent invoicing by municipal entities and heat and energy providers which prevents fair allocation between homeowners. A lack of metering compounds this problem and can lead to cross subsidies within HOAs and PHOAs where homeowners in one building pay for the services supplied to another building within the HOA or PHOA. This lack of transparency also leads to similar cross subsidies between homeowners in the same apartment block. These problems are compounded when condominium managers pay the bills as they may create cross subsidies by using funds from one homeowner to pay another homeowner’s bills. In some cases where a number of condominiums are managed by one condominium manager, homeowners in one condominium may subsidise homeowners in another condominium. We have concluded from our research that cross subsidies are multi-layered and can be compounded by the lack of transparency in both the provision of services and the management of properties.

Municipal entities do not create separate accounts or invoices for individual apartment owners or apartment buildings. There is no report on whether a building or apartment has a surplus or deficit and this lack of transparency compounds the problem of cross subsidies. Residents in one building can pay for work to be carried out in another building.

Municipal Entities do not receive full payment from all customers. This makes it difficult to carry out planned maintenance work. The lack of payment by some customers amounts to a cross subsidy as those customers who pay their bills subsidise those who do not pay. This system amounts to a lot of uncontrolled subsidies in the housing sector. This is further complicated by the widespread belief among homeowners that building maintenance and improvements in the heat distribution system are the responsibility of the State and should be funded by the State, not the homeowner.

The multiple cross subsidies created by the supply of and payment for heat, energy and property management services is a particularly significant barriers to energy efficiency as there is no incentive on the part of the homeowner to reduce energy and heat use if that reduction is not reflected in the amount paid for services. Indeed a lack of public awareness and information from the Municipal Entities means that homeowners are not aware of the amount of energy they use or the measures that can be taken to improve energy efficiency.

Based on information we received through interviews with condominium managers, we have concluded that there is a general absence of contractual arrangements governing the management of property in Moldova. This absence pervades the whole system from the supply to services to the allocation of costs between homeowners. Likewise there are no standard property management procedures and those responsible for property management cope as best they can. The lack of an effective Condominium Law, transparent provision and invoicing of utilities and services and the size and composition of PHOAs and HOAs all prevent transparent and equitable property management.

### 3.1.7 Current Status of Housing Stock Privatisation in Moldova

The practice of privatisation in Moldova has resulted in common parts of approximately 50% of apartment blocks in Moldova remaining in State ownership. In some cases the practice of privatisation has not been consistent with the law. For example roofs, basements and outside space surrounding apartment blocks have been sold to private investors, not homeowners. In some cases, this has resulted in new apartments being built on the top of existing apartment blocks. Table 3.6: below sets out the current status of housing stock.

At present, municipalities will not transfer state owned common parts of residential buildings to HOAs until outstanding debts in respect of property maintenance have been paid to municipal entities. This requirement to repay debts is currently preventing condominiums and PHOAs from being formed which in turn is preventing the management of apartment blocks by homeowners.
The Law on Housing Stock Privatisation and the Housing Code are complex pieces of legislation. We recommend that a detailed analysis of these laws is undertaken to establish the extent to which privatisation has taken place in accordance with the law and to ensure these laws are consistent with the objectives of the Condominium Law. Additionally, further thought needs to be given to the issue of addressing the outstanding debts owed to Municipal Entities. A similar situation arose in Slovakia during privatisation and was addressed by a cash payment to the municipal entities by the state. The municipal entities were then privatised and the cash payment repaid to the state. Further research is needed to establish whether such an approach would be appropriate in Moldova.

Table 3.5: Home Ownership Structures

<table>
<thead>
<tr>
<th>Law</th>
<th>ownership</th>
<th>Number of Property Management Vehicles formed</th>
<th>Type of Property</th>
<th>Ownership of homes</th>
<th>Ownership of Common Parts of properties</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Code No 306 1983</td>
<td>Private Cooperatives</td>
<td>312</td>
<td>Mainly apartment blocks</td>
<td>Private ownership</td>
<td>Private ownership</td>
<td>Homeowners are responsible for the cost of maintenance. Municipal entities may carry out maintenance in accordance with Government Decision No 1224/1998</td>
</tr>
<tr>
<td>Housing Stock Privatisation Law 1993</td>
<td>Privately owned apartments and single family homes</td>
<td>675 HOA’s formed</td>
<td>Apartment blocks and single family homes</td>
<td>Private ownership</td>
<td>Following privatisation approximately 50% of common parts are still in public ownership. Some common parts of buildings including roofs, basements and outsides space have been sold to third parties. Some homeowners own common parts of their buildings (percentage unknown.)</td>
<td>Homeowners are responsible for the cost of maintenance. Municipal entities may carry out maintenance in accordance with Government Decision No 1224/1998</td>
</tr>
<tr>
<td>Condominium Law 2000</td>
<td>PHOA</td>
<td>44</td>
<td>Mixed residential and commercial property</td>
<td>Private ownership</td>
<td>Private Ownership</td>
<td>Homeowners are responsible for the cost of maintenance. Municipal entities may carry out maintenance in accordance with Government Decision No 1224/1998</td>
</tr>
<tr>
<td>Not applicable</td>
<td>State owned residential Property</td>
<td>Not applicable</td>
<td>Apartments and single family homes</td>
<td>Public ownership (38,000 properties)</td>
<td>Public Ownership</td>
<td>Municipal enterprises in accordance with Government Decision No 1224/1998</td>
</tr>
</tbody>
</table>

3.2 ENERGY RESOURCES AND ENERGY USE IN THE RESIDENTIAL SECTOR

In this section of the report, we consider energy resources and the use of energy in the urban and rural residential sector.
3.2.1 Energy Resources

The Republic of Moldova has no reserves of coal and gas and only small domestic reserves of crude oil, which account for less than 0.1 per cent of the total primary energy supply. There is also low hydroelectric potential in the country. Moldova is therefore highly dependent on energy imports mainly from the Russian Federation and Ukraine, and these imports comprise 98 per cent of total energy consumption.

The Energy Strategy of the Republic of Moldova until 2020 (Government Decision No. 958 of 21 August 2007) plans to increase the share of renewable energy sources in the country’s energy balance by up to six per cent in 2010 and 20 per cent in 2020. In order to achieve these goals, about one million m² of solar installations for water heating and 80,000 m² of solar installations for the drying of agricultural products, such as tobacco, are required up to 2010. Based on this estimates up to 40,000 toe (tonnes of oil equivalent) could be substituted, while the required installation of photovoltaic cells for electricity production would amount to 6,300 kW.

3.2.2 Energy Consumption in the Residential Sector

Moldova’s housing sector consumes a significant percentage of total energy consumption. In 1997 the housing sector’s energy consumption was 35.4% of total consumption. This figure has increased slightly with the domestic market consuming 38% of total energy consumption in 2007. Energy use is greater in urban areas where people rely on district heating systems and gas and oil. In rural areas, many families are not connected to utilities and rely on traditional stoves for heating.

Table 3.6: Residential energy consumption by Fuel Type in 2007

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Total energy Consumed in Moldova</th>
<th>Percentage consumed by Residential Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fuel Types</td>
<td>2,038 ktoe</td>
<td>38%</td>
</tr>
<tr>
<td>Heat</td>
<td>10,689 TJ</td>
<td>50%</td>
</tr>
<tr>
<td>Gas</td>
<td>651 ktoe</td>
<td>38%</td>
</tr>
<tr>
<td>Electricity</td>
<td>4,155 GWh</td>
<td>31%</td>
</tr>
</tbody>
</table>

3.2.3 Heat Consumption in the Residential Sector

While approximately 75 per cent of the urban dwellings in Moldova are connected to district heating Systems, it is understood that over the last 15 years, heating networks throughout the country have fallen into disrepair. There has also been consolidation and changes to heating systems, with the original 32 district heating systems operated in Moldova, now comprising two centralised heating systems in Chisinau and two more in other cities. Given the fact that there are 15 municipalities (cities or large urban conurbations) and 52 towns it is evident that a significant percentage of the urban population have been disconnected from the district heating system. We infer from these statistics that occupiers of dwellings which no longer receive district heating use a variety of heat sources such as electric heaters, gas or solid fuel stoves.

Decentralized heating systems are being developed to meet residential sector demands. During the period of 2003 to 2005 over 400 thermal stations were built for the decentralized supply to customers, including 148 units in 2005. Our research indicates that this trend will continue in the future to ensure heating supply to customers in rural areas, with the primary energy sources being natural gas and local renewable energy sources (solar energy and solid, liquid, and gaseous biofuels).

3.2.4 Payment for Heat

The research undertaken as part of this study on invoicing and payments resulted in conflicting data. It is inferred that this is because the approach to invoicing is not consistent. The information received indicates that typically:

\[ \text{Source: Statistical Year Book of Moldova 2009} \]
- Customers receive an invoice identifying a sum payable. No details are given of the amount of energy consumed; the rate payable or the manner in which the invoice is calculated; and,
- Cross subsidies are occurring in apartment blocks. There are also cross subsidies from one apartment block to another when multiple blocks are under the same management.

There is one heat meter for each apartment building. Apartments receive invoices but with no details of the amount of energy consumed the rate or the period of supply. Individual apartment owners sometimes negotiate payments with the heat supplier, and although apartments are not separately metered, individual apartment owners sometimes receive separate invoices from the heat supplier.

Some apartment blocks in urban areas are not connected to the district heating system and have their own gas boilers. Although there is reasonable penetration of the gas distribution system with 80-95% of the population being able to connect to the system, rural communities tend to use small heating stoves to heat their homes. Research indicates rural homeowners do not use gas because they cannot afford it or because they prefer traditional stoves. Consequently, improved heating and hot water supply in rural areas would improve ambient indoor temperatures and alleviate fuel poverty but may not contribute significantly to security of energy supply unless non-fossil fuel technologies are employed. Communities in rural areas are generally poorer than those in the urban areas and may need greater financial support in the form of grants, allowances or subsidies to assist with home improvements.

### 3.2.5 Energy Tariffs

The cost of gas, electricity, district heating and hot water remained fairly static throughout the period 2001 to 2005 save for increases of approximately 10% and 20% in electricity and gas prices respectively in 2003, which we have assumed were as a direct result of the second Gulf War. Price started to increase in 2006 and have continued to do so. Price increases for 2006-2008 are set out in the following table.

<table>
<thead>
<tr>
<th>Service</th>
<th>Price increases as % of previous year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2006</td>
</tr>
<tr>
<td>Electricity</td>
<td>0</td>
</tr>
<tr>
<td>Gas</td>
<td>14.1</td>
</tr>
<tr>
<td>District heating</td>
<td>4.7</td>
</tr>
<tr>
<td>Hot water</td>
<td>0.0</td>
</tr>
</tbody>
</table>

On the 17th December 2009, Parliament approved the Law on Amending and Supplementing Laws no. 107-XVIII, which transferred responsibility for heat tariff setting from the local public authority to ANRE, the national energy regulator. ANRE also sets tariffs for gas and electricity. Tariffs set at the start of 2010 were as follows:

### 3.2.6 Natural Gas Supply

- For household consumers with average monthly consumption of up to 30 m³ tariff set as 3,574 lei/1,000 m³, compared to the previous tariff of 3,068 lei/1,000 m³ (16.5% increase);
- For household consumers with average monthly consumption exceeding 30 m³ tariff set as 3,992 lei/1,000 m³, compared to the previous tariff of 3,427 lei/1,000 m³ (16.5% increase);

### 3.2.7 Electricity

The electricity tariffs are set by the different power companies are presented in the following table:
### Table 3.8: Electricity and Heat Tariffs

<table>
<thead>
<tr>
<th>Company</th>
<th>Electricity Tariff (MDL/kWh)</th>
<th>Heat (lei/Gcal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CET-1</td>
<td>131.84</td>
<td>455.78</td>
</tr>
<tr>
<td>CET-2</td>
<td>96.60</td>
<td>375.72</td>
</tr>
<tr>
<td>CET Nord</td>
<td>103.03</td>
<td>786</td>
</tr>
<tr>
<td>RED Union Fenosa</td>
<td>95 (110 kV networks)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>133 (Other categories)</td>
<td></td>
</tr>
<tr>
<td>RED Nord and RED Nord-Vest</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Termocom</td>
<td>N/A</td>
<td>821</td>
</tr>
</tbody>
</table>

Some of the above tariffs represent significant increases on previous tariffs in the order of 5 to 20%. Termocom increased the tariff at the start of 2010 to 699 MDL/Gcal which represented an increase of 29.2% on the tariff previously applied by the Municipal Council of Chisinau which has been set three years earlier on 1st January 2007. In May 2010 the tariff was increased again to 821 MDL/Gcal. These price rises occurred mainly as a result of increases in imported gas and electricity prices and a change in the US dollar exchange rate; the energy is purchased in US dollar currency.

#### 3.2.8 Price increases in November 2011

In November 2010 the price of gas and heat was one again increased. Current tariffs are as follows:

- For household consumers with average monthly consumption of up to 30 m³ of natural gas the tariff is set as 4,777 lei/1,000 m³, compared to the previous tariff of 3,574 lei/1,000 m³ (more than 30% increase);
- For household consumers with average monthly consumption exceeding 30 m³ of natural gas the tariff is set as 5,146 lei/1,000 m³, compared to the previous tariff of 3,992 lei/1,000 m³ (more than 25% increase);
- Heat tariffs from S.A Termocom were increased from 821 MDL/Gcal to 898 MDL/Gcal (an increase of nearly 10%).

#### 3.3 THE CASE FOR ENERGY EFFICIENCY IN MOLDOVA

Moldova faces a number of complex social and economic challenges associated with energy including:

- **Security of Energy Supply.**
  Moldova has little in the way of domestic energy resources and 98% of energy resources are imported, mostly from Russia and Ukraine.

- **Challenges associated with Housing**
  As highlighted in our discussion above, the housing sector consumes 39% of total energy. It is generally of poor construction, badly insulated and badly maintained and the provision and invoicing for utilities including heat, energy and maintenance services lacks transparency. Ownership of the common parts of many apartments blocks remains with the state and the requirement to pay existing debts to Municipal Entities before transfer of the common parts to a PHOA prevents PHOAs being set up which is the first step towards homeowner management.
  
  Many homeowners are unaware of their rights as homeowners and their obligations to manage their own homes and many homeowners retain the view that property management is the State’s responsibility.
  
  The Condominium Law requires reform to provide a fair and effective regulatory structure for property management
  
  A lack of privately available finance is a barrier to those homeowners who wish to take responsibility for their own homes. The inertia created by these barriers results in a continued deterioration in the housing stock.
- **Systemic Problems.** Moldova’s energy industry faces significant challenges as a result of a number of complex social and economic factors which include significant historical debts, outdated electrical generation systems, inefficient energy and district heating distribution systems and tariffs set below economic levels.

- **Fuel Poverty.** Fuel poverty is part of a larger poverty problem in the country. Moldova has the lowest GDP in Europe, ranking 131st in the IMF world list at $US 2,839 per capita in 2009. In 2005 the UNDP reported that almost 50% of the population was living under the poverty line with around 8% living on less than $US 1.25 a day and another 29% on less than $US 2.00. Poverty is more pronounced in the rural areas, with most households in Chisinau owning their own homes outright. However, families in Chisinau are often asset rich and income poor and could not cope with the adjustment of tariffs for communal services and utilities.\(^{11}\)

While the above issues are complex, significant in scale and will require multifaceted solutions, improved energy efficiency in the residential sector is one factor that could make a significant contribution to reducing the scale of the problems. The comparative analysis which is set out at Section 8 considers the experience of Germany and Slovakia. The current challenges faced by Moldova are similar to those faced by Germany in the 1970s and Slovakia in the 1990s. The experience of these countries provide insights into how energy efficiency might be improved in Moldova.

### 3.4 ENERGY EFFICIENCY POLICY

Moldova’s Energy Strategy 2020 (Government Decision No 958 of 21 August 2007) and sets a goal of achieving 20% energy efficiency improvements by 2020, consistent with EU policy. This Policy has three strategic objectives: security of energy supply; promoting energy efficiency; and liberalisation of the energy markets and restructuring of the power industry.

The National Energy Efficiency Action Plan 2010-2020 has been prepared and is awaiting parliamentary approval. Activities anticipated by the Plan include:

- Implementing secondary legislation to support energy efficiency
- Developing new building standards
- Developing sector programmes
- Conducting energy audits of public buildings and implementing energy efficiency measures
- Relaunching the National Energy Efficiency Agency
- Funding energy efficiency
- Creating an economic environment for ESCOs

#### 3.4.1 Institutional Structure

Energy efficiency is the responsibility of the Ministry of Economy, Department of Energy. Energy issues associated with the residential sector are the responsibility of the Ministry of Construction and Regional Development.

A new National Energy Efficiency Agency (NEEA) is planned by the Law on Energy Efficiency passed by the Parliament on 2\(^{nd}\) July 2010. The draft Regulation on Approving the NEEA has been drafted and circulated for comments to the relevant stakeholders and is currently awaiting the final opinion of the Ministry of Justice.

The NEEA’s functions are to: implement state policy on energy efficiency and renewable energy; to approve projects partly or wholly funded by the State, the administrative territorial units and the Energy Efficiency Fund; to coordinate national and regional projects; to coordinate programmes and action plans developed by local authorities and coordinate energy efficiency programmes funded by international organisations in cooperation with the government; to keep a register of energy auditors and energy audits conducted; to ensure dissemination of information on energy efficiency; and prepare and publish annual sector reports.

\(^{11}\) Source ‘Lost in Transition: Housing reform in Moldova 2007; Dr Sasha Tsenkova, University of Calgary’
3.4.2 Institutional Gap Analysis

Other than at the very highest levels, there is a lack of institutional capacity. Those at the highest levels in government do not have the institutional structures or the staff to implement policy effectively. Given the limited time available to achieve the 20% target, it may be prudent to consider the following:

**NEEA**

The target of achieving 20% improvement in energy efficiency by 2020 will need to be resourced. It will need a coordinated approach by the NEEA and a number of ministries. Energy efficiency is relevant to a wide range of activities from public and private transport, energy use in residential and public buildings and commercial and industrial energy use. Additional expertise and resource will be required in each relevant ministry to conduct this new work streams and liaise with the NEEA. Funding and technical assistance will be important to assist with the setting up of institutional structures and work plans to achieve relevant targets. Funding will also be required to recruit and train staff. Support will be required from technical experts to assist with the implement of the NEEA’s activities.

**Energy Institute**

Setting up a civil energy institute (non-governmental organisation) funded by national resources or international donors to undertake capacity building, training and education in the area of energy efficiency and renewable energy. This institute would be a resource for government, the public commerce and industry and would work across all sectors to implement pilot projects, provide practical help and promote energy efficiency. The institute would be supported and staffed by national and international experts.

This proposal is made as there are Moldovan experts in energy efficiency working for NGOs, in the private sector and in education. These resources could be more easily harnessed by a civil Energy Institute than a government organisation. Given the limited resources in Moldova, it is important that all resources are used effectively.

**Housing Institute**

Based on the experience of Slovakia, the Housing Institute was central to the success of capacity building and awareness raising in local communities. It helped homeowners take responsibility for property management and the setting up and operation of PHOAs. The remit of the Slovakian Housing Institute was as an Educational and Information Center for Housing Development. It was a civil association set up by government regulation as a voluntary organization to bring together people and organizations to provide education and information in the field of housing, focusing on:

- administration of apartment houses owned by citizens,
- financial management,
- housing development and renovation of housing stock,
- use of housing stock,
- energy saving in housing sector,
- care for environment and improvement of its quality as well as quality of housing and life as such.

The donor community including USAID helped support the Institute. It is recommended that a similar institute is set up in Moldova.

3.4.3 Moldovan Energy Efficiency Law

In July 2010, Parliament passed the **Law on Energy Efficiency** transposing the EU Directive 2006/32/EC of April 5, 2006 on End-Use Efficiency and Energy Services. We understand transposition of the EuP Directive is forthcoming, but we have not seen details.
The **Law on Renewable Energy Sources** (Parliament Resolution No. 160 of 12 July 2007), provides for an Energy Efficiency Fund. The Fund should be an independent and financially autonomous legal entity. The Fund’s main activity will be financing energy efficiency and renewable energy projects in accordance with Moldovan policy and the provision of guarantees, loans and technical assistance. 10% of the fund will be provided by the government of Moldova and other sources will include donations and loans from banks or investors.

The Energy Performance of Buildings Directive is being transposed by the following regulation and decree which are currently working their way through the legislative process and are not yet in force:

- **Regulation of Energy Performance of Buildings** which includes (i) specifications for the calculation of energy performance of buildings, (ii) minimum requirements for energy performance (iii) regulations addressing the preparation of energy performance certificates
- **Decree on Inspection of Boilers** which includes procedures and requirements for the regular inspection of boilers

A detailed analysis of Moldovan law and technical standards has already been undertaken by the Ministry of Construction and Regional Development assisted by EBRD in connection with the development of the above Regulation and Decree to identify amendments to other Laws, Regulations Standards and Decisions.

### 3.4.4 New Law on Energy Performance of Buildings

The Law on Energy Efficiency 2010 includes a general reference to the development of a new law and Regulation on **Energy Performance of Buildings**. It is anticipated under the regulatory scheme that a new law on Energy Performance of Buildings is adopted and we recommend that this work is undertaken. This new law should provide the primary legal framework for Energy Performance of Buildings and include:

- Obligations of building owners on Energy Efficiency (EE)
- Obligations of state institutions regarding EE in buildings
- Introduction of instruments for EE in buildings (e-certification, regular inspection, methodology for assessment, minimum EE requirements)
- Monitoring system on EE in the building sector

Primary legislation will be implemented by secondary legislation which has already been developed by the Ministry.

The proposed regulatory framework for energy efficiency in buildings in Moldova is shown in Figure 3.1. The Ministry of Construction and Regional Development will be responsible for implementation of the all aspects of the EPB Directive other than those dealing with HVAC (heating, ventilation and air conditioning) which will be dealt with by the Ministry of Economy.

The Ministry of Construction and Regional Development will therefore be responsible for implementation of the following:

- Single methodology for energy performance
- Minimum requirement for energy performance of new buildings
- Minimum requirements for energy performance of large renovated buildings
- Energy Performance Certificates

There are existing provisions in the Law on Energy Efficiency (which is the responsibility of the Ministry of Economy) to develop new laws and regulations to implement the EPB Directive. As mentioned above, we recommend that this new sector-specific law is promulgated to provide the legal framework for the EPBD including implementing regulations, technical standards and certification requirements for energy efficiency assessors and verifiers.
Figure 3.1: General Institutional Framework for EPBD Implementation in Moldova

General institutional framework for EPBD Implementation in Moldova

  - Requirements
  - Single Methodology for Energy Performance
  - Minimum Requirements for Energy Performance of New Buildings
  - Minimum Requirements for Energy Performance of Renovated Large Buildings
  - Energy Performance Certificates

- Moldovan Ministry of Construction and Regional Development
- New Law on Energy Efficiency of Buildings
- Draft Regulations Enhancing Regulatory Framework for Energy Efficiency in Built Environment
- Technical Standards
- Develop regulations law and
- Draft Law on Energy Efficiency

- HVAC Requirements
- Moldovan Ministry of Economy

Law on Certification of Experts Performing in Construction
3.4.5 Energy Efficiency Standards

Moldova does not currently have energy efficiency standards for new construction and the refurbishment of existing buildings. Table 3.9 below presents the U-values (W/m²K) for new construction, set by the National Technical Standard. Table 3.10 represents new standards that will be implemented with the Regulation on Energy Performance of Building for new and existing buildings.

Table 3.9: U-Values for New and Existing Dwelling Stock (15-30 years old) Set by the National Technical Standard

<table>
<thead>
<tr>
<th>Construction</th>
<th>Unit</th>
<th>New Construction</th>
<th>Existing Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>External wall</td>
<td>W/m²K</td>
<td>U = 0.4</td>
<td>U = 1.0 – 1.2</td>
</tr>
<tr>
<td>Flat roof</td>
<td>W/m²K</td>
<td>U = 0.3</td>
<td>U = 1.2</td>
</tr>
<tr>
<td>Windows</td>
<td>W/m²K</td>
<td>U = 2.56</td>
<td>U = 2.8 – 3.5</td>
</tr>
</tbody>
</table>

Table 3.10: U-Values for New and Existing Dwelling Stock (15-30 years old) that will be implemented by the Regulation on Energy Performance of Buildings

<table>
<thead>
<tr>
<th>Construction</th>
<th>Unit</th>
<th>New Construction</th>
<th>Existing Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>External wall</td>
<td>W/m²K</td>
<td>U = 0.32</td>
<td>U = 0.32</td>
</tr>
<tr>
<td>Flat roof</td>
<td>W/m²K</td>
<td>U = 0.20</td>
<td>U = 0.2</td>
</tr>
<tr>
<td>Windows</td>
<td>W/m²K</td>
<td>U = 1.5</td>
<td>U = 1.5</td>
</tr>
</tbody>
</table>

4 CONDOMINIUM LAW

4.1.1 Summary

Following Moldova’s Independence in 1989 and privatisation of housing stock, the Condominium Law was enacted in 2000 to provide a mechanism for homeowners to organise themselves for the purposes of managing their blocks, allocating costs and implementing repair and refurbishment works. The Private Homeowners Association (PHOA) is the mechanism used in the Condominium Law to facilitate homeowner management and decision making.

Common parts are owned by the PHOA, the HOA or the municipality and should be transferred to homeowners in accordance with their share as calculated in accordance with the Condominium Law. Protections will need to be included in the Condominium Law to protect municipal tenants who still occupy municipal apartments in privately owned buildings. It will be important that they are treated equally but thought needs to be given as to who pays their share of contribution to the maintenance of refurbishment of the building. Property law principles dictate that the municipality should pay as the municipality owns the apartment and is responsible for the maintenance of the apartment.

The Condominium Law does not contain adequate provisions to support transparent management by PHOAs. PHOA’s lack the powers they need to collect payments. Accounting is not transparent which leads to a lack of trust in the PHOA management. Invoicing is not transparent which leads to cross subsidies among homeowners. Condominiums comprise multiple apartment blocks and different types of properties which leads to conflicts of interests between homeowners. The high percentages of homeowners required to be present at PHOA’s meetings to form a quorum (66%) and the number of votes needed to approve decisions (51%) can be a barrier to change. If homeowners are absent or do not vote, decisions cannot be made. This problem is magnified by the delegation of voting rights by homeowners to others which results in homeowners becoming remote from the decision making process. In many apartment blocks up to 20% of homeowners live outside Moldova which can result in paralysis of the decision making process due to the high percentage of votes needed to pass decisions. This issue coupled with wider systemic issues discussed below are contributing to the deterioration of the fabric of apartment blocks and are a barrier to the implementation of energy efficiency refurbishments. Reform of the Condominium Law is required to address these issues and put in place effective mechanisms for the management of apartment blocks. In the following
paragraphs of this section we review the Condominium Law in detail and present a gap analysis and recommendations for amendments to the law.

4.1.2 Analysis of the Condominium Law No 913/2000

This part of this section of the Report considers the wording of the Condominium Law in detail and its practical consequences. It suggests and justifies amendments to the Condominium Law which are vital and also pre-requisites for renovation and energy efficiency improvements of apartment blocks and single family homes.

The first step in amending the Condominium law is to define more precisely the terminology used in the law. Secondly, the financial management of apartment blocks must be more transparent to encourage home-owners to become involved in the decision-making processes and managing common finances and taking loans to renovate and improve energy efficiency. These amendments are necessary because home-owners will only become engaged if they have direct control over the financial management of renovation which will subsequently be reflected in costs of services (assuming invoicing of energy is transparent between the energy provider and apartment block) and increased value of immovable property. It is for these reasons that the Condominium Law requires amendment.

The introductory part of the Law “Chapter I - General disposals” defines its goal: “This Law establishes the property relations in a Condominium, the mode of creation, exploitation, alienation of real estate property and transfer of property rights in a Condominium; mode of administration of real estate property in a Condominium; procedure for creation, registration, operation and dissolution of Associations of Property Co-owners in a Condominium.”

Chapter I General Disposals contains a major problem of this Law; the definition of condominium allows different types of properties to be included in one condominium. For example, non-residential property, residential property, privately owned property, state owned property and municipal property may all be included within one Condominium. At the same time, the Law allows for just one association of homeowners to manage the housing complex. (Art. 1 and 4 part 1): “Condominium - a unified complex of real estate property comprising the land plot within the established boundaries, residential block/s and other real estate objects located there on; a part of this complex being dwellings and other non-residential premises, which are in private, state or municipal ownership, and the other part makes the common indivisible property.”

Chapter II deals with “Property relations under a condominium and rights and obligations of the property owners”

The issue here is similar to that identified above. Article 4 allows a condominium to comprise different types of property with different uses and under different ownership. Joint administration of such properties will create problems so far as decision making is concerned as owners may have different priorities and needs based on their use of the property. Joint management of funds will create conflicts as a result of different and possibly conflicting priorities of owners. (Art. 4 part (1) “The Condominium may comprise :”(b) several buildings or edifices which are compactly located and are united within a common land plot and common infrastructure: residential houses for one family, cottages; garages and other objects.”

In Article 6 part (3) “The common real estate objects within a condominium are in the common separate ownership of dwelling owners.” The Law expressly has to state what “common separate ownership” is and how it should be calculated. This is important as this share needs to be defined clearly as it is used to determine the property owner’s contribution towards payments for repairs. Definition of ownership is implied by cadastral registration (apartment/room and share in common parts and facilities) in given entity, definition in Article 1 claims following: “Co-share of participation - property share of each owner in the common separate real property. It is used to establish the share of each owner in the common pool of mandatory payments for maintenance and repair of common real property; other common costs and share of votes in the general meeting of the Association of Co-owners of a Condominium”.

Article 7 part 1; states: “co-share of each owner in the common property in condominium is proportional to the total surface area (sq. m.) of the dwellings (premises) possessed by the owner,” which corresponds with substance of ownership in one condominium of multi-apartment house.
For an association of homeowners in a residential complex which includes a number of apartment blocks and different types of properties, the decision-making process, as well as payments, becomes very difficult. The management of such a large complex results in cross subsidies where the owner of one apartment pays for work on another apartment or building. This process leads to disenfranchised homeowners and this problem can be exacerbated by the delegation of power from homeowners to other legal entities. Disenfranchised homeowners lose interest in the management of their blocks and do not take part in management and decision making. They may also stop making payments towards maintenance and repair when they see that the contribution they have made in the past have been spent on other properties. This is one reason why there is a high level of indebtedness to Municipal Enterprises.

It is necessary to set clear rules and forms of payments for repairs and services — payments based on official invoicing documents with identification of provider and consumer of the subject of invoicing, volume and price (relation to other laws — on accounting and taxes). To prevent defaults in payments by homeowners, it is important that the Condominium Law includes measures allowing a lien to be taken against apartments to secure payment. This lien should be registered in the Cadastre. Such a mechanism will create a mechanism which will allow HOAs to provide security for loans which will enable HOAs to borrow from commercial banks for the purpose of carrying out repairs and energy efficiency improvements. The current wording of the Condominium Law does not include this mechanism.

The law does however provide a suitable solution for transformation of building apartment cooperatives into association of home-owners in case of full payment and annuity (Article 3). Equally suitable is a condition for “encumbrance by the right of limited use (servitude) of other persons” in Article 6 part 6.

When land surrounding a condominium is included within the curtilage of the condominium homeowners are responsible for the maintenance of the land. The local public administration is responsible for determining the extent of surrounding to be included within the curtilage of the Condominium free of charge and transfers the land to the condominium. Once this transfer occurs, maintenance becomes the responsibility of the homeowners (Article 9).

Provisions addressing maintenance and repair of common parts, alterations to apartments and voting quorum relating to common parts are included in Article 10. The wording relating to voting rights is as follows: “The association of property co-owners by a majority of 2/3 of the votes may decide upon the improvement of building comfort and efficiency, including of the primary facilities.” The law does not allow absent homeowners to give authority by power of attorney (or some other legal transfer of power) to a third party to vote on their behalf. Given the high percentage of absent homeowners in Moldova, it is important that there is a mechanism to those homeowners to vote through other members of the Condominium to facilitate effective property management. Article 11; addresses the rights of a purchaser of a dwelling and Article 12 lists homeowners’ obligations in relation to maintenance and repair in apartments.

Article 14; discusses payments for communal and other services as well as payments for maintenance and repair. Part 1 States: “The property owners pay for the utilities and other communal services provided to them in accordance with the legislation and normative acts.” Payments for utilities are administered by independent regulations which will need to be mutually harmonized with the law on apartment ownership and introduce clear system of payments for received communal and other services. This approach will create transparency in consumption and payment for utilities and will allow home-owners to calculate potential energy efficiency savings and verify results against utility invoices.

Article 14 Part 2 states: “Property owners, tenants and lessees of state and municipal dwellings carry liability for not paying on time for the dwellings (premises) which they own or rent and for the utilities contracted directly from service providers….” Where a HOA has been established or property management has been contracted to professional managers, all payments should be made by the homeowners to the HOA and the HOA or its manager should contract directly with the service supplier. This approach is the only way of achieving a transparent and fair system of cost allocation for utilities for an apartment block. Allocation of costs will be allocated between homeowners taking into account costs or communal services such as lifts and heating of common parts. When invoices
are received costs will be allocated among homeowners in accordance with the agreed cost allocation (see below). Mechanisms will need to be introduced to manage and resolve disputes quickly and inexpensively and the lien referred to above will allow the HOA to enforce against homeowners for non-payment.

“(4) The volume of obligatory payments due by each property owner (tenant, lessee) for the maintenance and repair of common property, is determined proportionally to the co-share of the property owner (tenant, lessee) in the common parts of the condominium, and is established in accordance with the Norms for allocation of funds for technical maintenance and repair of the housing stock.” It is not clear why the law introduces also “tenant, lessee”, since all apartments have owners and those owners should have the same rights and responsibilities as other apartment owners and should also take part in the decision making process and adopt decisions of the general assembly as binding. The Civil Code governs the relationship between tenants and property owners and there is a contractual relationship between them which sets out their rights and responsibilities. Tenants should not be allowed to intervene with the decision-making process.

Chapter III, Art. 15 deals with „Administration of Condominium“ which leaves it up to homeowners to decide upon the form of administration. A condominium may be administered directly by an association of homeowners or contract wholly or partly to a person or organisation authorised to carry out such activities.

Chapter IV sets out the terms for the establishment of homeowners’ association and their registration.

Article 16; requires at least two homeowners to create at HOA. Once created, it may continue in existence for an indefinite period of time. The HOA has responsibility for its own actions and does not have responsibility for the actions of its members. Likewise, members do not have responsibility for actions of the HOA.

Article 17; addresses the registration of the association’s as a legal entity in the separate registry of the Ministry of Information Development and requires simultaneous registration of apartments and surrounding shares pursuant to the Cadastral Law. The final part of the law includes the obligation to reorganise all previous forms of associations into a HOA but no deadline for reorganisation is included in this law. Our research indicates that the creation of HOAs is not happening. A system needs to be put in place to register apartment ownership and the ownership of common parts. Amendments to the Condominium Law should resolve all outstanding issues associated with ownership of common parts of buildings which still remained in local public administration ownership pursuant to old regulations.

Chapter V - deals with financial management of the association and sets out the rights and powers of the association and property owners. It accepts complete report, provision of services, utilisation and rental of property owned by the association. General assembly of homeowners makes decisions about the use of finances (Art. 18). Facilitation of subcontracted work and services is done via tenders and subsequent conclusion of contracts. Provision of utilities is governed by the Law on energy (Art. 19). The question is whether for the tendering process, it is important to maintain conditions of the law on economic competition or whether it is possible to organise a tender based on criteria stipulated in advance.

Art. 20 introduces rights of association of homeowners: to conclude contracts; to administer joint property; to develop annual plans of income and expenditures; to stipulate payments to be made by individual owners; to deal with bank loans; to pay for works and services based on concluded contracts; to sell and rent facilities and excluded stock as well as keep registration; to perform structural works in accordance with legal regulations; to acquire land in line with the interests of the association for construction of apartment houses; and in the event that the association provides technical services such as the provision of cold and hot water, heat, sewerage and electricity systems it may claim compensation from utilities and service providers.

As indicated above (and using the numbering used in the Condominium Law) associations have the following rights:

a) „managing and /or servicing the common property belonging to the association”;

b) „Hold its own premises within the condominium“
k) “Receive for unlimited use or acquire ownership in land plots for the construction of residential houses, penthouses and other constructions with their subsequent maintenance;

o) “In the event that the association on its own performs the technical servicing of interior engineering facilities, such as: cold and hot water supply system, sewerage system, heating system and power supply system, demand from the service companies appropriate compensation of costs”.

HOAs should not be allowed to own real estate, their powers should be limited to the provision of an organisational structure for administration of condominiums and protecting home-owners' interests. HOAs should be constituted as non-profit organisation and should not have the power to own property or develop business activities. The Law on Privatisation currently requires common parts to be transferred to HOAs and PHOAs. This provision should be amended to require such property to be transferred homeowners in accordance with their share.

Article 21; deals with Obligations of the association of property co-owners. The Association has the obligation to represent its members' interests and ensure contractual duties of the association are being fulfilled in accordance with the law and to require all members of association (homeowners) to fulfil their obligations and advocate their interests.

Article 22; regulates membership in the association. All home-owners become members. When a building is newly constructed, membership commences with registration of association. Membership terminates with death, dissolution of a legal entity or termination of one's ownership. In case of minors, replacement is organised via parents or guardians. In case of heritage or sale, membership is transferred to a new home-owner.

The rights of home-owners are regulated by Art. 23. A home-owner has a right to rent his/her property, however, owners of non-residential premises must use their property in line with interests of other home-owners while not violating their rights.

Article 24; defines bodies of the association:

a) General meeting of association members (authorized representatives);

b) Board of Directors of the association.

The article should also mention the auditing body which is referred to in Art. 26 as a body elected by the general assembly, which plays an important role in the association.

Article 25. - Authorized representatives of the association members – This is an important article which requires amendment. It allows representatives to be appointed according to a ratio of 1:5 in cases where there are more than 40 members of the association. However, there is no detail description of the selection procedure. This article incorporates old practices of housing cooperatives. The practice of appointing representatives removed homeowners from direct involvement in the decision-making process. Where the association comprises only houses, it would not be advisable to include this provision.

Article 26; The Role and authority of the general assembly is explained in Art. 26. The general assembly is the governing body of the association and adopts decisions which are binding for all members. It has an obligation to convene a general meeting of association members within 60 days of the close of the financial year. Assembly meeting may be summoned by the Board of Directors, members with 30 % of the total vote or at the request of the Supervisory Committee or local public administration authorities. Number of votes corresponds with the number of apartments and non-residential premises owned.

Owners of premises have one vote per one apartment and so do communal apartment owners.

The key task of the general assembly is to approve articles of association and any amendments consistent with legislation. The key decision-making powers of the general assembly include – granting a right of lien and other rights related to common property: adopting decisions linked with repairs and extensions; and decisions on loans (voting quorum is excluded). Furthermore, it approves annual accounts including funds and audit commission reports and it elects the administrative committee as well as auditing commission (audit) of the association. It also stipulates payments by individual owners in relation to their share. It also creates special funds including reserve funds for refurbishment and repair – however, the establishment of such a fund is not obligatory. It evaluates
complaints about activities of the Board of Directors, chairman and auditing commission and states basic competencies of the Board of Directors. It also approves internal rules of the association and decisions on payments for work performed for association. The wording does not clearly imply whether officials may be employees of the association or whether they just receive remuneration. Moreover, it makes decisions about restructuring or liquidation.

Article 26 (5) b); it adopt decisions with regard to alienation, leasing out, pledging or transfer of other rights in the property of the association to property owners or other persons – it is not clear whether the association has a legal right to withdraw someone’s ownership or whether it only approves dealings in property.

Article 27; Procedures at the general meeting of property co-owners (authorized representatives). This article deals with procedural issues associated with summoning the general assembly, notifying property owners, the manner in which assemblies should be conducted and the requirement to take minutes of meetings. It defines the quorum as at least 2/3 of the overall number of votes. If a quorum is not achieved the meeting can be recalled after 48 hours and has the right to adopt decisions with a majority of at least 51% of the vote. 2/3 participation is too high in cases when ordinary problems are being addressed. A simple majority should be sufficient. Once participation in meetings improves, a majority of those present should be sufficient to pass decisions. Higher quorum should be reserved for more important tasks such as approval of loans, hand-over of the form of administration and liquidation, etc.

Responsible and the role of the Board of Directors is included in Art. 28; The Board of Directors is elected as the executive body of the association and makes decisions about all matters which are not covered by the General Assembly. The General Assembly elects members for a maximum period of 3 years. In cases when state or communal ownership exceeds 30%, a representative automatically becomes a member of the Board.

Article 29; addresses the responsibilities of the Board of Directors. The Board implements decisions made by the General Assembly; ensures compliance with the laws and articles of association; ensures timely payment be homeowners; prepares annual plans of income and expenditures and submits them for approval of the General Assembly; maintains a register of home-owners; keeps records, accounts and reports; and summons assemblies. A board meeting is chaired by the chairman or his replacement in his absence and the assembly achieves a quorum if the majority of members are present. The Board is authorised to manage money and make payments in accordance with approved plan.

Article 30; Duties and position of the chairman of the Board of Directors. The Chairman and board of directors are elected for a period of no more than 3 years. The chairman’s role is to make sure that decisions of the Board and Council are facilitated, he hires and dismisses employees of the association according to the law, he manages employees, prepares articles of association and has them approved by the general assembly along with any amendments; he concludes contracts and represents the association vis-à-vis third parties. The abovementioned rights imply that position of the chairman of Board of Directors is a statutory one.

Article 31; The auditing commission is not included in Article 24, it is however an important part of the entire system of the association. It is elected for a period of two years; members of the Board may not be its members; and the Board elects a chairman out of at least 3 members. It controls economic and financial matters of the association and submits a report to the general assembly about its activities. Members of the auditing commission may be present at Board meetings and their vote is an advisory one.

Article 32; Funds an Assets of the Association - funds comprise fees and other payments of the members. They also include income from economic and financial activities of the association (Article 18 – 21), payments of expenditures for maintenance of internal distributions, income from the trade with securities based on decisions of the general assembly, which is very risky. Part (4) deals with association’s property "common movable and immovable property within the condominium formed as a consequence of its activity", These provisions contradict the very objective of the association as a non-profit organisation to manage property and protect the interests of homeowners.

The association may insure common property of home-owners against physical damage, while each apartment owner insures each apartment individually. Article 33 sets out procedures for
indemnification and the allocation of insurance proceeds between homeowners in the event that the
condominium is extensively damaged or destroyed.

Two associations may merge subject to approval by homeowners – Article 34. The wording does not
make it clear, whether the existence of the original entities cease due to the establishment of a new
entity or whether the powers of the original entities are transferred to newly-established entity.

Article 35; deals with direct re-organisation and liquidation, which happens in line with valid legislation.
Once all commitments, including loans, are settled, the residual property is distributed according to
the statutes.

Article 36; stipulates administrative, penal and other responsibilities for failure to meet legal
requirements.

4.1.3 Conclusions and Recommendations

The following conclusions and recommendations are presented for amendments to the Condominium
Law:

Definitions

The law contains some definitions which, according to the current formulation of condominia allow
numerous properties and buildings to be included in one condominium (Article 1 and 4 Section 1).
There are several unclear provisions within the decision-making process as well as the definitions
relating to payments by property owners.

*Recommendation:* The definition of Condominium should be amended to remove references to
properties such as bungalows, cottages and commercial premises. One condominium should
comprise one apartment block. Property owners of different types of properties have different
interests and priorities and these cannot be managed under one PHOA without problems such as
cross subsidies arising.

Status of PHOA

The legal status of the PHOA is unclear and the law allows associations to own property and trade
securities, etc.

*Recommendation:* Homeowner associations should be clearly defined as non-for-profit entities for the
purpose of administering property of home-owners in multi-apartment buildings. PHOAs should have
the power to borrow. Borrowing by the PHOA on behalf of the homeowners is an efficient way to fund
and manage refurbishment works

Association Bodies

The law introduces only general assemblies and board of directors as the association’s bodies

*Recommendation:* The auditing commission should be included among key bodies

Representation

The law currently allows homeowners to be represented via elected delegates in the ratio 1:5,
however, it fails to describe the procedure.

*Recommendation:* This procedure results in homeowners becoming distanced from the decision
making process. This provision should be repealed. Adequate protections should be included to
ensure the interests of municipal tenants are represented at meetings.

Ownership of Common Parts

The PHOA owns the common parts.

*Recommendation:* common parts should be transferred to homeowners in accordance with their
share. Appropriate protections should be included to ensure this transfer occurs. The share
attributable to municipal tenants in largely privately owned buildings should remain with the
municipality and the municipality should be responsible for paying its appropriate share of costs as
the municipality is the owner.

Quorum
The law requires high quorums to be achieved before day to day business is conducted.

**Recommendation:** Voting rules should be amended to accommodate a range of voting requirements depending on the importance of the issue

**Invoicing**

Payments for services to suppliers are based on a contract with the association and subsequent contracts between the association and home-owners. Based on interviews we conducted in Chisinau, no official invoices are provided by service providers giving details of the price per unit and the amount of goods or services supplied.

**Recommendation:** The Condominium law should be harmonised with laws on accounting and payments should only be made against correctly formulated invoices.

**Funds**

The Condominium Law gives powers to create various funds – including funds for repairs, but it fails to make the formation of these funds obligatory and it fails to impose obligations on homeowners to make payments into these funds.

**Recommendation:** To amend the law to impose an obligation to set up a repair and refurbishment fund and for common parts and to impose an obligation on homeowners to make payments into the fund at a level set by the homeowners association.

**Enforcement**

The law includes a right for home-owners’ associations to claim outstanding payments from home-owners who have defaulted by means of court proceedings.

**Recommendation:** Efficient enforcement mechanisms should be introduced to deal with enforcement. These mechanism should comprise summary proceedings and the issue of an order for payment. Also homeowner associations should have the power to take liens over apartment blocks by way of security. This mechanism allows PHOAs to take enforcement action against homeowners for non-payment for services including loans taken out by the PHOA.

### 4.1.4 Recommendations for Reform of the Condominium Law

In addition to the above recommendations for review of the Condominium Law, the following recommendations are made for the reform of Condominium Law:

- Develop a new Law on Energy Performance of Buildings to provide the primary legal framework for energy efficiency of buildings and to give Ministers the necessary powers to implement regulations and deals with ancillary issues such as auditing and verification.
- Common parts of apartment blocks are still in the ownership of Municipal entities and PHOAs are prevented from taking ownership until outstanding debts are paid to Municipal Entities. Repeal the law requiring unpaid maintenance costs to be paid to municipalities prior to the transfer of buildings from municipalities to homeowners.
- Municipalities should develop a plan to progressively transfer common parts to homeowners over a specified period, say 2 years. This approach will only work if homeowners are supported during this process and helped to acquire the necessary skills to manage their own properties.
- Repeal the law requiring residents of housing associations to pay 1 leu per square meter per month as a service charge. As described above homeowner associations should set up repair and refurbishment funds and determine contributions by homeowners.
- Where new buildings are constructed, impose a legal obligation to create a PHOA.
- Create a social safety net and incentives for early adaptors through financing mechanisms coupled with grants. This issue is discussed further in Sections 6 and 7 below
4.2 ADDITIONAL BARRIERS TO EFFECTIVE IMPLEMENTATION OF ENERGY EFFICIENCY MEASURES IN THE RESIDENTIAL SECTOR

In addition to the limitations in the Condominium Law, a number of additional barriers have been identified to the effective implementation of energy efficiency measures in Moldova. While it is recognised that it is not within the scope of the proposed reforms to the Condominium Law to address these issues and these issues cannot be addressed by private sector lending, it is also recognised that for the Condominium Law reforms to succeed and private sector lending to occur, these barriers will need to be addressed:

4.2.1 Legal, Institutional and Administrative

- Institutional weakness. While those in senior positions are well versed in the issues they do not have the institutional frameworks through which to deliver change.
- A lack of metering and transparent invoicing by energy and heat providers.
- An inability by homeowners to regulate energy use

4.2.2 Economic and Financial

- Lack of government and private finance to support investment in energy efficiency. The Energy Efficiency Fund as envisaged by the Law on Renewable Energy Resources is not yet operational and there is currently no commercial lending
- A lack of reliable certified energy efficiency products in the marketplace
- Heat tariffs that do not reflect the true cost of the service (although these costs are currently rising).
- Widespread poverty which is reflected in an inability to pay for heat at the current tariffs.
- Low collection rates for property management services

4.2.3 Skills, Capacity and Awareness

- A widespread belief among the population is that decaying buildings and energy inefficiencies are a problem for the municipalities to address and fund.
- A lack of awareness of the benefits of energy efficiency among the public is partly due to a lack of education initiatives and public awareness campaigns.
- A lack of capacity and expertise in energy auditing, installation and refurbishment and verification of energy reductions achieve by refurbishment

4.2.4 Measures to Promote Energy Efficiency

While this paper focuses on reform of the Condominium Law to facilitate property management by homeowners and to provide a regulatory framework to accommodate commercial lending for energy efficiency measures, it is recognised that these reforms will not be successful unless additional measures are undertaken to support the cultural, social and economic changes needed for a successful transition to a more energy efficient residential sector in Moldova: Such measures include:

- With the assistance of donor funding provide adequate resources for the NEEA and recruit staff and experts.
- With the support of donors create a civil Energy Institute (NGO) funded by international donors to undertake capacity building, training and education in the area of energy efficiency and renewable energy.
- With the support of donors create a Housing Institute for capacity building, training and education in property management. This institute will have lifespan of 5 or 6 years and will coordinate efforts with the Government, NGOs and donors.
- With the assistance of donor funding support the Association of PHOAs in capacity building activities and interface with government over the development of housing policy.
- Run public information programmes to educate the public about the benefits of energy efficiency.
• Create demonstration projects to address any unforeseen problems and allow access to public. In return for public service being provided, provide buildings with incentives - longer grace period, lower interest rate or higher percentage of grant.
• Put a scheme in place to train builders as certified energy efficiency installers. This scheme could be managed by the NEEA
• Put in place a scheme to train energy efficiency auditors and verifiers. This scheme could be managed by the Energy Efficiency Agency

5 FUNDING OF ENERGY EFFICIENCY INVESTMENTS

5.1 INTRODUCTION

This chapter looks at the main issues affecting energy efficiency investments for households in Moldova. The first section looks at the institutional aspects. The next section assesses financial markets in Moldova and the barriers facing consumers when looking to borrow funds. Some of the principles of responsible financing are explained as well as initiatives in general financial education for the general public. These issues may seem trivial in advanced economies but in Moldova there is a still a significant gap in consumer awareness of taking loans and corresponding banks’ requirements in facilitating these loans. Finally the analysis constructs a fairly simple financial model of a hypothetical investment in a number of energy efficiency measures such as insulation, double glazing and thermostats. This looks at the general conditions of funding as applicable today in Moldova and whether investments are financially feasible.

5.2 RESIDENTIAL SECTOR

The residential sector is characterized by a broad range of inefficiencies starting from large commercial heat and hot water losses (thefts and leakages) in the systems, to wasteful end use in dwellings that are not insulated. Generally, energy efficiency projects in the residential sector are not implemented with the exception of donor-assisted demonstration projects and occasional projects by managers of buildings.

The increase in energy price levels, combined with the low level of income (the energy bill of a household in the winter season might represent more than 50% of an average salary, however the average annual expenditure for dwelling and facilities, inclusive for energy services, constitutes only 13.5% of total income; [source National Bureau of Statistics, 2008]), has resulted historically in low rates of payment collection (the payment of electricity bills reached 100% after the Law on Energy allowed disconnection of non-paying consumers).

It is difficult to achieve real savings in the residential sector at present as ambient temperatures are below that which is generally regarded as comfortable and it is difficult to define the “baseline energy consumption”.

Increase in prices of imported energy fuels, big system losses, and chronic non-payment by the consumers, led to a serious financial crisis in the heating sector. Since 2000, heating companies have been established as municipal enterprises, wholly owned by the local administration.

The majority of these units did not have the necessary funds to redress their financial problems. Consequently, many heat supply systems have stopped operation, whereas the efficiency of the remaining ones is very low. As a result, heating services both to public and residential buildings continue to deteriorate. Many customers have started refusing the heat supply, thus reducing significantly the demand for heat and the efficiency of the district heating systems..

5.3 GENERAL FINDINGS ON THE STATE OF FINANCIAL ENVIRONMENT FOR PROMOTING ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES

• Although primary legislation on energy efficiency and renewable energy exists in the Republic of Moldova, there is lack of secondary legislation; thus, energy efficiency legislation is more declaratory than operational;
• Economic incentives to stimulate the implementation of the recommended measures have to be developed;
Inefficient legislation to support the structure of the ANCE; most important barriers posed to the fulfilment of Agency activity are the lack of financial and human resources;

All sectors have significant energy efficiency potentials in the building stock, technologies and management; however, lack of financing is a general barrier for the implementation of energy efficiency measures by all types of consumers;

According to 2007 data, new investments in the corporate sector have been mostly financed using internal funds; capital markets on the whole are underdeveloped;

There are needs for capacity reinforcement on business development issues for businesses involved in energy efficiency;

Financial and human resources are still insufficient to implement practical actions; institutional stability is required and the existing normative and legislative framework need to be extended; and

Lack of financing for core business activity limits the interest for energy efficiency investment; the limited awareness of the corporate sector of the possible benefits and needed actions results in little activity in energy efficiency investments; equity and mezzanine financing business development skills are therefore limited.

5.4 FINANCIAL MARKETS IN MOLDOVA - BACKGROUND

5.4.1 Current financing conditions in Moldova:

The global financial crisis has indirectly affected Moldova’s financial system, mainly because the limited access of domestic banks to international capital markets. The banking system therefore remains generally sound, although some banks have suffered temporary liquidity shortages and relatively large deposit withdrawals or conversions of local currency into foreign-denominated deposits.

Lending to the economy has fallen significantly, most of which is attributable to the reduction in local currency loans for consumer lending, but small and medium-sized enterprises (SMEs) also report substantial difficulties in obtaining bank credit, partly related to the impact of the global crisis on the real sector. The National Bank of Moldova (NBM) has announced a programme of funding to Moldovan banks for to provide liquidity and support lending to the real economy at affordable interest rates.

5.4.2 Authorized banks of the Republic of Moldova

There are 15 commercial banks in Moldova, all engaged in funding various activities. Due to this issue of a contraction in bank lending it was deemed important to ascertain the appetite of banks to participate in the potential facility. Thus visits were planned and a total of 11 of the 14 trading banks agreed to meet the consultant. In addition one non banking financial institution that is a leader in mortgage borrowing also consented to a visit. The notes to all of these meetings are attached in Appendix A and key statistics are presented in the following Table.

Table 5.1: Key Bank Statistics:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Year of Creation</th>
<th>No of outlets</th>
<th>Total Assets 2009 US$,000</th>
<th>Equity 2009 US$,000</th>
<th>Net Income US$,000</th>
<th>Visit by team</th>
<th>Worked with EBRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moldova Agroindbank</td>
<td>1988</td>
<td>87</td>
<td>626.454</td>
<td>128.163</td>
<td>12.8</td>
<td>Yes</td>
<td>SME EE</td>
</tr>
<tr>
<td>Banca de Economii</td>
<td>1990</td>
<td>486</td>
<td>416.864</td>
<td>68.98</td>
<td>1.932</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>VictoriaBank</td>
<td>1992</td>
<td>21</td>
<td>486.369</td>
<td>73.12</td>
<td>5.33</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Moldindconbank</td>
<td>1991</td>
<td>50</td>
<td>373.398</td>
<td>46.106</td>
<td>1.139</td>
<td>Yes</td>
<td>SME EE</td>
</tr>
<tr>
<td>Mobiasbanca</td>
<td>1990</td>
<td>69</td>
<td>260.373</td>
<td>50.987</td>
<td>1.131</td>
<td>Yes</td>
<td>SME</td>
</tr>
<tr>
<td>Banca Sociala</td>
<td>1988</td>
<td>60</td>
<td>203.434</td>
<td>29.294</td>
<td>4.92</td>
<td>Yes</td>
<td>SME</td>
</tr>
<tr>
<td>Eximbank</td>
<td>1994</td>
<td>59</td>
<td>296.819</td>
<td>65.784</td>
<td>-4.732</td>
<td>Yes</td>
<td>SME</td>
</tr>
<tr>
<td>Bank</td>
<td>Year of Creation</td>
<td>No of outlets</td>
<td>Total Assets 2009 US$,000</td>
<td>Equity 2009 US$,000</td>
<td>Net Income US$,000</td>
<td>Visit by team</td>
<td>Worked with EBRD</td>
</tr>
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<td>---------------------</td>
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<td>---------------------</td>
<td>---------------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Fincombank</td>
<td>1993</td>
<td>31</td>
<td>151.874</td>
<td>29.488</td>
<td>0.475</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Banca Comerciala Romana</td>
<td>1997</td>
<td>3</td>
<td>163.154</td>
<td>10.836</td>
<td>-26.549</td>
<td>Yes</td>
<td>EE</td>
</tr>
<tr>
<td>Enerbank</td>
<td>1997</td>
<td>58</td>
<td>105.586</td>
<td>18.868</td>
<td>6.63</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Unibank</td>
<td>1993</td>
<td>18</td>
<td>32.465</td>
<td>12.707</td>
<td>-3.68</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Pro Credit</td>
<td>1999</td>
<td>22</td>
<td>46.845</td>
<td>10.235</td>
<td>-4.955</td>
<td>Yes</td>
<td>SME</td>
</tr>
<tr>
<td>Comertbank</td>
<td>1990</td>
<td>1</td>
<td>45.876</td>
<td>1.4</td>
<td>1.66</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Universalbank</td>
<td>1994</td>
<td>8</td>
<td>22.8</td>
<td>11</td>
<td>-0.628</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EuroCreditbank</td>
<td>1992</td>
<td>16</td>
<td>22.8</td>
<td>11</td>
<td>0.87</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Prime Capital</td>
<td>2005</td>
<td>4</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

The consultant was able to see the seven leading banks by assets. At the same time it was considered useful for the consultant to obtain the views of some of the lower classified banks. The market share of the 6 major Moldovan banks are set out in Table 5.2 below.

### 5.4.3 Market Share of Major Banks

Figure 6.1 sets out the market share of the six major banks of Moldova.

#### Table 5.2: Market Share of Six Major Moldovan Banks (31.12.09)

![Market Share Chart]

**5.4.4 Loan Structures**

Most loans with maturities of more than one year are financed by international donors. Loan structure reveals that industry and commerce capture 49% of loans vs. 14% each for consumer loans and agriculture. Banking system stability and high profits enabled total assets to reach USD 2,828.5
Million. (31,978.1 million lei at FX MDL/USD 11.306) end-2007, a 40.6% increase due to extensive bank activity.

**Table 5.3: Moldovan Bank Loan Structures**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans to industry and commerce</td>
<td>6%</td>
</tr>
<tr>
<td>Consumer loans</td>
<td>2%</td>
</tr>
<tr>
<td>Agriculture and food industry</td>
<td>2%</td>
</tr>
<tr>
<td>Real estate, construction and development</td>
<td>49%</td>
</tr>
<tr>
<td>Other loans</td>
<td>14%</td>
</tr>
<tr>
<td>Loans for roads, construction and transportation</td>
<td>13%</td>
</tr>
<tr>
<td>Energy and food industry</td>
<td>14%</td>
</tr>
</tbody>
</table>

The consumer market for banking has been changing of late. Some of the current good practices, policies and perceptions are as follows:

- The introduction of reputable foreign banks to the market have influenced communication practices;
- Several banks are slowly becoming more proactive in the area of open communication and transparency with clients in response to changing market conditions and demands; and
- Detailed informative marketing materials are usually available;

However, few institutions have strong marketing, human resource systems or management accountability for instilling Responsible Finance.

### 5.5 FINANCIAL EDUCATION

In terms of the level of financial literacy and needs assessment the following applies for Moldovan consumers:

- Urban dwellers and young people have a relatively higher level of financial literacy;
- Remittance recipients have a relatively higher level of financial literacy;
- Returned migrants have a higher level of financial literacy than non-migrants;
- Financial literacy is lower among people in rural areas (61% of the people) and older people;
- Financial education is not addressed systematically in schools or by banks;
- Neither the Banking Association nor the Consumer Protection Agency, which does not represent financial products, promotes financial education; and
- Despite the obvious link to long term business development, commercial banks have played no role in promoting financial education except to provide occasional training to existing clients on new products. Thus far, the aim of bank financial education is short term sales development, not client or community outreach. This is consistent with the banks' perceived role as sales vs. service organizations.

Moldova has a high proportion of *Remittance recipients* which are characterised as follows:

- More recipients who pick up money at the bank (and not elsewhere) have a bank account (20%);
• A majority (72%) of those picking up money at banks put their money in savings;
• The amount of money saved increases incrementally with the frequency of money received.
• Account ownership is heavily associated with savings and investing: 58% of those who save and 31% of those who invest have bank accounts; and
• Female recipients save more money than men (US$2,400 vs. US$1,800), but have half as many bank accounts as men. This is particularly important because two-thirds of remittance recipients are female.

An EBRD study shows that remittance recipients are different from the general population, which is valuable information for designing a financial education strategy for remittance receivers. Whereas 14% of the general population has a bank account, 19% of remittance recipients have one.

However 20% of remittance recipients have a poor or distrusting view of the banks and cite the following reasons for their negative opinion:
• Poor experience with banks (36%),
• banks charge too much (25%),
• their money is not safe in a bank (23%),
• not familiar with banks (8%), and
• banks do not treat people well (6%).

Another 20% of remittance recipients do not know how to rate the banks’ service.

5.6 CONDITIONS FOR ENERGY EFFICIENCY LOANS TO HOUSEHOLDS:

Two years ago, a team looking at the financial position regarding funding of energy efficient investments considered a number of parameters; these have been reviewed as follows:

Current financing conditions:
• interest rates 10 – 12% in case the credit is allowed in €/USD (14% very recently due to inflation) – credits in €/USD are only available for companies.
• In local currency loans have fallen from around 25% two years ago to about 14 to 15% today although much depends on the credibility of the client, the fluctuations are a reflection of the economic circumstances of Moldova.
• HOAs cannot receive credit (by law) – only PHOA (Condominium), and this was a key issue for discussion with Banks as to their ideas for change.
• Maturity of loans is growing, up to the maximum of 5 - 7 years industries, 10 years households, SMEs – 7 years. However small loans can be repaid in two years.
• Collateral is high with typically 130% loan security.
• Co-financing by the client – about 30%, not always, depends on the project robustness and revenues, bank financing can reach 100%.
• As to the size of loans, the general opinion of the banks is that several small loans are better than one big loan. This stands to reason that the banks would consider this as far more profitable even though it would be administratively burdensome. There are no limits to the size of the loan, approval procedures are standard (with an increasing size the higher levels of management are involved). Given the need to amend the Condominium law, small loans to individual homeowners working together may be easier to achieve in the short term rather than one loan via the PHOA. Once the condominium Law has been amended and PHOAs are able to operate effectively, it is likely that the opportunities to make larger loans will increase. This situation will arise due to improved decision making processes within the Condominiums and loans being made for the energy efficiency refurbishment of all apartments in a condominium not just to a limited number of proactive individuals.
• Commission fees: these have increased significantly of late and can comprise up to 4% of the loan size.

A recent assessment by Pro Credit Bank showed that the segments showing lowest portfolio quality were small loans below USD 50,000 and very small loans for amounts between USD 3,000 and USD 10,000. The respective portfolio at risk (PAR) over 30 days of these categories was 1.13% and 0.65% at the end of 2009. For the entire portfolio, the PAR over 30 days was just 0.47% (2008: 0.53%).
Two years ago there was to be an EFSE credit line to be provided to Banca Sociala for households mortgage finance; in addition to standard mortgage loans, this would allow the financing of improvements to boilers and heating systems. Loan conditions were considered standard and eligible energy efficient technologies were to be financed (insulation, boilers.). The consultants understand that the line has not been taken up.

In addition, in 2008, Mobiasbanca Groupe Société Generale was considering financing a large biogas plant project (€ 200000); however, this project did not proceed. Most banks have little experience funding energy efficiency and renewable energy projects.

Technical assistance to support the public building sector and local financial institutions in undertaking energy efficiency projects is necessary even though the knowledge base of banks has improved over recent years.

The economic downturn has forced many homeowners to engage in some form of refurbishment and repair and some of these measures have included simple energy saving procedures such as double glazing, insulation and even heat meters.

There should be some technical assistance included within the facility to identify a range of eligible measures identifying the technical specifications for the following categories of housing:

- New house;
- New Apartment Blocks;
- Old houses; and
- Old Apartment buildings.

This technical assistance needs to be ongoing and updated as technology is rapidly changing and newer measures may be more appropriate. The local consultant team was able to identify some technical specifications and the associated costs of investments but these will change over time and it is important that technical expertise can be on hand to show such changes and the effects on households.

In addition there will be a need for coordination of a publicity programme with the Ministry of construction and regional development. It is certainly an appropriate time to develop these publicity measures as energy prices have just risen significantly so the local populace is very much aware of the difficulty of keeping pace with energy prices.

However a major finding of the consultant in the visit to the Banks was their enthusiasm to participate in a potential line for energy efficiency. All of the banks visited stated categorically that they wanted to know more regarding the conditions of the EBRD facility. The consultant considers that the reduction in general bank lending is a major contributor but in addition the attraction is also due to this type of funding relating to the banks’ existing mortgage financing.

The banks were all provided with the financial models of investment for the categories of individual apartments, houses and apartment blocks (see next section). Whilst they can see the attractiveness of the apartment blocks investment (in terms of higher rate of returns, healthier cash flows with financing and obvious economies of scale) there is still scepticism of undertaking this type of funding under the existing laws.

Banks are currently unwilling to lend to PHOA as current legislation does not provide adequate security for banks. This weakness in the legislation is one of the reasons for reforming the legislation.

Therefore it is recommended that as a condition of participating in the facility that banks will be committed to providing at least half of their loans to apartment blocks. This has to be refined but the message to participating banks is that they cannot see this line as operating for individuals and houses only. The consultant explained that this was not the purpose of the facility and that the economic benefits are far higher and greater when applicable to apartment blocks.

Again as with general interest in the facility all of the banks were prepared to channel the grant to the borrowers. However their lack of experience in administering a grant was obvious as most enquired as to how the grant procedures of approval and subsequent payment should be undertaken.

The consultant discussed a range of measures but the most simple would appear to be after approving an application for an energy efficiency loan then the householder would need to spend...
upfront materials and works undertaken. On showing invoices and seeing the works completed the bank could make the grant component payable within the next 7 to 14 days. The important principle is that no grant should be payable until all goods and services are paid in full.

The models discussed in the next section show a higher grant for individuals and house owners as against grants for apartment blocks. Should this finally eventuate then it is important that any potential abuses for housing associations to obtain the higher grant be curtailed. Similarly there is an issue regarding works and services. There is a large underground of unregistered builders and installers who are significantly cheaper in their services to clients. The poorer groups in society may well be tempted to use their services in order to pay less. But the grant incentive should work to avoid such potential abuse. It should not be a difficult process to record all works and use only registered installers and approved suppliers.

5.7 A GENERAL FINANCIAL MODEL FOR ENERGY EFFICIENCY IMPROVEMENTS:

Notwithstanding the general poverty of Moldova and the perceived inability of consumers to engage in loans for energy efficiency improvements, the consultants consider that there is a degree of willingness of apartment dwellers and homeowners to undertake such improvements. This assumption is based on previous initiatives that have been introduced in similar countries such as Slovakia, Bulgaria and Ukraine.

The consultants have prepared three financial models attached at Annex 1 showing the expected returns to homeowners who invest in energy efficiency measures. The models should only be seen as a guide to determining costs and calculated benefits of utilising energy efficiency investment. As stated previously these models were distributed to all of the institutions visited in their personal discussions and they were invited to provide their comments as such. The Models are attached at Annex 1 to this Report.

5.7.1 Model N°1 Apartment Block Connected to the District Heating System

In order for clarity and meaningful analysis, the first model shows a range of possible improvements for a typical 5 storey apartment block, with a total of 20 apartments. The block is assumed to be connected to the district heating system. The range of investments included:

- Wall insulation;
- Roof insulation;
- Radiator;
- Thermostats; and
- Double Glazing.

In addition a building heat meter with an individual heat substation costing in the order €15,000 has been included in the range of measures. Further investment is considered in the rehabilitation and insulation of main horizontal distribution pipes in the building at a cost of €13 per meter.

Latest tariffs were provided for each utility:

<table>
<thead>
<tr>
<th>Tariff</th>
<th>Gas 1m³</th>
<th>Heat 1Gcal</th>
<th>Elect. kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lei</td>
<td>4.3</td>
<td>821</td>
<td>1.33</td>
</tr>
<tr>
<td>Euro</td>
<td>0.26875</td>
<td>51.3125</td>
<td>0.083125</td>
</tr>
</tbody>
</table>

These are the tariffs currently in existence but they are scheduled to increase in the New Year.

Assumed measures were given for number of rooms, length, width and height and external walls.

Main economic assumptions were as follows:

- Loan to be made either to individual homeowners cooperating together or to PHOA;
- Grant 35% payable on loan drawdown;
- Loan Grace period, 2 years with a 10 year repayment;
- Interest rate on the loan 10 % per annum;
- Bank Administration Charges of 2.5% of drawdown (for individuals this is around 4%, the larger loan and increased substance of the investment would assume less fees charged);
- Additional capital maintenance of 3% of initial capital expenditure in Year 5;
- Real annual increases in gas prices 2%;
- Real annual increases in electricity prices 5%;
- Real annual increases in heating prices 5%; and
- Discount rate 12.5%.

The following monthly energy consumption per apartment was as follows:

<table>
<thead>
<tr>
<th>Energy Type / Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (kWH)</td>
<td>150</td>
</tr>
<tr>
<td>Gas (m3)</td>
<td>8</td>
</tr>
<tr>
<td>Heating (Gigacal)</td>
<td>3</td>
</tr>
</tbody>
</table>

The introduction of energy saving measures would lead to the following efficiency improvements in percentage terms.

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Percentage Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (kWH)</td>
<td>15%</td>
</tr>
<tr>
<td>Gas (m3)</td>
<td>5%</td>
</tr>
<tr>
<td>Heating (Gigacal)</td>
<td>50%</td>
</tr>
</tbody>
</table>

Annual savings are assumed applicable for six months for electricity and gas and 5.3 months for district heating. With the initial measures the savings were in the order of 30%, but the addition of the building heat meter and the rehabilitation and insulation of the horizontal pipes increases these savings to at least 50%.

For the apartment block the initial yearly savings in money terms would be as follows:

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Savings ( Moldovan Lei)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (kWH)</td>
<td>374.00</td>
</tr>
<tr>
<td>Gas (m3)</td>
<td>13.00</td>
</tr>
<tr>
<td>Heating (Gigacal)</td>
<td>8,975.00</td>
</tr>
</tbody>
</table>

Whilst there are savings with all mediums, it is the heating that generates the most savings. A 50% reduction in usage would lead to savings of just under Euro 8,975 per year at current tariff levels.

The project assumes an internal rate of return of 9% which is below the internal rate of return of 12.5%. There is also a payback period of 8 years before the project is feasible (that is project cash flow benefits need to be aggregated for nine years before equalling the total investment cost of Euro 84,253.

When including the financing, the cumulative cash flow line is positive from Year 1 which would give comfort to potential lenders. This is obviously helped by the level of a 35% grant but in addition the two year grace period before repayment of principal.

5.7.2 Model N°2 Individual Apartment Owner

The average loan is likely to be quite small and in our example we have a single apartment of 60 square metres and assuming no work on insulating the roof or walls. The cost of a typical investment would be just under Euro 1,820 and this would include installing an efficient stove which is very effective in reducing heating requirements in buildings not connected to district heating.

Given this low level of investment, it is considered likely that the Banks would not entertain a loan for more than four years and there would be a grace period of just one year before three equal annual principal payments. Borrowers would need to be pay more like 4% of the loan in administrative fees.
In addition householders would not have additional maintenance over the life of the loan.

Due to the higher risk of individual homeowners it is assumed that a grant of 50% is required in order to reduce the levels of principal and interest paid. With the grant payable, the cumulative cash flow is positive from Year 1. Whilst of comfort to the banks, however they would need to assess other risks of potential borrowers in order to ascertain their interest in funding these measures.

5.7.3 Model No 3 Loans to Single Family Home Owners

The third model shows the financial structure for houses and this is important given that this would be typical for most villages in Moldova where there are no apartment buildings.

The average loan is likely to be higher than for individual apartments and in our example we have a house of 80 square metres and assuming partial thermal insulation of roof and walls. The cost of a typical investment would be around Euro 10,350 and this would also include installing a wood stove.

As with the individual apartments this low level of investment assumes banks would not entertain a loan for more than four years and there would be a grace period of just one year before three equal annual principal payments. Borrowers would need to pay more like 4% of the loan in administrative fees and there is no additional maintenance over the life of the loan.

As with individual homeowners it is assumed that a grant of 50% is required in order to reduce the levels of principal and interest paid. With the grant payable, the cumulative cash flow is positive from Year 1. Whilst of comfort to the banks, however they would need to assess other risks of potential borrowers in order to ascertain their interest in funding these measures.

5.7.4 Concluding Comments

Moldova’s consumer lending market is opening up and making itself more available for funding. However issues that still need to be addressed are financial education for consumers and improvements in transparency regarding lending by the banks.

There are a range of energy efficiency improvements available and it is reasonable to consider that Moldovan households are prepared to engage in these measures.

The availability of programmes designed to show household needs to be expanded showing a combination of relatively affordable loans and cash grants.

The consultants constructed three relatively simple financial models highlighting the effects of funding a range of energy efficient investments. Whilst the loan/grant ratio was arbitrarily set it is possible to set any number of combinations in order to make the investment affordable.

Although in practice it would seem that banks would prefer to fund to householders individually there is a strong case based on economies of scale for groups of households such as condominium or housing association to apply for a joint loan.

Individual homeowners represent a higher risk but, with a larger grants, banks may consider loans to individual homeowners who would not spend as much.

Whatever the situation, there is reason to be optimistic that measures can be affordable to households.

5.7.5 Recommendations

The Bank provides a facility of €50 Million to be shared amongst three to four participating Moldovan banks or financial institutions.

The financing model used by EBRD in Slovakia and Bulgaria and for commercial loans in Moldova is successful and should be replicated in the Moldovan residential market. This model includes donor funded assistance to the banks and borrowers by the project implementation team consisting of international and local experts recruited by EBRD. Each team includes technical and financial experts to assist with project identification, preparation and verification and marketing experts to promote the facility as well as project management coordination and administrative expertise to structure, operate and monitor the facility.
The participating banks may agree to channel the distribution of grants and there will be a consistent procedure for the approval of loans and subsequent payment of grant, the latter only after all receipts of goods and services provided are shown as well as approval of the procedures on completion. The banks will also have measures incorporated to prevent any potential fraud involving grant applications.

Given the economies of scale for implementing energy efficiency measures in apartment buildings and the higher rates of return involved it is important that a sizeable component of the facility be used for these buildings rather than for individuals. Each bank should allow for 60% of applications to be processed from housing associations and condominiums.

In order to alleviate the banks concerns of existing legislation regarding the unattractiveness of lending to housing associations it will be a condition precedent on the facility going ahead that the legislation is amended so that there is no impediment to the housing associations and condominiums being treated as equal to individual apartment owners in terms of credit risk.

5.8 THE GREEN MORTGAGE CONCEPT

A green mortgage facilitates the financing of cost-effective energy-saving measures as part of a single mortgage. Green mortgages may be used to purchase homes or may be taken at a later date to fund energy efficiency measures. Technical criteria are included in the mortgage to ensure the energy savings measures achieve the required level of energy performance. In countries where energy rating of buildings exists, compliance with a certain energy class (e.g. higher energy classes “A”, “B” and “C”) or energy certification can be required. Energy savings achieved by the borrower as a result of the energy savings measures allow the borrower to finance the energy efficiency improvements. Green mortgages are now available in Europe but none have been developed in Moldova.

6 OPPORTUNITIES FOR RESIDENTIAL ENERGY EFFICIENCY

6.1 INTRODUCTION

There are opportunities for residential energy efficiency in Moldova and they are starting to become more apparent as energy and heat prices increase. We have seen significant increases in energy and heat prices since 2007 and this factor more than any other presents an economic case for energy efficiency.

The choice of technology will depend on the type and location of housing stock as well as the financial circumstances of homeowners. Opportunities for energy efficiency will increase over time as the barriers we have identified are removed, the cost of energy efficiency technologies reduces and the price of imported fossil fuels increases.

Given the fact that 58.8% of the population lives in rural areas and 97% of this population occupy single family homes relying mostly on stoves for heating and hot water, limited reduction in imported fossil fuel use will be achieved through energy efficiency measures in these areas. Rural inhabitants are among the poorest in Moldova and have limited means to improve their homes. However, as and when the living standards of this population improve, there could be an increase in demand for gas as this population does have access to mains gas supply. The use of clean technologies such as solar thermal water heating by this population could reduce demand for gas in the longer term.

41.2% of the population live in urban areas and the majority of this population lives in apartment blocks. Fossil fuel use by this segment of the population is significantly higher than that used by the rural population. 50% of total heat use is by the urban residential sector. Approximately 30% of gas and electricity are used by the residential sector. Given the low use by the rural population, most of this use is likely to be by the urban population. As the urban population suffers from under-heated homes, this use is likely to increase as the standard of living improves.

Much of the electricity use is likely to be attributable to alternative heating sources used by occupiers of apartment blocks no longer receiving heat from district heating companies. Gas may also be use for heating by occupiers on floors 1-6 of apartment blocks. During our research we were told that apartment owners are installing their own gas boilers. (Gas is not installed above floor of apartment blocks for safety reasons.)
Based on the data contained in this report, it is evident that addressing energy efficiency in the urban areas will create an immediate reduction in fossil fuel use. As most of this population live in apartments, a focus on apartment will achieve the greatest reductions. These conclusions support reform of the Condominium Law.

Given the different energy sources used by apartment receiving heat from the district heating system and those not receiving heat, we have dividend our research into three groups within the population:

- Single homeowners;
- Apartment owners receiving heat from the district heating system; and
- Apartment owners not receiving heat from the district heating system.

Choices of technology will depend on price, access to technology and government policy in the form of grants, feed in tariffs and other policy instrument to influence energy choice. We have seen how cost directly affects choice in Slovakia where electricity was preferred over gas due to price but now that choice has been reversed as gas is now cheaper than electricity.

The purpose of this section of the Report is to illustrate the type of measures that are financially feasible. Homeowners should conduct energy audits and take the advice of professions before making an investment decision. However, there are some general principles of best practice that have influenced the type of technologies we have considered:

- Insulation is the most cost effective energy efficiency measure and should be undertaken before non-fossil fuel technologies such as solar power and heat exchangers are installed.
- In the case of apartment blocks, it is more efficient for the whole block to be insulated rather than an apartment by apartment approach.
- If the absence of a PHOA cooperation among all homeowners may be impractical. An alternative solution would be to fund groups of homeowners investing together in an informal and cooperative manner. For example, all homeowners on the north side of the building could finance the installation of external insulation on the north side of the building. It should be noted that where structures belong to municipalities, such as external walls and roofs, it would be advisable to obtain the consent of the municipal owner before making improvements. It is likely that this approach may create financial and energy savings as compared with single homeowners initiatives. However, without the involvement of a PHOA banks will need to provide individual loans to each homeowner so there will not be an opportunity for efficiency with finance administration.
- Financing individual homeowners is the least favoured approach and provides the most limited option.

Based on the above principles, we have prepared models to illustrate how the financing of some energy efficiency measures could be achieved. We have modelled best practice measures for single homeowners, single apartment owners and apartment blocks. We recognise that measures taken by apartment blocks may be taken by PHOAs or informal groups of apartment owners working together.

### 6.2 POSSIBLE MEASURES TO PROMOTE ENERGY EFFICIENCY

All those interviewed during our research agreed that the “Whole House” approach should be taken to achieve effective energy efficiency measures and alleviation of fuel poverty. This view is consistent with that of experts in the field. However, the whole house approach may not be feasible in all cases. Based on our research, we have set out some examples of work that could be undertaken to improve energy efficiency using a step-by-step approach.

#### 6.2.1 Repairs to Windows

Many windows in apartment blocks are broken or badly fitting resulting in drafts and loss of heat. Repair is less expensive than replacement and results in considerable improvement in ambient room temperatures and energy efficiency relative to the cost of such work. Cost of repair will vary.
depending on the extent of work required, so we have taken an average cost for the purposes of this study.

**Benefits**

Repairs are modestly priced and deliver significant improvement in ambient room temperatures and energy savings. In Slovakia, it was estimated that this work improved energy efficiency by 42%.

Repairs can be undertaken and paid for by independently by homeowners without the need for a properly functioning HOA.

Loans could be made directly to homeowners for the purpose of carrying out repairs.

**Challenges**

A longer term and more energy efficient solution would be the installation of new double glazed windows. New windows cost € 100 compared with repair costs of €20.00. Ideally windows should be repaired with the most thermally efficient glass. It may be difficult sourcing these materials. Due to the extent of disrepair, it may not be possible or economically efficient to repair some windows.

**Financing**

Repairs can be undertaken and paid for by independently by homeowners without the need for a properly functioning HOA. Loans could be made directly to homeowners for the purpose of carrying out repairs. Administrative costs for small loans may be prohibitive.

### 6.2.2 Installing heat exchanger in the basement of buildings and heat meters on every floor

**Benefits**

Experience in Slovakia showed this work made considerable savings and was suitable for vertical district hearing systems. Heat was not wasted and homeowners were able to control the amount of heat coming into their building. This work should be done only after insulation has been completed.

**Challenges**

Such work requires the cooperation of all homeowners in the building.

Homeowners may not wish to make such improvements if there is no guarantee that heat savings will be reflected in reduced bills. As billing is not transparent, it will be difficult to see the financial benefits of these improvements.

**Financing**

The installation of this technology is feasible only where there is a functioning HOA as the installation of this technology will be part of a systematic and carefully planned refurbishment programme which will first need to address insulation of the whole building.

### 6.2.3 Bypass Valves and Thermostats

A bypass valve is a valve that can be installed on each radiator in a vertical system. It allows the flow of heat to the radiator to be by-passed. Using this mechanism with a thermostatic valve allows homeowners to regulate heat use without affecting the heat flow to other floors.

**Benefits**

These adjustments would allow customers to regulate heat use.

If apartment blocks had effective PHOA’s the cost of heat could be apportioned based partly on use and partly on floor area to achieve an equitable cost distribution. This is established practice in other jurisdictions with district heating systems. The split between use and floor area takes account of upward heat flows in the building and the benefit one apartment gets from heating of adjoining apartments.

Relative to major infrastructure works, these improvements are modestly priced.

These improvements represent the first step in any refurbishment. The first priority is to stop paying for unwanted or unnecessary heat. This is particularly important for apartment blocks close to the district heating system that can suffer from overheating.
Challenges

Occupants may not wish to make such improvements if there is no guarantee that heat savings will be reflected in reduced bills. As billing is not transparent, it will be difficult to see the financial benefits of these improvements. For this reason, it may be particularly difficult to persuade homeowners in overheated apartments to install heat control measures.

All occupants in a block would have to install thermostats and bypass valves for this approach to work. Some organisation will be required to make the improvements and calculate contributions towards heating costs.

Financing

The installation of this technology requires the cooperation of all homeowners in the building. While it may be possible for the banks to make loans to individual homeowners, it would be more efficient for loans to be made via the PHOA.

It may be difficult to persuade those at the start of the district heating circuit to install energy efficiency measures. A higher grant element may be needed to provide an incentive to act. Alternatively, transparent billing would help to alleviate this challenge.

6.2.4 External Wall Insulation, Roof Insulation and insulation of Horizontal Pipes

Experts indicate that these measures are the most cost effective to improve energy efficiency and reduce heating costs.

Benefits

These measures can be taken over time if funds are not available to make all improvements at once.

Challenges

Installing energy efficiency measures in common parts such as corridors and roof spaces may only be taken when all homeowners or a group of relevant homeowners agree.

Financing

Financing should not be provided for the insulation of external walls by single homeowners as this is inefficient from an economic and energy perspective. Whole walls could be insulated if a gradual approach is required or a group of homeowners wish to insulate one wall. Financing will be to a group of individuals either through a PHOA or by individual loans to each member of the group.

6.2.5 New Double Glazed Windows

Installing double glazed windows would be within the control of individual apartment owners.

Benefits

Installing double glazing is within the control of homeowners. The process of changing windows can be undertaken on a step-by-step basis if funds are not available to change all windows at the same time.

Challenges

None

Financing

Loans could be made to individual homeowners or to a PHOA if the installation of new windows was part of a systematic and carefully planned refurbishment project.

6.2.6 Air Source Heat Pump

Benefits

This technology is extremely energy efficient. Between 70% and 90% energy savings can be achieved.

Challenges
This technology is expensive relative to gas boilers and it may be difficult to source in Moldova. Finding experts to install the technology may also be difficult.

**Financing**

Loans could be made to individual homeowners.

### 6.2.7 Wood Burning Stoves

It may be possible to install wood burning stoves in apartments with chimneys and in single family homes

**Benefits**

In rural areas, access to wood and the space needed to store wood is available.

**Challenges**

There are practical challenges associated with operating wood burning stove in towns and cities. There is little space to store the bulky fuel which prohibits large deliveries. Small purchases result in wood being carried. The size and weight of logs makes this method impractical. Chimneys need regular maintenance to avoid chimney fires. Flues must be swept at least annually. Sweeping of all flues in an apartment block will require cooperation between homeowners in the blocks. Flues also need to be lined to avoid tar seeping through mortar (which is a fire hazard) and the escape of carbon monoxide and other noxious fumes into rooms in upper floors.

If stoves were installed, there would be no control over the fuel sources used by home owners. Experience in other countries indicates that homeowners may burn inappropriate fuel sources including unseasoned wood and noxious waste. Unseasoned wood leads to increased tar deposits in chimneys which increases fire hazard and noxious waste impacts on air quality. The burning of wood is not permitted in smokeless zones. As Moldovan law is harmonised with EU law, more restrictive measures on air quality in urban areas will be imposed which may prohibit the burning of wood or other solid fuels through the implementation of smokeless zones or other measures.

**Financing**

Loans could be made to individual homeowners.

### 6.3 ENERGY SERVICE COMPANIES

We have not considered employing Energy Service Companies (ESCOs) to facilitate energy efficiency improvements. ESCOs are starting to develop in Moldova and it may be appropriate to use their services in the future to deliver energy efficiency. At present, billing is not transparent and there is still significant cross subsidies across apartment homeowners. Homeowners are unable meter or control the amount of heat they consume. These conditions create uncertainty and will not guarantee customers reduced cost in return for energy savings. These circumstances are all barriers to the effective operation of ESCOs in Moldova. Amending the Condominium Law to facilitate efficient management of apartment blocks will remove some of these barriers.

Currently there is no private sector funding specifically for energy efficiency, neither is there government support available in the form of grants. As discussed above The Energy Efficiency Law provides for an Energy Efficiency Fund to support private investment in renewable energy and energy efficiency but the fund has not yet been set up.

The only support for energy efficiency is from the donor community. UNDP is currently working on a pilot programme for the installation of some energy efficiency measures into 10 apartment blocks, but plans are at the early stages.

The situation with respect to mortgages and loans in Moldova when compared other counties in Europe is very different. In most European countries, long term mortgages for house buying are available for 25 – 30 years. Providing loan to value ratios are adequate, it is possible for these loans to be increased during their term provide funds for energy efficiency measures. Unsecured loans may also be available from banks. Some credit cards have high limits which allow spending on large purchases such as new windows, doors and insulation.
By comparison in Moldova, most houses are purchased with the assistance of relatives working abroad (up to 25% of the population works outside the country). Secured loans to support the purchase of residential properties are typically short-term and expensive ranging from 3 to 10 years at interest rates of between 14% and 20% and loan to value ratios of 70% and maximum loans of $50,000.12

7 STRATEGY

The first part of this section sets out a strategy to amend Moldova’s Condominium Law and support lending to the residential community facilitate energy efficiency measures. The second part sets out suggested institution strengthening measures which could be implemented by the Government of Moldova and international donors subject to funding to support the Government’s Policies on energy Efficiency. These wider measures would raise public awareness about the importance of energy efficiency.

7.1 PROPOSED LEGISLATIVE CHANGES AND FUNDING STRUCTURE

The first priority should be to complete the development of the regulatory framework to support energy efficiency. A considerable amount of work has already been undertaken and it is recommended that the next steps should include:

- Amendments to the Condominium Law based on our recommendations set out at 4.1 above. The work could be undertaken by the Ministry of Construction and Regional Development with the support of EBRD. Subject to funding this work could commence immediately
- The development of a new Law on Energy Performance of Buildings by the Ministry of Construction and Regional Development with support from EBRD
- Repeal the relevant sections on the Law on Privatisation requiring unpaid maintenance costs to be paid to municipalities prior to the transfer of buildings from municipalities to homeowners associations. We recognise the outstanding debts owed to municipal entities by homeowners will have to be addressed if this law is to be repealed. Further research is needed to establish an appropriate mechanism for repayment of such debt. Consideration could be given to the manner in which similar circumstances were addressed in Slovakia. A cash payment was made to the municipal entities by the state in the sum of outstanding debts. The municipal entities were then converted into limited companies and privatised. On privatisation the case payments were repaid to the State.

Once the debts of Municipal Entities have been addressed, they should not provide maintenance services to homeowners unless homeowners pay the full cost of the provision of such services. An assessment of costs of services will have to be undertaken to establish the true cost of services. Further consideration will have to be given as to the source of funding. This issue is outside the remit of this paper.

- Careful consideration will need to be given to the Law on Housing Stock Privatisation 1993, the Condominium Law 2000, the Housing Code 1983 and a number of government decisions including Government Decision 1224/1998 to ensure they are completely harmonised.
- Amend the Law on Privatisation to provide for common parts to be transferred to homeowners in accordance with their share rather than to HOAs and PHOAs.
- Repeal the law requiring residents of housing associations to pay 1 leu per square meter per month as a service charge. Impose the full market cost of maintenance services.
- The current ownership position of common parts presents a particular challenge. Ideally, Municipalities should transfer common parts to homeowners in accordance with their share. Experience with the exiting Condominium Law in Moldova indicates that homeowners are unwilling to create PHOAs. If Homeowners fail to take transfers of their common parts or create PHOA in accordance with the amended Condominium Law, penalties should be imposed. In

12 Source ‘Lost in Transition: Housing reform in Moldova 2007; Dr Sasha Tsenkova, University of Calgary’
Slovakia municipal entities stop providing maintenance services and financial penalties were imposed against the homeowners.

- Moldovan law requires notaries to verify the cost of repairs and refurbishments prior to a bank loan being made to fund such work. This process is costly and time consuming. Repealing this law and introducing an energy assessment and verification system linked to lending would be more efficient. This system could be introduced under the Law on Energy Performance of Buildings and the Law on Certification of Experts Performing in Construction.

- Assuming the facility is shared among 3 or 4 Moldovan banks, capacity building measures will be needed to train bank staff to evaluate and process applications.

- The financing model used by EBRD in Slovakia and Bulgaria and for commercial loans in Moldova is successful and should be replicated in the Moldovan residential market. This model includes donor funded assistance to the banks and borrowers by the project implementation team consisting of international and local experts recruited by EBRD. Each team includes technical and financial experts to assist with project identification, preparation and verification and marketing experts to promote the facility as well as project management coordination and administrative expertise to structure, operate and monitor the facility.

- There will be a consistent procedure for the approval of loans and subsequent payment of grant, the latter only after all receipts of goods and services provided are shown as well as approval of the procedures on completion. The banks will also have measures incorporated to prevent any potential fraud involving grant applications.

- Given the economies of scale for implementing energy efficiency measures in apartment buildings and the higher rates of return involved it is important that a sizeable component of the facility be used for these buildings rather than for individuals.

### 7.2 INSTITUTIONAL STRENGTHENING TO SUPPORT ENERGY EFFICIENCY

The following measures would support energy Efficiency in Moldova:

- With the assistance of donor funding set up and staff the proposed NEEA and a civil Energy Institute and Housing Institute to support homeowners and PHOAs and provide education and training in energy efficiency and property management. This institute will have lifespan of 5 or 6 years and will coordinate efforts with the Government, NGOs and donors.

- With the assistance of donor funding support the Association of PHOAs in capacity building activities and interface with government over the development of housing policy

- Run public information programmes to educate the public about the benefits of energy efficiency.

- Create demonstration projects to address any unforeseen problems and allow access to public. In return for public service being provided, provide buildings with incentives - longer grace period, lower interest rate or higher percentage of grant.

- Implement a scheme managed by the Energy Institute to train builders as certified energy efficiency installers

- Implement a scheme managed by the Energy Institute to train energy efficiency auditors and verifiers.

### 8 COMPARATIVE ANALYSIS

#### 8.1 GERMANY

**8.1.1 Energy Efficiency in Germany**

There are a number of social and economic factors that have lead Germany to develop "technology forcing legislation" that has resulted in Germany's leadership in the areas of energy efficiency.

Germany is a country with limited natural resource. It is highly dependent on imported energy. In 2007, 76% of total energy demand was provided by imports, which included 97% of its oil, 82% of its natural gas and 66% of its coal. Germany is currently the fifth largest consumer of energy in the world and has the largest national economy in Europe with industry comprising 29.1%.

The two major oil crises of the 1970s and the gulf war in the 1980s highlighted Germany’s vulnerability in terms of security of energy supply. Efforts to address the country’s vulnerability to
supply issue have focused on improving energy efficiency. The work on energy efficiency commenced in the 1970s and over the past 40 years has led to improved building standards which have resulted in energy demand for new buildings being reduced from 300 kWh/(m²·a) to 50 kWh/(m²·a) over that period.

Improving energy efficiency in existing buildings has been a major challenge for Germany. World War II had a considerable impact on Germany’s housing stock, and today, fewer than 30% of buildings are more than 50 years’ old. Nearly half of all dwellings in Germany were built between 1949 and 1978 and many of these were built quickly with minimal insulation.

Germany’s Leadership in energy efficiency of buildings has come about through a consistent policy on energy efficiency since the 1970s and the gradual and progressive improvement in energy efficiency standards. This consistent policy has been underpinned by research and investment by industry. New standards in energy performance are now supported by studies on cost effectiveness that show that new measures are economically beneficial. If measures are not economically beneficial, they will not be implemented in new regulations, an approach that provides confidence in the regulatory regime. Government announces new standards well ahead of their implementation and this allows industry to use the new standards as part of their advertising regime when announcing new products.

There is also a high level of public awareness of energy efficiency in Germany and this has contributed to the success of property refurbishment. Funding has also been available to assist with capital costs.

8.1.2 Government Funding

All the government’s funding programmes are managed by the Kreditanstalt für Wiederaufbau (Bank for reconstruction), or KfW. The KfW is a non-profit public banking group. The KfW Förderbank (KfW Promotional Bank) promotes housing construction and modernisation, energy conservation, environmental protection on the part of commercial enterprises, local communities, along with infrastructure and education.

The Promotional Bank programmes of the KfW banking group were initially set up in 1996 with the aim of mitigating CO₂ emissions and to increase energy efficiency.

Up until 2005, the KfW programmes provided long-term low-interest financing of energy efficiency improvements. Applicants were also freed from capital repayment during the early years of the loan. Loans covered 100% of the investment costs, including indirect costs. The KfW raises funds from the financial market and transfers this capital, via commercial banks, to programme applicants in the form of lower interest loans.

Since 2005, additional subsidies from the federal government have been used by the KfW both to improve the financial conditions of the programmes and to expand their volume. The subsidies are used to pay the difference between the interest rate awarded to applicants, and the interest rate paid by KfW for capital raised from the financial market. In addition, applicants may receive a grant of between 17.5% and 7.5% of their costs depending on the energy efficiency performance achieved. Those taking a loan may receive a bonus repayment of between 12.5% and 2.5% of their loan with those achieving greater energy efficiency receiving larger bonuses. The energy efficiency standards applied are those set out in the Energy Conservation Ordinance which applies to new buildings.

Homeowners are entitled to more than one KfW loan and may combine these loans with other financial support programmes, including grants offered at a community or state level. In 2008, the KfW extended the maturity period of their long-term loans from 30 to 35 years. Fixed interest-rate periods of up to 15 years are now offered, along with the 5 and 10 year periods already offered.

Germany is considered to have addressed social housing very effectively, reflected in the fact that state help programmes for social housing were closed in 1993 as no further help was considered to be required.

8.1.3 The Residential Sector and Energy Performance of Buildings Directive

Germany did not need to implement significant regulatory changes to implement the EPBD as its existing law either complied with or exceeded the requirements of the Directive. Germany’s energy performance of buildings standards were not affected by the Directive. Germany also had a buildings
certification programme in place for new and substantially refurbished buildings prior to the Directive coming into force and it extended that scheme to existing buildings. Germany’s regulations addressing the energy performance of major refurbishments of buildings does not have the 1,000 m² threshold and it also goes further than the requirements of the Directive by requiring a minimum use of renewable energy for all new buildings. Some federal states go further requiring major renovations of existing building to include renewable energy sources.

8.1.4 Condominium Law

The devastation of World War II caused a desperate housing shortage in Germany and a need to provide homes for thousands of homeless people. This compelled German legislators to reconsider a form of apartment ownership that would spread homeownership and create social and economic stability. A new Condominium Law came into force in 1951 and this law is still current today.

Ownership of a condominium in Germany consists of a co-owner’s share in the building and an individual apartment. The Condominium Act sets out rules to manage the relations between the co-owners and to settle potential conflicts. Apartment owners are subject to certain duties which may limit their use of the property for the benefit of all apartment owners.

The co-owners are allowed to create their own rules to manage apartment block but this right is subject to certain mandatory requirements in the Condominium law which protect all apartment owners. Rules are incorporated in bye-laws created by a contract between all apartment owners and if they are registered with the Land Registry, they bind future owners.

In some cases the majority vote of the co-owners’ meeting may be sufficient to make decisions both under the bylaws and the Condominium Law.

The condominium bye-laws may vary the cost allocation provisions under the Condominium Law to a per capita distribution or a distribution per square meters. Distribution under the Condominium law is in accordance with the percentage of the co-ownership share.

8.1.5 Lessons from Germany

- There are significant economic drivers in the form of security of energy supply that have shaped Germany’s energy efficiency law. These circumstances have resulted in comprehensive long-term policies that have gradually increased standard and given industry and the public adequate notice of changes to allow them to plan ahead. This approach has created stability and regulatory certainty and lead to investment by industry and research and development into new products. The financing of energy efficiency improvements has created a large market for energy efficiency products which in turn has resulted in mass production and reduced prices. It is the combination of these elements that is considered to have led to Germany’s success in improving the energy efficiency of its building stock.

- There were also social and economic drivers for the development of Germany’s Condominium Law which lead to an effective system being put in place in the 1950’s to regulate multiple occupancy buildings. To some extent, the implementation of this law may have been easier in Germany than it will be in Moldova as the Condominium Law was created before most people moved into their apartments and people simply had to comply with the new law. Moldova is dealing with a situation where properties have not been adequately managed for 20 years and residents have got used to the current circumstances. As a result, greater focus on education and awareness will be needed to change behaviour.

- Moldova can be compared with Germany in term of its reliance on imports of energy and the contribution it residential sector could make to energy efficiency. Direct comparisons can also be made with the poor energy efficiency standards of buildings in Germany in the 1970s and building stock in Moldova today. Giving homeowners the tools they need to manage condominiums through an effective Condominium Law is one important element in achieving a reduction in energy use in the residential sector. As can be seen from Germany’s experience, regulatory certainty; progressive increase in standards; early notification of new standards; the availability of financing; public awareness campaigns; research and development by industry and pilot projects are all essential factors in achieving improved energy efficiency in the residential sector.
8.2 COMPARATIVE ANALYSIS SLOVAKIA

8.2.1 Introduction

Slovakia joined the European Union on 1 May 2004, and is one of the fastest-growing economies in the Central Europe, with GDP growth of 8.5% in 2006 and 10.4% in 2007. According to the World Bank’s ‘Doing Business Report’ in 2007, Slovakia has been one of the fastest reformers in the world. Slovakia is classed as an upper middle-income country with Gross National Income per capita in 2006 of $9,620.

The significant GDP increase has not led to substantial changes in primary or final energy consumption levels. Primary energy intensity improved on average by 3.8% annually and final energy intensity by 4.8% from 1993 to 2005. However, the energy intensity of Slovakia is still 40% higher than the average of the OECD Europe countries.

Like Moldova, Slovakia does not have significant domestic energy production, and is highly dependent on imports of crude oil, natural gas, and solid fuels. The share of net energy imports in total primary energy supply was 67% in 2007. A large percentage of imports are natural gas and oil from the Russian Federation. Gas and electricity markets were liberalised for households on 1 July 2007, and prices do not contain any cross-subsidies, but subsidies (housing allowance) are still given to small group of customers, on a means-tested basis.

8.2.2 Energy Efficiency Policy

Key responsibility for energy policy lies on the Ministry of Economy. The policy is approved by the Government and implemented by the Ministry of Environment, Ministry of Economy and Ministry of Construction and Regional Development. The Ministry of Environment deals with environmental issues linked with energy.

Consistent with other EU countries, The Energy Policy of the Slovak Republic sets targets for energy intensity for the years 2010 to 2020. Buildings are expected to contribute 11% of energy savings out of a total 100%.

The National Energy Efficiency Action Plan (NEEAP) for the years 2008 – 2010 was approved in October 2007 in accordance with EU Directive 2006/32/EC. The NEEAP includes a range of measures to achieve an interim target of a 3% reduction in energy use from projected levels in 2010 and anticipates achieving 9% savings by 2016.

The Energy Efficiency Concept is a strategic document adopted in 2007 with a program of measures until 2020. It is similar to concepts adopted by other EU Member States, and supports the implementation of EU directives.

On a local level each town has had to formulate its own local energy policy, which must include an analysis of the town’s heat and distribution net. This local energy policy, once approved by the local council, imposes obligations on new developments, with the aim of deterring developments with standalone boilers that do not fit with the local energy plan.

8.2.3 Energy Efficiency Policy and Legislation

Within Slovakia the EPBD has been implemented through the following primarily legislation:

- Law on Energy Efficiency of Buildings
- Act No. 656/2004 on Power Supply,
- Act No. 17/2007 Coll on Regular Inspection of Boilers, Heating Systems and Air-conditioning Systems

In addition to this primary legislation the international ISO EN standards and legislation are fully implemented in Slovakia:

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13 Ministry of Economy is responsible for all organizations which have influences on prices (Regulator, Energy Inspection and Energy Agency)

The Thermal Insulation Standards of Buildings standard STN 73 0540 this was developed in the 1960s and 1970 at that stage did not include any energy consumption requirements. This was amended in 1979 when the maximum energy consumption for newly constructed houses of 9.3 MWh.m\(^{-1}.r^{-1}\) (130 kWh.m\(^{-2}.r^{-1}\))\(^{14}\) was introduced to the standard and became obligatory from 1984. After 1992 new requirements for new houses of 7.3 MWh.m\(^{-1}.r^{-1}\) (103 kWh.m\(^{-2}.r^{-1}\)) and for reconstruction 9.3 MWh.m\(^{-1}.r^{-1}\) (130 kWh.m\(^{-2}.r^{-1}\)) were introduced. These amendments also set minimum values for thermal resistance of specific parts of buildings such as roofs buildings envelope and inner walls for new properties substantially refurbished buildings. The additional energy savings resulting from these revisions to this standard (compared with the previous standards) is estimated to be over 10%.

Government Regulation No 433/2000 this regulation addressed Technical Demands on Efficiency of Hot Water Boilers Burning Liquid and Gaseous Fuels defining minimum efficiency standards for 4 kW to 400 kW capacity boilers which are mostly used in the residential sector.

Act No 657/2004 on the Thermal Energy Sector implements the boiler inspection provisions of the EPBD and requires energy efficiency inspections of heat delivery equipment every three years. Prior to this regulation being introduced, the inspection of boilers and other heat producing, delivery and distribution equipment was required each year; therefore this new regulation is a step backwards in some respects.

The Domestic appliance energy consumption and labelling measure according to Act No 264/1999 Coll. This Act implements the EuP and Energy Labelling Directive and defines minimum energy performance requirements for refrigerators, freezers and ballasts, and requires energy labels for washing machines, household lamps, tumble dryers, refrigerators, freezers, combined washer/drier, dishwashers, household electric ovens and air-conditioning systems.

8.2.4 Energy Efficiency Funding

Private and State funding have assisted with the implementation of energy efficiency measures in residential properties in Slovakia. These initiatives have included:

Construction Savings Bank

In 1992 homeowners were given the opportunity to save with the Construction Savings Bank and to take out loans to fund energy efficiency improvements once a certain percentage of the costs had been saved with the bank. Currently loans at 5.58 to 6.69% are made when the borrower has not made any savings. Where the borrower has saved 50% of the costs, the interest rate is 2.9%.

The Ministry of Transport, Construction and Regional Development of the Slovak Republic is responsible for the management of the scheme and sets the rules for granting subsidies. There are three forms of state help for construction development and housing repairs which support energy efficiency as one criterion through:

- State Fund for Housing Development
- Subsidy system
- Program of banking guaranties

State Fund for Housing Development

State support for housing development was established by Act No. 124/1996 Coll. in 1996 and amended in 2003-2004. It covers capital costs for development and reconstruction of housing stock. Loans and grants are available to homeowners and HOAs with greater focus on loan support. Loan of up to 80% of the total amount are made. Loan amounts are based on floor area and the minimum loan is 30 € per m\(^2\) and the max loan is 500 € per m\(^2\) of apartment area. A condition of the loan is that the borrower makes minimum energy efficiency savings in heating of 20%. The interest rate is 1.0% and the repayment period is 20 years. Loans of this type are limited to one per house.

14 kWh/m\(^2\) \(r^{-1}\) (which can also be written as ‘kWh/m\(^2\) per annum’) is a measure of heat demand per year where \(r=\) one year.
State loans are also made to insulate the outer walls of homes. Loans of up to 100% of total costs are available at a maximum rate of 50 €/m² of insulation area of the facades of a family house and 80€/m² for insulation of the facades of multiple occupancy buildings such as apartment blocks. No interest is payable and repayments are made over 15 years.

**Subsidies for Repair of Panel Built Apartment Blocks**

Deficiencies in the design and construction of ‘panel houses’ (apartment blocks built from concrete panels), lead to problems which had to be resolved through refurbishment. These deficiencies were documented and subsidies were provided by the state to assist with refurbishment works. Subsidies are available for 12 defined deficiencies and are possible to 50% total costs of repairs, subject to a maximum of 18 € per 1 m² of apartments area for each apartment. This refurbishment works, although not focused on energy efficiency, have provided an opportunity to undertaken energy efficiency improvements.

**State Support Programme for the Housing Stock Renewal**

The State provided Bank Guarantees for commercial loans through the Slovak Guaranty and Development Bank. This programme made an important contribution to the refurbishment of housing stock in Slovakia.

From 1999 to 2003, Slovakia had a Programme for the Reduction of Energy Intensity and Utilisation of Renewable Energy Resources. This programme replaced two previous programmes that had run from 1991.

Beneficiaries included housing associations, apartment owners, HOAs and municipalities. The support took two forms:

- A subsidy covering up to 70% of the interest of bank loans taken out to cover capital payments to a maximum 4 million SKK
- Grants of financial aid, up to a maximum of 3 million SKK.

**State Environment Fund**

The State Environment Fund is financed by fees and fines generated as a result of environmental pollution. The fund makes loans and grants for low and zero emission energy sources.

**Slovak Sustainable Energy Finance Facility (SLOVSEFF)**

Under this new financing scheme, EBRD provides credit lines to participating banks for a total amount of up to EUR 60 million for on-lending to private sector industrial entities for energy efficiency and renewable energy investments and for on-lending to Housing Associations for energy efficiency. The facility is supported by grant funding of EUR 15m from the Bohunice International Decommissioning Support Fund. The grant is targeted to provide technical assistance, energy audits and financial incentives to sub-borrowers and the participating banks for the successful implementation of such projects. Participating banks have already allocated funds to 388 projects at EUR 46 million including 245 housing projects).

8.2.5 Housing Regulation

Slovakia has a population of approximately 5.4 million. Approximately 40% of the housing stock comprises some 858,000 apartments. The vast majority of these apartments were constructed with prefabricated technology (commonly referred to as ‘Panel Houses’). As in the case of Moldova, under the Housing Policy Reform of 1991, home ownership was transferred under the Law 182/1993 Coll. to occupiers of homes with 95% of housing stock privatised. Technical standards for housing construction and refurbishment were improved in line with EU standards and amendments were made to the Condominium law (discussed below) to require homeowners to manage their properties through homeowners association or management companies. Homeowners associations were given powers to manage effectively and borrow on behalf of homeowners.

8.2.6 Condominium Law

As mentioned above, the Condominium Law requires homeowners to manage their apartment blocks in one or two ways: either through a management company which will take full management
responsibility for the block or by forming a Homeowners association (HOA). This paper focuses on HOAs.

A HOA is a not-for-profit organisation which may be formed for apartment blocks with more than four apartments and is established via a Contract of Association and registered with state administration office. The registration document identifies the chairperson of the association; its board; general assembly and any other management bodies agreed by the homeowners.

The chairperson acts in accordance with the decisions of the general assembly and the Condominium Law. The chairperson co-ordinates the activities of the HOA and the general assembly elect him or her for three years. The chairperson is responsible for distribution of an activity plan to homeowners at the start of the year and to account for payments for services in the previous year. Division of payments for heat supply services are made on a 60/40 basis i.e. 60% of the cost of services is paid on the basis of floor area and 40% is paid on the basis of meter readings.

The board is the supervisory body with at least three members. Its role is to control the economic management of the apartment block. The board convenes the general assembly at least once a year. The Condominium Law sets out voting rights, approval processes for documents and election rules.

The Condominium Law regulates the management of money by the HOA and requires homeowners’ money to be held in separate bank accounts. Accounting is undertaken in accordance with the rules applied to not-for-profit organisations. Any government subsidies are received by homeowners not the HOA.

Typically a HOA will be established for one apartment block. A HOA will rarely manage more than one block and will only do so when there are common facilities such as boilers.

Homeowners pay regular monthly payments in advance to the HOA for services and into fund of repairs and maintenance according the share of ownership on common areas. The HOA has a lien over the apartment of each homeowner and if payments for services and repairs are not made, the HOA may enforce its security which could result in a sale of an apartment by the HOA to recover the debt from the homeowner. Liens are registered at the cadastre (Land Registry). Rights and obligations of homeowners are set out in the Condominium Law.

The National Association of Homeowners is a legal entity and a voluntary association. It provides training for HOA officials; publishes a magazine for its members and lobbies government on behalf of its members. It has become a very important partner to government and provides opinions on the development of all laws and regulations relevant to HOAs.

8.2.7 Pilot projects and education

Pilot projects were extremely important in Slovakia, they raised awareness of the opportunities provided by energy efficiency and demonstrated what could be achieved. The first pilot project in Slovakia was completed in 1996 and helped to establish an education system through Consultation Centres in the four largest towns in Slovakia.

The Union of HOAs was financed throughout by USAID to provide education, support and assistance to homeowners and to work with the government on regulatory reform and best practice.

8.2.8 Lessons from Slovakia

- Although direct comparisons cannot be made between Slovakia and Moldova as Slovakia has been a member of the EU for 6 years and was working towards integration of its laws with those of the EU for some time prior to that. Slovakia is a good example of what can be achieved by harmonisation of laws, financial support for energy efficiency and public awareness campaigns.
- Providing incentives through grants and loans has proved to be effective in Slovakia. Government loans to assist with the payment of interest on loans from commercial banks have provided the added benefit of stimulating the development of banking sector.
- Energy efficiency measures in Slovakia are resulting in homeowners reducing the volume of heat they consume from the district heating system. This is a matter for national energy policy and is beyond the scope of this paper.
- Robust Condominium legislation, allowing homeowners to manage their buildings and giving HOAs powers to borrow, gives homeowners the power to fund energy efficiency improvements to the whole building. This approach is far more effective than separate improvements by individual homeowners.

- Homeowners in apartment blocks do not have the personal right to make improvements to common areas such as the roof, corridors, and main doors. They may only make such improvements by acting together. HOA’s give them the opportunity to work together to make the most cost-effective and energy-efficient savings.

- HOAs have a lien over apartments. This gives them security against which to borrow and rights to enforce against homeowners for non-payment. This is an important financial management mechanism.

- The rights and responsibilities of HOAs are set out in legislation and each party has a remedy in the event that the other does not perform. Again, this is important for the effective management of the block and the protection of other homeowners against cross-subsidies.

- Provisions requiring homeowners money to be placed in separate accounts is important to protect homeowners and give them confidence in the operation and management of the HOA.

- The mandatory obligation to manage through a maintenance company or HOA assures that each block is properly managed. This protects each homeowner and prevents property values declining and properties falling into disrepair as a result of some homeowners not wanting to pay for the upkeep of the block.

- Compulsory management allows homeowners to work together to make energy efficiency improvements. Yearly plans assist in this regard by allowing homeowners to plan gradual improvements in their property as they save.

- Enforceable rights and remedies allow problems to be resolved between the HOA and homeowner.

- Allowing homeowners to choose to manage their homes through a professional management company is important as some homeowners may prefer to pay for a service than spend time learning new skills and managing their own property.

- Requiring homeowners to take responsibility for maintenance of their buildings has led to homeowners gradually developing a sense of responsibility for their homes. This process takes time and requires cooperation between the public and private sector as well as education and awareness raising initiatives on television and through other media.

- Slovakia’s standards are based on the ISO system

- Pilot projects are extremely important in demonstrating what can be achieved and raising awareness of the opportunities of energy efficiency. Combining pilot projects with education centres achieves the maximum gains in education and capacity building.
8.3 COMPARATIVE ANALYSIS UK

8.3.1 Background

Over the past 35 years, the UK has not had to deal with security of energy supply issues associated with heating residential homes which has been a feature of the German and Slovakian experience. In the mid-1970s gas was discovered in the North Sea off the coast of the UK. This gas supply has influenced fuel choice and 80% of heating systems in UK are now fuelled by natural gas. However these gas supplies are now starting to dwindle and security of energy supply is now becoming a material issue in the UK.

The total number of households in the United Kingdom is estimated to be approximately 25 million. Of these it is estimated that 6.1 million homes lacked an adequate thickness of loft insulation, 8.5 million homes had un-insulated cavity walls, and there is a potential to insulate 7.5 million homes that have solid external walls. These three measures alone have the potential to save 8.5 million tonnes of carbon emissions each year. Despite this, 95% of home owners think that that the heating of their own home is currently 'effective'.

Lack of awareness about energy efficiency is considered to be a significant factor in the UK's poor record in energy efficiency improvements over the last 30 years. UK unlike Germany has not has any significant economic drivers to support the promulgation and effective implementation of energy efficiency regulation. As a result, technical skills and industries have not developed.

UK like Germany has energy inefficient building stock but for different reasons. Although damage to city centres during World War II resulted in the development of new energy inefficient housing stock in the 1960s and 1970s the development was not of the same order of magnitude as in Germany. Much of the UK building stock is more than 100 years old and cannot be easily retrofitted. Approximately 9.2 million dwellings (43%) in England are defined as 'hard to treat'.

8.3.2 Implementation of the EPBD

The approach taken in the implementation of the EPBD in the UK has included the following measures which are also shown in diagrammatic form in Table 8.1:

**Minimum Energy Performance Requirement for New Buildings - Target Emission Rate**

The Target CO₂ Emission Rate (TER) is the minimum energy performance requirement for a new dwelling. It is expressed in terms of the mass of CO₂, in units of kg per m² of floor area per year, emitted as a result of the provision of the specified fixed building services for a standardised household when assessed using the Standard Assessment procedure. For new buildings, the target is achieve by using the “notional building” approach. This requires comparison of CO₂ emissions from the actual building to be compared against a "notional" building of the same shape and size. An improvement factor is then applied to achieve the TER. For example, the current improvement factor is a 25% improvement on 2006 standards. This approach is well understood by the building industry. The improvement factor can be increased as standards increase. The Standard Assessment Procedures can be used for calculating the TER.

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15 Office of National Statistics
Table 8.1: UK Legislative Framework

Single Methodology For Calculating Energy Performance - Standard Assessment Procedure

The UK introduced the Standard Assessment Procedure 2009 (SAP) as a single methodology for the calculation of the energy performance of new and existing buildings. SAP is consistent with ISO and CEN standards and calculates the energy performance of a building by deducting the energy savings resulting from energy generating technologies from the energy costs of a building. This is based on calculating CO₂ emission per m² for the building and comparing this with the CO₂ emissions per m² for a ‘notional building’ which corresponds to Building Regulations. The SAP rating is expressed on a scale of 1 to 100, where the higher the number the lower the running costs of a building. If a building is a net exporter of energy, the rating can exceed 100.

SAP requires the collection of a large amount of data from a building which is achievable in the case of new buildings where plans and specifications are to hand. In the case of old buildings where information is not available, SAP provides a standard method to create missing data. SAP software has been created to make the calculation based on the data input provided by the assessor.

Building Regulations Part L (Conservation of Fuel and Power)

The main regulatory tool in the UK setting out measures for energy efficiency of new and significantly refurbished residential buildings in the UK is Part L of the Building Regulations. Part L is now contained within the Building Regulations 2010 which came into force on 1 October 2010.

Part L sets out the requirements of the EPBD in the broadest terms and gives the Secretary of State powers to determine details such as the Target Emission Rate for new buildings without the need to issue further regulations.

Part L provides for Approved Guidance to be issued by the Secretary of State which provides guidance on how to comply with Part L. The Approved Guidance deals with such issues as using
SAP to calculate the TER. The approved Guidance also provides a ‘model design packages’ of designs that meet the Target Emissions Rate. Builders may use these instead of calculating the TER. Model design packages set out the various elements of a property including roofing, windows and door and prescribe a ‘U’ value for each element.

Building regulations are enforced by the local authority (municipality) or by ‘approved Inspectors’ which are companies or individuals authorised under the Building Act 1984 to carry out building control work in England and Wales.

Experience indicates that the public does not consider breach of the Building Regulations to be a serious offence. Under previous law, breach of building regulations could only be enforced for one year following completion of building works. However under the Climate Change and Energy Efficiency Act 2007, the enforcement period has been extended to two years to facilitate improved enforcement by regulators.

**Inspection of Boilers**

Under the EPBD, Member States are given the option to provide advice about inspection of boilers and air conditioning units rather than set prescriptive requirements for regular inspections. The UK took the approach of providing advice rather than setting inspection requirements.

**Energy Performance Certificates**

The Government promulgated separate regulations requiring energy performance certificated to be prepared on construction sale or letting of a property and setting up an accreditation scheme for energy assessors. Inspection of air conditioning systems was also included in this regulation. SAP is used to calculate the energy performance of buildings.

### 8.3.3 Standard for New Materials and Systems in Renovated Dwellings

In addition to the requirement of the EPBD, the UK also sets minimum standards for new materials and systems to be installed when homes are renovated. The specification of these materials and systems are expressed in U Values.

### 8.3.4 The Code for Sustainable Homes

The Code for Sustainable Homes complements Energy Performance Certificates in that it uses the same form of energy assessment. The Code measures the sustainability of a home against design categories and rates the complete building as a whole rather than specific criteria such as lighting, space heating and hot water. Compliance with the code has been voluntary but the government look to the code for guidance and when making improvements in energy efficiency legislation.

### 8.3.5 Energy Services Directive

Since 2002, the Carbon Emissions Reduction Target (CERT) has imposed a legal obligation on energy suppliers with a customer base in excess of 50,000 customers to make savings in the amount of CO₂ emitted by householders. Suppliers meet this target by promoting energy efficiency measures with mechanisms such as subsidies. CERT and similar earlier schemes resulted in 7.5 million homes receiving full or part subsidised energy saving measures. This has resulted in an average saving on energy bills of £45 a year\(^{16}\).

Targets under CERT are defined in terms of "lifetime tonnes of CO₂". Measures to be taken to achieve the targets are also prescribed under CERT. The obligations of the energy companies are increased in respect of the very poor who include children in poverty, the old, the disabled and those on state benefit.

Targets under CERT are increased periodically and energy savings measures revised to reflect changes in EU law, developments in technology and experience gained from the scheme.

CERT will be replaced by the Housing Energy Management Strategy (HEMS) in 2012 and this will run until at least 2020. HEMS includes a range of new measures including:

- Exclusive focus on insulation supported by targets which each company will be required to meet.

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\(^{16}\) HM Government: Warm Homes, Greener Homes: a strategy for Household Energy Management
Failure to meet targets may result in a fine of up to 10% of global earnings. (Most energy suppliers in the UK are global companies so this is potentially a very significant penalty).

66% of funding will come from energy suppliers while the remainder will come from banks. Loans from banks will be secured against properties and the repayments will be made by homeowners from funds arising from energy savings. Overall, households will realise a monthly savings in expenditure resulting from energy cost and loan repayment. This approach, known as “pay as you save”, is already being piloted around the country by the Energy Saving Trust.

A partnership between energy suppliers, local government and the private sector with local government using its knowledge of local areas to improve implementation.

Other measures proposed in the strategy include:

- A network of “demonstrator” homes will be retrofitted with energy efficiency measures to raise public awareness
- Public sector properties to be connected to heat networks where possible.
- A “Warm Homes Standard” will be developed for the social rented sector, covering insulation and heating systems.
- Regulation to ensure that homes must have loft and cavity wall insulation as a condition of renting
- Standards for workmanship will be introduced to protect consumers from rogue elements of the building trade.

8.3.6 Addressing Fuel Poverty

Households in the UK are considered by the Government to be in ‘fuel poverty’ if they would have to spend more than 10% of their household income on fuel to keep their home in a ‘satisfactory’ condition. 2.8 million households in England were classified as being in fuel poverty in 2007 (13% of all households).

“Warm Front” is the government's main grant-funded programme for addressing fuel poverty. Under the scheme an engineer surveys the property and makes recommendations actions needed to improve energy efficiency.

Winter fuel payments and cold weather payments are also made to the elderly and other vulnerable groups. CERT and the Housing Energy Management Strategy mentioned above also provide greater support for those in fuel poverty.

8.3.7 Energy Using Products

The Energy Saving Trust estimates that the UK waste over £900 million per year by leaving appliances in stand-by mode when not in use. This is in addition to the energy wasted through appliances not being as energy efficient as they could be when in operation. These energy-using products are responsible for about half of the UK’s CO2 emissions. Their replacement is considered a cost-effective source of emissions cuts, saving £86-161 for every tonne of CO2 cut. Current policies are expected to bring net benefits worth £28bn by 2030, according to the Department of Environment and Rural Affairs (Defra), the central government department responsible for the implementation of the EUP Directive.

The Market Transformation Programme is the UK framework which facilitates the implementation of EU standards such as energy labelling, mandatory energy efficiency requirements and voluntary industry initiatives. The programme provides Government, industry, and others involved in designing and implementing policies that influence the environmental impact of products with consensus-based information. The programme:

- gathers evidence and draws up action plans in consensus with a wide range of stakeholders.
- quantifies the impact of products, and develops plans for how various policy measures could best transform the market for each major product type.
- estimates the environmental impact savings that could be achieved through the proposed mix of policies to help prioritisation.

The Energy Saving Trust is a non-profit organisation funded by the UK government and the private sector with a mandate for research into energy savings and the provisions of free advice to the public.
works with stakeholders to publish reliable information about the environmental performance of products as well as current and anticipated future performance standards.

seeks to establish the role that innovation could play in achieving policy goals.

The programme is managed by Defra’s Sustainable Products and Materials Division through a consortium of contractors. The programme holds regular stakeholder meetings to develop policy strategies for domestic and commercial products.

The programme covers products that consume large amounts of energy and water at the point of use and are responsible for a significant waste and hazardous materials arising at end of their useful life:

8.3.8 Latest Developments - An Holistic Approach

To date, the UK has developed a variety of measures to improve residential energy efficiency. In some cases, policies have overlapped, caused confusion, focussed on the wrong priorities and resulted in wasted costs and lost opportunities. The Government’s latest Policy document suggests a new approach to residential energy efficiency using the Whole House Approach” 18. This focuses on considering the household’s energy needs and establishing a package of measures which can be paid back through the energy bill over time. These include appliances, insulation, space and water heaters, micro-generation thermostats and ‘smart meters’ which show ‘real time’ energy use and cost

8.3.9 Management and ownership of UK Multi-tenanted Properties

Nearly 20% of the UK population live in apartments. There are a number of different ownership structures depending on the size and location of apartments. Many apartments are located in large family homes which have been converted into multiple occupancy homes while other are in purpose built blocks. There are many ownership and management structures depending on the size, age and location of properties. Most involve the landlord maintaining the structure of the building at the cost of the homeowners.

Over the past 30 years, property prices have increased significantly and traditional property management regimes have resulted in poor management by landlords which have resulted in homeowners suffering financially.

The government has sought to address this matter with legislation that has allows homeowner to take control of the management of their buildings. Legislation passed in 2002 provides a right for homeowners to force the transfer of the landlord’s management functions to a special company set up by them - the right to manage company.

Other measures were imposed by legislation in 2002 to protect tenants. These include:

- The use of safe trust funds to hold homeowners periodic contributions to maintenance costs
- Mandatory consultation on works involving significant expenditure
- Transparent accounting and reasonable administration costs
- Effective and cost effective remedies for all parties.

These changes illustrate that even where a system of property ownership is well established and based on agreements between private parties that are grounded in hundreds of years of tradition, regulations changing the relationship of the parties may be applied retrospectively to these, so that the agreements are consistent with current economic and social circumstances.

8.3.10 Lessons from the UK

- The EPBD and New Homes the EPBD has significantly improved energy efficiency standards of new homes. In 2006 building standards were 40% more energy efficient that for properties built in 2002 and 70% higher than those built in 1990. Around 30% of the houses that will be standing in 2050 have not yet been built in the UK. This means that as this new housing stock continues to be developed, so the overall average efficiency of residential building in the UK will improve. 19

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19 Uk Energy Efficiency Plan 2007
- **The EPBD Renovation of existing Buildings** Experience in the UK and across Europe indicated that the provisions of the EPBD addressing refurbishments which included a 1,000 m² threshold below which there were no energy efficiency requirements was limiting the Directive’s application on refurbishment to approximately 30% of multi-family dwellings. This issue has been acknowledged and addressed in the 2010 recast EPBD which has removed the 1000m² threshold and now imposes obligations based on the cost of renovation or the proportion of the property affected. The requirements can be set either for the renovated building as a whole or for the renovated systems or components.

- **Approved Guidance** the use of ‘model design packages’ and Approved Guidance assists developers, architects and builders achieve minimum energy efficiency requirements.

- **Voluntary Codes**: Codes such as the Code for Sustainable Homes set benchmarks that are higher than regulation. They are developed by industry through research and used to encourage best practice and to provide the market with early warnings about future changes to policy and law. They also allow developers to market low energy homes. As targets for energy efficiency increase, so voluntary codes are adopted by government as new regulation.

- **Pilot Schemes**: Pilot programmes improve the likelihood of success of national policies they allow government to learn from experience and refine policies before implementing on a national scale.
BIBLIOGRAPHY

Bibliography

- Country Profiles on The Housing Sector, Republic of Moldova 2002 Economic Commission For Europe
- Promoting Energy Efficiency Investments - Case Studies In the Residential Sector 2008 USAID IEA
- Alliance To Save Energy Moldova Fact Sheet MUNEE
- Study Visit To Germany Best Practice Examples – Technical Aspects of Energy Savings In Buildings Michal Tvrdoň Regional Environmental Center For Central And Eastern Europe Country Office Slovakia et al
- Vertically Integrated Systems In Stand-Alone Multi-story Buildings By Robert Bean, Associate Member ASHRAE, Tim Doran, Member ASHRAE, Bjarne Olesen, Ph.D., Fellow ASHRAE, And Peter Simmonds, Ph.D., Member ASHRAE
- HM Government: Warm Homes, Greener Homes: A Strategy for Household Energy Management
- Energy Efficiency: A Recipe For Success – Executive Summary World Energy Council
- Constitution of a Condominium in Germany – procedure and documents Dr. Hans-Frieder Krauß
- Lost In Transition: Housing Reforms In Moldova Dr. Sasha Tsenkova University of Calgary
- Condominium and right of Ownership Valentina Piontkovskaya

TERMINOLOGY

CHP means combined heat and power

Common parts common parts include the outer walls, foundation and roof of an apartment building and all areas not occupied by homeowners such as landings, corridors, stairs lobby and boiler room. The term also includes infrastructure not individually owned by homeowners such as lifts, central boilers and pipes serving apartments. External areas such as gardens and paths are also common parts as they are in common use.

Cross subsidies a cross subsidy is a situation where one apartment owner is unintentionally paying for services provided by another apartment owner. Cross subsidies may occur due to lack of transparency in billing, metering or the mechanism for allocation of common services between homeowners.

Fuel Poverty The World Health Organisation recommends that a pan-European Definition of fuel poverty is not appropriate. Instead indicators should be develop to indicate where fuel poverty is present. Current definitions range from general indicators such as: “a household which cannot afford to keep adequately warm at reasonable cost” to narrower definitions which include: “needing to spend in excess of 10% of household income on fuel”

NGO Non-Governmental Organisation

toe tonnes of oil equivalent
Annex I
Energy Efficiency Potential for the Residential Sector in Moldova

Energy efficiency potential of residential sector was assessed taking into account simplified energy modelling (quasi-steady monthly method according to ISO EN 13790/2008) of the reference type of residential building. Assumptions used and packages of energy efficiency measures for refurbishment of residential buildings are described in section 5.7 on financing modelling.

In general energy efficiency refurbishment is supposed to improve condition of the 90% of the residential stock from current level of energy performance of the reference stock at energy classes D and E to classes C and B representing requirements of the newly developed regulations transposing provisions of the Energy Performance of Building Directive.

Energy efficiency measures include improvement of thermal characteristics of building fabric for 90% of the residential properties by insulation of outdoor walls and roofs, replacement of glazing and windows and up-grade of heating systems.

For family houses heating systems will be improved by installation of new efficient biomass stoves or efficient gas boilers and installation of thermostats and control.

Heating systems in apartment buildings connected to district heating systems are supposed to be provided with heat meters, with building heating sub-stations with autonomous automation and control. Main horizontal distribution pipes are to be replaced/insulated. Hydraulic balancing will be provided in 60% of these category of buildings and thermostatic valves installed on radiators of 90% of apartment buildings connected to district heating.

Heating systems in apartment buildings not connected to district heating will be provided with efficient local heaters whether efficient gas boilers or heat pumps depending on availability of the relevant supply infrastructure.

Overall technical potential was assessed at 44,358 TJ per year. This is the potential for energy savings on heating only. Savings which could be achieved from domestic hot water, lighting or movable electrical appliances used in households are not included.

Sustainable energy investments required to achieve this overall technical potential of space heating are EUR 11,706 million.

Anyway this reference to Energy Efficiency potential does not take into account current constrains with energy affordability and sub-standard heating of many residential building, especially in rural areas. Many family houses are only partially heated and/or heated at lower indoor temperatures, not meeting thermal comfort requirements. Taking these constrains into account reduces the technical potential to 27,600 TJ.

Some of the measures have longer pay back period under current energy tariffs, what make these measures not profitable from macro economic point of view. Economic potential defined by energy efficiency measures and profitable from macro-economic point of view is assessed at 16,100 TJ.

Anyway existing significant economic potential is further constrained by market imperfections, including subsidised energy tariffs, not transparent billing, low penetration rate of technologies, lack of awareness among stakeholders, low capacity of engineering infrastructure, and last but not least lack of appropriate financing mechanisms.

All these market barriers reduce existing economical potential for savings from space heating to 6,108 TJ of current market potential. This potential could be easily exploited even under current conditions of Moldova.

Sustainable energy investments required to meet the market potential are EUR 1,380 millions.

With up-grade of legal and regulatory framework by transposition of effective legislation models based
on EU Directives as well as by setting up financing mechanisms, the current market potential will expand toward economical potential.

With adoption of subsidy-free energy tariffs, the current economical potential will expand toward affordable technical potential. With economy growth affordable technical potential will expand toward overall technical potential.

Realisation of the full technical potential will allow Moldova to save 1.29 million cubic meters of natural gas per year or 145.9 kt of oil equivalents, and to reduce CO2 emissions by 2.46 t CO2 per year (as per natural gas carbon factor).
Responsible Finance (RF) is understood to mean financial practices where investment and business decisions take into consideration social, developmental, and/or environmental aspects consistent with high ethical standards, in addition to purely commercial logic of profit maximization and risk-return profiles. Responsible finance includes clear and transparent lending practices, responsible product sales suitable to client needs, fair and full information in financial product advertisements. Prudent review of a loan applicant’s debt obligations and ability to repay loans on a scheduled basis, even accounting for a minor disruption in income, and a client complaint mechanism are responsible financial practices.

RF includes fair and clear loan terms and conditions, opportunities to reschedule debt repayments, trained staff, access to an ombudsman in case of dispute, and existence of an independent agent. Thus, in addition to suitable client services, RF means appropriately tailored products presented in an easy to understand and comparable fashion combined with quality delivery.

The main stakeholders who play a role in RF include government, the regularity authority which attempts to prevent negative effects on the stability of financial systems, regulated financial service firms, shareholders and partners of those firms.

However, there are certain areas for improvement as follows:

- Although marketing materials are detailed and abundant, they are not clear or easily understood by customers, nor do they make clear the full cost of the loan to facilitate consumer choices;
- Banks lack a visible and effective customer complaint system;
- Internal systems and procedures are often do not promote fair treatment of customers, or only in theory, not practice and
- Many banks link responsible finance to higher costs per customer.

In order to implement changes support is needed to develop policies, procedures and systems for building bank capacity in the areas of human resource management, marketing, communication, customer service and internal control.