Modernization of local public services in the Republic of Moldova

- Intervention area 2: Regional planning and programming -

Regional Sector Program on Energy Efficiency in Public Buildings: Development Region Centre

Final version

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Acronyms and abbreviations

RDA	Regional Development Agency
CAPEX	Capital expenditures
DR	Development Region
EE	Energy efficiency
EEA	Energy Efficiency Agency
EEC	European Economic Community
EC	European Commission
ESCO	Energy Service Company
EU	European Union
EUR	EURO
GD	Government Decision
GIZ	German International Cooperation Agency
GOPA	Organization, Planning and Education Agency
GWh	Gigawatt hours
h	hour
kW	Kilowatt
kWh	Kilowatt hours
LEEAP	Local Energy Efficiency Action Plan
LEEP	Local Energy Efficiency Program
LPA	Local Public Administration
m²	Square meter
m³	Cubic meter
MDL	Moldovan Lei
MRDC	Ministry of Regional Development and Construction
MW	Megawatt
MWh	Megawatt hours
NBS	National Bureau of Statistics
NEEAP	National Energy Efficiency Action Plan
NSRD	National Strategy for Regional Development
PPC	Possible Project Concept
RD	Regional Development
RDC	Regional Development Council
RDS	Regional Development Strategy
RES	Renewable Energy Sources
ROP	Regional Operational Plan
RPP	Regional Planning and Programming Expert of RDA
RSP	Regional Sector Program
TJ	Terajoule
toe	Tons oil equivalent
TWh	Terawatt hours
VPC	Viable project concept

Definitions

Building envelope	The integrated elements of a building which separate its interior from the external environment;
Boiler	A vessel designed to heat water and generate steam;
Energy performance certificate	A regulation-based document indicating the energy performance of a building or unit calculated based on established methodology;
Energy class	A measuring system, from "A" to "G", indicating the energy performance of a building. For the classification of buildings with very high energy performance, class "A" may be divided into subclasses;
Building whose energy consumption is near zero	A building with very high energy performance achieved mainly through effective heat protection of the building, whose energy needs are covered to a very large extent using renewable sources, including ones generated on site or nearby;
Building with mixed purposes	A building with multiple purposes where at least 10% of the total area of the building has a purpose other than its main purpose;
Public building	A building owned by or in the use of a public authority, a public institution or a state or municipal enterprises;
Cogeneration (combined heat and power)	The simultaneous generation of heat energy and electrical energy and/or mechanical energy in one process;
Energy savings	The amount of saved energy determined by measuring and/or estimating consumption before and after implementation of one or more measures for improving energy efficiency, and/or the primary energy savings in verifiable and measurable or estimable conditions;
Increasing the efficiency of energy consumption	The organizational, scientific, practical, technical, economic and informational activities which lead to the achievement of higher energy efficiency indicators;
Energy efficiency	The ratio of the output as performance, service, commodity or energy, to the energy used for this purpose;
Building element	The technical building system or an element of the building envelope;
Energy performance indicator	The amount of energy consumption measured relative to the total area of the building;
Energy intensity	The effectiveness with which energy is used to produce value added. It is defined as the ratio of primary energy supply to GDP;
District (centralized) heating or cooling	Distribution of heat energy as steam, hot water or chilled liquids, from a central generation source through a network to multiple buildings or locations to be used for heating or cooling spaces or industrial processes;
Energy performance of a building	The assessed amount of energy needed to provide sufficient power under the standard use of a building, including the energy used for heating, cooling, ventilation, hot water and lighting;
Heat pump	A mechanism, device or system that transfers heat from the natural environment (e.g. air, water or soil) to buildings or industrial systems by reversing the natural flow of heat to flow from lower to higher temperature. Reversible heat pumps may also transfer heat from the building to the natural environment;
Energy efficiency improvement programs	Activities that focus on groups of final users and lead to verifiable and measurable or estimable energy efficiency improvement;
Major renovation of a building	Making changes to an existing building where over 25% of the building envelope undergoes renovation
Energy service	A physical benefit, utility or good derived from a combination of energy technology and/or effective energy action, which may include the operation, maintenance and control activities needed to deliver the service under a contract, and which, under normal circumstances, has proven to lead to improved energy efficiency and/or primary energy savings in verifiable and measurable or estimable conditions;
Air-conditioning system	A combination of components needed to provide a form of indoor air treatment through which the temperature is controlled or can be lowered;
Heating system	A part of the heating system consisting of one or more boilers, heat distribution pipes and heat-emitting elements designed only for space heating purposes, which ensures normative thermal conditions in rooms.

1 Introduction

In 2013, the Center Regional Development Agency (RDA) finalized the regional planning document on energy efficiency in public buildings with the active participation of international organizations, district energy managers, energy efficiency experts, representatives of Local Public Administrations (LPAs) and line ministries.

In accordance with the provisions of the Law on Energy Efficiency, local public authorities must develop their own energy efficiency programs and action plans. Therefore, this regional planning document for the energy efficiency of public buildings, developed for 2013-2020, includes a qualitative analysis of energy consumption at district and regional levels that will support the goals of the action plans to be developed by LPAs. At the same time, detailed planning at the district level will provide information for local energy efficiency programs. The tier II local public authorities and the Popular Assembly of Gagauzia should develop these programming documents for a period of 3 years, while the energy efficiency action plans will cover a period of one year.

The Regional Sector Program is an operational tool for regional planning aimed at increasing the skills of LPAs in developing sustainable regional projects based on intermunicipal cooperation, and in creating the conditions for developing a pipeline of energy efficiency projects in compliance with sector policies, current practices and the relevant strategic framework.

The program also puts forward a clear and realistic approach for improving energy efficiency in the public building sector. This will help to achieve the national target set in the 2010-2020 National Program for Energy Efficiency and the 2013-2015 National Energy Efficiency Action Plan (NEEAP). To achieve the target a plan of activities and measures was developed as part of the Regional Sector Program (RSP), based on which the priority buildings for renovation will be identified.

The activities of the RSP on energy efficiency will focus on strengthening the planning and regional sector programming process for creating a regional system to identify possible priority project concepts with the maximum energy efficiency potential. This will result in the optimization of investment and development of sustainable projects related to the energy efficiency of public buildings in the Center Development Region (DR). The RSP on energy efficiency will support local authorities in their activities aimed at improving the efficiency of energy consumption in public buildings in the Center DR and move gradually to the new standards according to the EU Directives' requirements.

1.1 Identifying the problem

The need for well-developed projects based on national policy and detailed regional planning in the sector has led to the development of the regional sector program. During the sector planning process, an algorithm was proposed for identifying potential project concepts (PPC), which will then be developed into viable projects for financing.

The Republic of Moldova has been importing around 95%[1] of the energy resources needed to cover its energy demand. This makes the country extremely vulnerable in terms of energy security and economic stability. Moreover, the country is hugely dependent on one main source of energy, since natural gas makes up around 60% of to-

[1] The energy balance of the Republic of Moldova, Chisinau 2012

tal energy consumption[2]. Thus, the lack of domestic energy resources threatens the energy security of Moldovan consumers.

Energy efficiency is a solution that can significantly address all the problems mentioned above: improving energy security, reducing the impact of higher energy prices and reducing emissions of greenhouse gases.

The development of a medium-term planning document provides the opportunity to identify energy efficiency measures for public buildings with huge energy consumption and the potential to generate, after renovation, a significant level of energy savings for the public authorities that own the buildings.

1.2 Methodology for Regional Sector Program Development

This Program has been developed following a participatory approach based on the decisions of the representatives of the working group created under the aegis of the Center RDA. The regional sector working group includes one representative of each rayon in the Center DR, and representatives of the Ministry of Regional Development and Construction (MRDC), the Ministry of Health, the Ministry of Education, the Ministry of Economy and the Energy Efficiency Agency. The working group carried out its activities with technical assistance from GIZ national and international experts. The regional sector planning process conducted during 2012-2013 in the Center DR can be characterized as:

- Ensuring participation and Program consultation during workshops at which all project information, analyses and recommendations of the EE planning sector were presented and discussed;
- Developing this document through a phased approach, ensuring a balance between national objectives, local and regional needs, area initiatives and consultation of stakeholders;
- Collecting data from all districts in the Center DR. These data cover population and economic aspects, energy consumption, technical, financial and organizational aspects of public buildings, and planned initiatives, as well as ongoing projects financed from different sources;
- Developing population and local budget projections;
- Assessing options for reducing energy consumption and developing recommendations;
- Analyzing energy technologies with low consumption and recommending optimal measures to be carried out in district public institutions;
- Undertaking a financial assessment of the implementation of EE measures and recommending optimal measures;
- Reviewing institutional arrangement options for empowering Energy Managers;
- Taking into consideration gender issues; and,
- Developing an action plan.

The development of this regional Program was supported by all stakeholders represented in the Regional Working Group for EE, who participated in a series of workshops organized for this purpose during the period from February to July 2013.

[2] http://www.iea.org/gtf/index.asp

1.2.1 Gender issues in the energy efficiency sector (public buildings)

Gender streamlining has been incorporated at all stages, including the provision of equal rights to participate in the drafting and further consultation of the document, and through differentiation and desegregation of the available data in all areas of intervention. As a result, the involved actors have become aware of the importance of the equal gender approach.

2 Analysis of the current situation

2.1 General aspects

Rapidly increasing energy prices over the past 10 years have exceeded consumers' ability to pay, and in the case of public institutions energy costs have made up an increasingly substantial portion of public budgets, with adverse implications for the quality of public services. From 2006-2012 the price of electricity more than doubled, and the price of gas for consumers nearly tripled. The cost increase affects the entire country, necessitating the allocation of financial resources from other areas to cover energy costs. Therefore, a very strong argument exists for implementing energy efficiency measures to offset the negative impact of current energy prices.

Climate change is also a pressing issue whose negative effects have become increasingly manifest in recent years. Local public authorities play a key role in mitigating climate change. Inefficient use of fossil energy resources is one of the main sources of environmental pollution. The building sector in Moldova is a significant consumer of energy from traditional energy sources, causing significant greenhouse gas emissions. This situation is exacerbated by the old infrastructure (including buildings) inherited from the Soviet period, when energy efficiency was not a major concern due to the availability of cheap energy resources. Much of this infrastructure is the property of local public authorities, who are burdened with its maintenance and energy consumption costs. Most public buildings are in need of capital repairs, presenting a great opportunity to introduce energy efficiency measures.

In recent years the level of external funding to the Republic of Moldova has significantly increased. This increase has been partly due to a recognition of the need to improve energy efficiency. It is important to address the EE issue in a more sustainable and proactive manner with the help of existing and potential financial resources (National Energy Efficiency Fund, donors, etc.). In this regard, the development of a medium-term planning document provides the opportunity to identify energy efficiency measures for public buildings with the greatest energy consumption and which, if refurbished, will provide a significant level of energy savings.

Public buildings (which will be the focus of further work) were classified into the following main categories[3] as a result of discussions of the working group and decisions adopted during workshops held from February to June 2013:

- Buildings in the education sector (pre-school and pre-university institutions);
- Buildings in the medical sector (public hospitals, medical institutions, polyclinics);
- Buildings in the administration sector (mayoralties, district councils); and,
- Buildings in the social sector (asylums and orphanages).

This classification is based on an analysis of the type and average size of the buildings and consequently their potential to generate significant energy savings that can have an impact on national targets. The criteria proposed by the regional working group were taken into account when selecting these categories of public buildings, namely the buildings' floor areas and utilization rates. The bigger these parameters' values, the higher the potential savings.

[3] Categories correspond with the relevant categories in the National Statistical Yearbook of the Republic of Moldova 2011.

The broader legal framework for energy efficiency policy currently applicable in the Republic of Moldova outlines the direction regional actors should take to achieve energy efficiency savings in public buildings. The main energy savings targets according to existing energy efficiency legislation are summarized in Table 2-1.

Table 2-1: Summary of energy savings targets in national policy documents

No	Policy document	Objectives	2015	2020
1	2013-2015 National Energy Efficiency Action Plan	Energy savings (top down TD approach), GWh	4,970	
		Energy savings (BU approach), GWh	2,790[4]	
2	2011-2020 National Energy Efficiency Program	Making the overall primary energy use more efficient (baseline year 2009), %		20
3	National Development Strategy "Moldova 2020"	Reduce the energy consumption within buildings, %		10
		Share of renovated public buildings, %		10
4	Energy Strategy through 2030	Making energy use more efficient, %	9	20

2.2 Policy framework for EE at the international level and its relevance for Moldova

In May 2010 Moldova became a member with full rights of the Energy Community and committed to implement the Energy Community acquis. Two additional directives with a direct impact on buildings are:

- Directive 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC;
- Directive 2010/31/EU on the energy performance of buildings.

The most recent major document which Moldova must comply with and use as a reference for its national energy efficiency policy is the Energy Strategy of the Energy Community adopted in 2012.

2.3 Policy framework for EE at the national level

2.3.1 Law on Energy Efficiency

Law no. 142 on Energy Efficiency regulates activities aimed at reducing the energy intensity of the national economy and diminishing the negative impact of the energy sector on the environment. The purpose of the law is to provide key principles for improving energy efficiency, including the establishment and support of structures involved in developing and implementing programs, plans, energy services and other energy efficiency measures. The same law requires the establishment of the Energy Efficiency Agency, an administrative body charged with implementing the national policy on EE and renewable energy. The law also establishes the responsibilities and duties of national and local authorities related to energy efficiency.

2.3.2 Moldova's Energy Strategy through 2030

The Energy Strategy of the Republic of Moldova through 2030, adopted by Government Decision (GD) no. 102 dated February 5, 2013, retains the energy efficiency objectives as a priority for both designated periods: 2013-2020 and 2021-2030. The strat-

[4] An objective established for 2016

egy provides specific guidelines for the development of the energy sector in Moldova, to provide the basis for economic growth and social welfare. The document also highlights the priority issues of the country, seeks rapid solutions and formulates objectives to ensure a balance between internal resources (both currently used and projected) and the needs of the country. It considers the objectives of the European Union and Energy Community compared to national targets, international obligations on treaties, and agreements and programs (including neighborhood ones) to which Moldova is a member.

For the first period, 2013-2020, the strategy proposes the same specific objectives that already exist in the 2011-2020 National Program for Energy Efficiency, namely to increase energy efficiency by 20% by 2020 with an intermediary target of 9% by 2016 (baseline 2009). For the same period the monitoring indicators are also mentioned in the National Development Strategy “Moldova 2020: Seven (7) solutions for economic growth and poverty reduction,” which include reducing energy consumption by 10% and the renovation of 10% of public buildings.

2.3.3 National Program for Energy Efficiency

The 2011-2020 National Program for Energy Efficiency (the Program), approved by the GD no. 833 dated November 10, 2011 as a planning document for a period of 10 years, stipulated that the district (rayon) and municipal councils and the People's Assembly of the Autonomous Territorial Unit of Gagauzia would ensure the development, coordination and approval of programs and action plans to improve their energy efficiency by the end of 2011; this has not yet been achieved.

The energy savings target is set at 20% by 2020 (baseline 2009). The document envisages several specific objectives for the public sector: the initiation of programs to improve street lighting, the rehabilitation of public buildings and social facilities, the construction of buildings with low or close to zero energy consumption, and the use of renewable energy sources for heating social facilities. For the construction sector the Program establishes minimum requirements for energy performance to improve energy efficiency.

2.3.4 National Energy Efficiency Action Plan

The 2013-2015 National Energy Efficiency Action Plan (NEEAP) approved by GD no. 113 dated February 7, 2013 also stipulated that the district and municipal councils and the People's Assembly of the Autonomous Territorial Unit of Gagauzia, in partnership with the Energy Efficiency Agency would ensure the development, coordination and approval of their own action plans and programs for energy efficiency by the end of 2013. The Energy Efficiency Agency is responsible for monitoring the implementation of the 2013-2015 NEEAP.

The objective of the NEEAP is to reduce energy end-use in all national economy sectors by 4.97 TWh, and to cut CO2 emissions by 962,848 tons over the period 2013-2015. Thus, through the NEEAP, the Republic of Moldova has undertaken to reduce energy end-use in all national economy sectors by approximately 1.8 percentage points annually during the period 2013-2015 relative to the 2009 baseline (end-use energy consumption in 2009 was around 24.08 TWh).

Similar to the EU member states’ aim to achieve an overall national energy savings target of 9% during 2008-2016, the Republic of Moldova has also set up an intermediary energy savings target of 9%, relevant to the 2009 baseline, to be reached by 2016. The 2016 targets estimated on the basis of a Top-Down (TD) approach, outlined by Directive 2006/32/EC on energy end-use efficiency and energy services, and the 2016

objectives resulting from the implementation of relevant measures by sector, set according to the Bottom-Up (BU) approach, are presented in Table 2-2.

Table 2-2: Energy savings targets indicated in the NEEAP

Indicator	Bottom-Up approach	Top-Down approach
Overall energy saving target, GWh	2,790	10,083[5]
Energy saving target for the public sector including public buildings, GWh	151.2	872.5
Reduction of CO_2 emissions, million tons	0.54	1.95

The "top-down" methodology is used to analyze short-term scenarios, while the "bottom-up" methodology is used for long-term scenarios, as important variables are better developed individually. The "top-down" approach is easier to use because it is based on several well-known values. Use of the "bottom-up" method requires significantly more initial data, much of which is not available in statistical reports.

The savings shown in the table above computed as per the BU approach ensure a 12%-coverage of the objectives estimated as per the TD approach. This gap is due to the fact that the computations determined using the BU approach take into account only the foreseen direct investments, and computations determined based on TD approach reflect the energy saving targets aligned to the targets set by EU legislation.

The plan details the energy efficiency measures proposed for the public sector, as follows:

- Development of a legal framework on the energy performance of buildings;
- Promotion of buildings whose energy consumption is nearly zero;
- Promotion of energy service companies;
- Energy management at the level of local public authorities;
- Increased energy efficiency in the public sector.

The next two National Energy Efficiency Action Plans should be developed for 2016-2018 and for 2019-2021. This means that the actions planned in this Regional Sector Program by 2010 will correspond with the period of implementation of the second NEEAP (2019-2021).

2.4 Policy framework for Energy Efficiency at the regional level

2.4.1 National Strategy for Regional Development

The National Strategy for Regional Development (NSRD) is the main sector policy document on regional development, produced under the responsibility of the Ministry for Construction and Regional Development (MCRD), which promotes integrated economic and social development at the regional level and aims at achieving the regional medium-term development objectives.

The first NSRD was approved in 2010 and aims at developing an efficient implementation mechanism for creating an attractive environment to achieve sustainable growth in

[5] The 4,970 GWh target is set for 2015 in the NEEAP, and the 10,083 GWh target is for 2016.

the development regions. The second National Strategy for Regional Development was adopted in September 2013 for 2013-2015. One of its objectives is to integrate the regional operational plans on water and sanitation, solid waste management, energy efficiency in public buildings, and roads, and to develop 90 investment project profiles in these sectors. It also includes a series of actions such as studies on the application of energy efficiency measures in the business sector, awareness raising campaigns on energy efficiency for economic operators, training sessions, and consultations for economic operators on economic efficiency and the rehabilitation of public buildings. Currently, the Center DR does not have its own energy strategies. Energy efficiency issues are partially addressed in the Center Regional Development Strategy (RDS), adopted in 2010 and updated in 2012, which includes specific objectives and measures to increase energy efficiency in public buildings detailed in the 2013-2015 Regional Operational Plan.

The energy policy framework at the regional level also derives from the national legislation on energy efficiency and regulations approved based on the Law of the Republic of Moldova no. 438 dated December 28, 2006 on Regional Development. This law defines the main objectives and principles and sets forth the institutional framework and planning tools for regional development.

2.4.2 Center Regional Development Strategy and Center Regional Operational Plan

There are two main documents for the Center DR that partially addresses the energy efficiency topic: the Center Regional Development Strategy and the Center Regional Operational Plan (ROP). The Center Regional Development Strategy is a document envisaging medium-term development paths for the region, and the Center ROP is the strategic implementation plan provided for a period of 3 years. The strategy is based on 3 areas:

- Priority 1: Rehabilitation of physical infrastructure;
- Priority 2: Supporting private sector development, especially in rural regions;
- Priority 3: Improving the environment and attractiveness to tourists.

As a result of a review of the Center RDS, the abovementioned priorities were addressed with measures to increase energy efficiency and use renewable energy sources in order to implement national development policies.

Priority 1, "Rehabilitation of physical infrastructure," includes measure 1.4, "Increasing the energy efficiency of public buildings and public facilities." Program 3 within this priority involves the promotion of energy efficiency of public buildings and the use of renewable energy sources to minimize maintenance costs and protect the environment.

2.5 Institutional framework

Acting institutions with competencies in energy efficiency include the following:

- The **Ministry of Economy** is in charge of the state policy for energy efficiency through the development, promotion and monitoring of concepts, strategies and development programs in the field;
- The **Ministry of Regional Development and Construction** is in charge of developing the regional policy for energy efficiency of public and private buildings;
- The **Energy Efficiency Agency** is in charge of implementing state policies to create the prerequisites for improving energy efficiency, and assisting the struc-

tures involved in the development and implementation of programs, plans, services and other energy measures for increasing energy consumption efficiency;

- The **Energy Efficiency Fund** is in charge of promoting investments in energy efficiency projects, providing technical assistance for drafting energy efficiency projects, directly funding EE projects, and helping with guarantees for bank loans on EE;
- The **National Agency for Energy Regulation** governs the economic and commercial activities carried out in the electricity, heat and natural gas sectors through licensing, ensuring the functioning of the electricity and gas market, and promoting an appropriate tariff policy and consumer rights protection;
- **Line Ministries (**the **Ministries of Health and Education)** are in charge of coordinating long-term policies for education and health services;
- The **RDA** is in charge of implementing the RDS and the ROP, which contain priorities and measures (RDS) and programs and projects (ROP) related to the energy efficiency of public buildings;
- **Local Public Administrations (LPAs)** are the local institutions managing public buildings.

Thus, the coordination of sector policies (education, health, and social) is carried out at all three levels: national, regional and local.

2.5.1 Energy Managers

According to the Law on Energy Efficiency, each district must establish the position of Energy Manager. The dedicated tasks of the Energy Managers include the following:

- Developing a local energy efficiency Program very three years. This Program will include annual action plans for implementing energy efficiency measures. The Program development will be supported by the Energy Efficiency Agency;
- Analyzing energy consumption in the territory and identifying possible interventions to optimize energy consumption (at least every year);
- Planning and monitoring the implementation of energy efficiency measures and the use of renewable energy sources;
- Developing and implementing technical and complementary measures at the local level;
- Consistent with his/her profile, it is proposed that the Energy Manager work according to a clear work plan, which could be modeled on the elements below and on the local measures in the Action Plan. Furthermore, Energy Managers will act as a connection point among stakeholders at the national, regional and local levels.

2.6 Potential sources of financing

Several funding sources are available in Moldova, and most provide financial support for a wide range of projects, including the implementation of energy saving projects in public buildings. The main financing sources include the following:

- National Energy Efficiency Fund:
  - Available budget in 2013: 100 million MDL (80% dedicated to the public sector);
  - Available budget until 2015: 510 million MDL.

- National Regional Development Fund:
  - Available budget in 2013: 191 million MDL;
  - Available budget until 2015: 625 million MDL[6].
- National Environmental Fund;
- Moldova Social Investment Fund;
- National Fund for Medical Insurance;
- International Donor programs/institutions (the European Bank for Reconstruction and Development, the European Union, the German International Cooperation Agency, the World Bank, the European Investment Bank, the Swedish International Development Cooperation Agency, the Eastern Partnership, the Japanese International Cooperation Agency, the U.S. Agency for International Development, the United Nations Development Program, etc.).

The first major exercise in providing financing for EE projects, including for public buildings, took place in 2011-2012. The state financed the Program in the amount of 25 million MDL (including budgetary support from international donors). The "Program for implementation of energy efficiency projects and use of renewable energy for public objects" provided a number of important lessons:

- Energy efficiency projects targeting public buildings offer a major potential for significant energy savings but require a high level of financial investment;
- The lack of trained specialists in the regions and in rural areas has a significant effect on the eligibility of project applications.

During the implementation of projects, beneficiaries made numerous complaints regarding the low quality of the construction materials. Therefore more rigorous quality control of construction materials and supervision of construction works are required.

2.7 Responsibilities for energy efficiency in public buildings

Since public buildings fall under the management of the LPAs, saving energy is an important issue on the agenda of local public authorities, especially given their limited financial resources. The process of transferring public building assets to LPAs started in 2006 when Law no. 435 on Administrative Decentralization came into force. According to this law a wide range of responsibilities are delegated to the different tiers of local public administration by the central public administration. The current situation is characterized by a set of inconsistent developments, unconsolidated partial progress in daily practices, legislative ambiguity, confusion about the exercise of power, etc.

Law no. 397 dated October 16, 2003 on Public Finances also defines the competences of local public authorities in determining their expenditures. In accordance with the law, local and rayon councils are entitled to set priority areas for budget allocations and make decisions on the use of special funds and excess revenues available to the local public authorities, including expenses for energy and expenses for maintenance of public buildings. Local public authorities can redistribute expenditures among different budget items during the fiscal year, but only within the limits set by the Ministry of Finance. The budget for educational institutions is calculated based on the number of students since 2012. Energy savings in one year do not lead automatically to a budget

[6] This amount provided is that envisioned under the medium-term budgetary framework

cut for the next year, so educational institutions have a strong incentive to reduce their energy costs. This will help provide resources for core services.

2.8 Energy sector situation in Moldova

2.8.1 Energy consumption at the national level

Total primary energy consumption in Moldova is around 25,000 to 26,000 GWh per year and has remained relatively stable throughout recent years, even though the GDP has more than doubled since 2004. Energy intensity decreased substantially from 0.78 GWh per 1,000 MDL GDP in 2004 to 0.32 GWh in 2011. The main reason for this difference is that the largest consumer of energy resources is the residential sector and not the industrial sector. Nevertheless, energy intensity in the Republic of Moldova is 3.5 times higher than in Romania and around 7 times higher than in Germany.

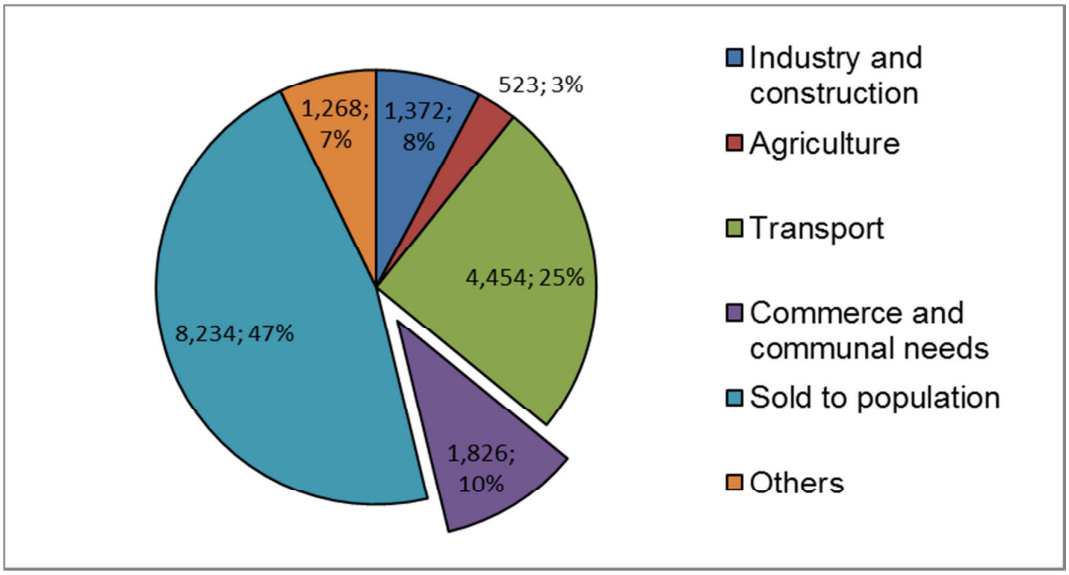
In 2011, the largest consumer by far was the residential sector with a share of 31% (8,234 GWh), followed by the transport sector with 17% (4,454 GWh). Energy consumption in public buildings is not reflected separately in the energy balance, but is included in the commerce and communal needs sector, which has a share of 7% (1,826 GWh). The consumption shares of the industry and agricultural sectors are rather low at 5% and 2% of total final consumption, respectively.

The distribution of energy resource consumption for different economic sectors is shown in Table 2-3 and Figure 2-1 below. The analyses were carried out based on annual reports by the National Bureau of Statistics, entitled "Energy Balance of the Republic of Moldova."

Table 2-3: Energy consumption at the national level, key indicators

Indicator	Units	2004	2005	2006	2007	2008	2009	2010	2011
Population	thousand	3,603	3,599	3,585	3,577	3,570	3,564	3,562	3,560
GDP, (current prices)	million MDL	32,032	37,652	44,754	53,430	62,922	60,430	71,885	82,174
Energy intensity of GDP	GWh/1,000 MDL GDP	0.78	0.71	0.59	0.47	0.41	0.40	0.36	0.32
Energy consumption per capita	toe/pers.	0.60	0.63	0.63	0.60	0.61	0.58	0.62	0.63
Total energy consumption:	**GWh**	**24,935**	**26,493**	**26,412**	**25,121**	**25,481**	**24,086**	**25,691**	**26,016**
Industry and construction	GWh	1,512	1,872	1,896	1,814	1,651	989	1,244	1,372
Agriculture	GWh	826	709	686	605	593	535	558	523
Transport	GWh	2,954	3,105	3,315	3,780	3,908	3,384	4,164	4,454
Commerce and communal needs	GWh	1,465	1,396	1,430	1,384	1,396	2,000	1,826	1,826
Sold to population	GWh	7,629	8,188	8,036	6,955	7,350	7,676	8,013	8,234
Other	GWh	1,442	1,430	1,547	1,663	1,698	1,175	1,314	1,268

Figure 2-1: Energy consumption for production and technological needs of different sectors in 2011, GWh



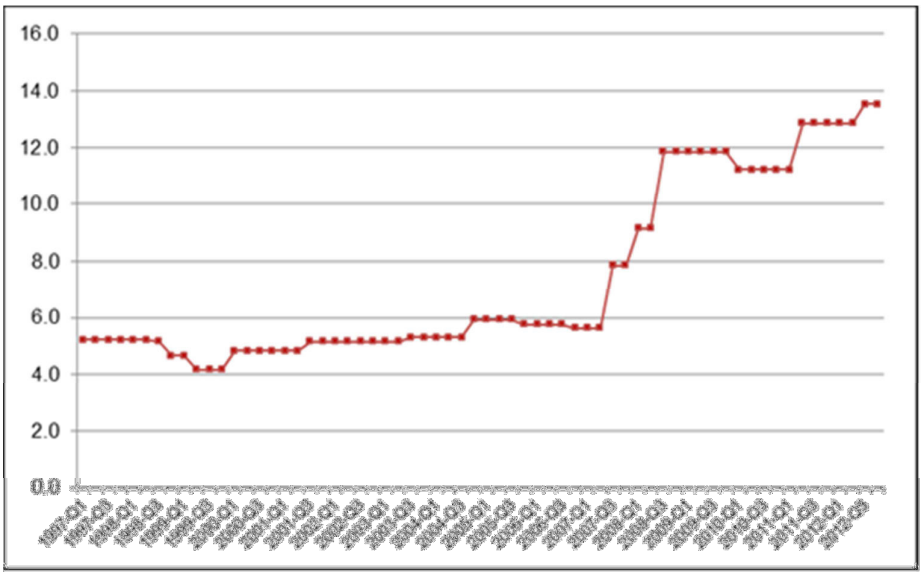
2.9 Energy price development

The Republic of Moldova has been importing around 95% of the resources it needs to cover the country's energy consumption, which results in a dependence on price fluctuations in the import market. This dependence creates a negative influence on energy intensive sectors of the national economy, which makes it difficult to keep the same development pace as regions or countries with their own energy resources. This situation creates an additional motivation to increase energy efficiency in all sectors of the national economy.

2.9.1 Electricity price

From 1997–2012 the price of electricity exceeded an annual growth rate of 6.1%. As shown in Figure 2-2, the electricity price shows a steep increase after 2006, on average around 13% per year.

Figure 2-2: Evolution of the electricity price in US cent/kWh[7]

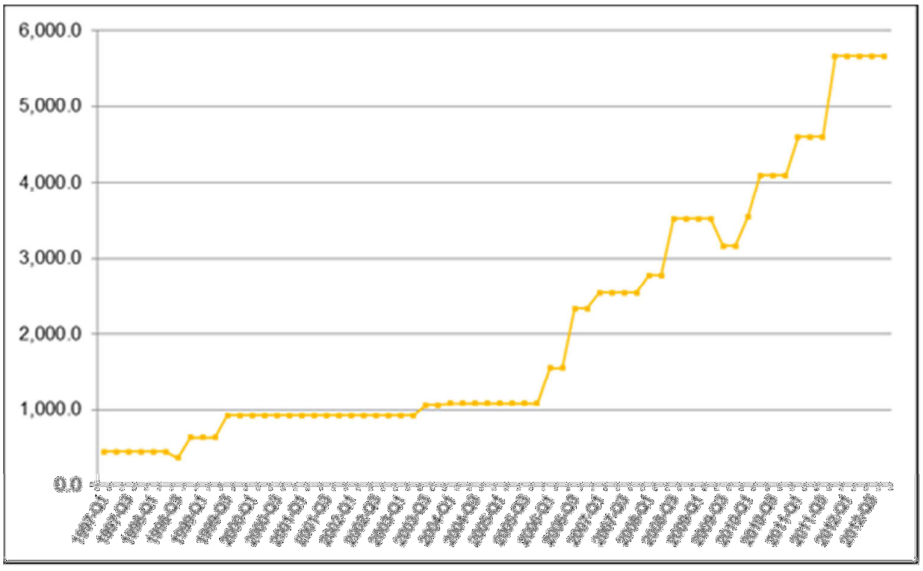


Source: Activity report 2012 of the Agency for Energy Regulation (ANRE)

2.9.2 Natural gas price

Natural gas prices have been steadily rising, resulting in a tariff increase from 454 MDL per 1,000 m³ in 1997 to 5,666 MDL per 1,000 m³ in 2012. From 1997–2012 the annual growth rate was around 17.1%. Since 2006 the natural gas price has shown a steep increase, on average around 20% per year.

Figure 2-3: Evolution of natural gas price in MDL/1,000 m³

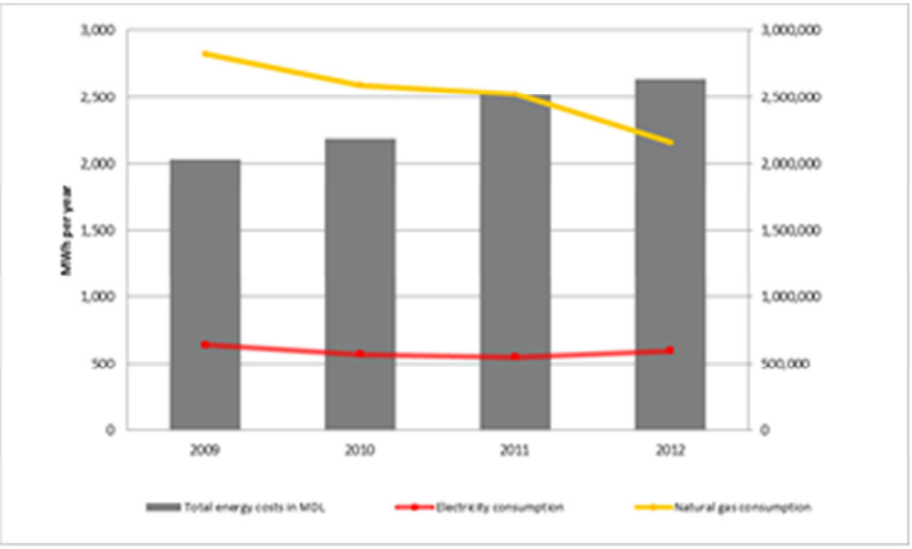


[7] The average between RED North and North-West and RED Union Fenosa

The accelerated increase in the prices of electricity and natural gas (which is the main energy resource consumed in both the public and private/residential sectors) has had a significant effect on the economic situation of the population as well as all branches of the national economy.

The share of expenditures for energy in the budgets of public institutions has increased substantially in recent years. Hospitals are a relevant example, as their energy costs have increased by 30%-40% since 2009, even as their overall consumption of energy has decreased. Illustrating this trend, Figure 2-4 shows the energy consumption and its cost in an ordinary hospital in the Republic of Moldova.

Figure 2-4: Energy consumption and energy costs in an ordinary hospital in the RM



For all consumer groups, but in particular for the public sector, increasing energy prices have become a major financial and economic strain with a negative impact on the public budget. The fact that energy prices in the Republic of Moldova remain below Western European prices in no way makes up for the country's major energy inefficiencies. To limit energy costs, many public institutions reduce the quality of their services by shutting down street lighting, reducing the number of heating days, etc.

For all situations described above, the implementation of energy efficiency measures is the most appropriate way to ameliorate the negative effects of price increases on public budgets, on the wider economy and on the overall population. Precisely which type of buildings offer the greatest savings, together with the overall extent of possible savings, will become evident when analyzed in greater detail in subsequent sections.

2.9.2.1 Final energy consumption in public buildings at the national level

The National Bureau of Statistics (NBS) in Moldova does not provide detailed information on buildings such as number of buildings, total floor area in m², energy sources for heating, or energy consumption. The information held by the NBS for residential buildings such as housing stock is also limited.

With regard to public buildings, national statistics provide only limited information on the number of education and health institutions, and on the number of users (such as the number of pupils in educational institutions and the number of beds in hospitals) at the national and rayon levels.

2.9.2.2 Estimation of final energy consumption[8] in public buildings

The estimation of final energy consumption related to electricity and heating in public buildings in the above mentioned categories is based on an estimation of the heated floor area for each building category, the specific energy demand for those types of buildings and recorded losses. To estimate final energy consumption for the selected categories, several assumptions and indicators were used. Their detailed description is provided in Annex A.

The calculations show that the estimated final energy consumption in public buildings was around 1,146,225 MWh in 2009, representing approximately 4.7% of total final energy consumption in the Republic of Moldova in 2009 (energy balance). In the same year, the estimated conditioned total floor area was around 6.1 million m². Secondary schools contribute 54% to the overall floor area of all public buildings, by far the largest among all types.

The estimated final energy consumption and heated floor area is presented in Table 2-4 and Figure 2-5 below.

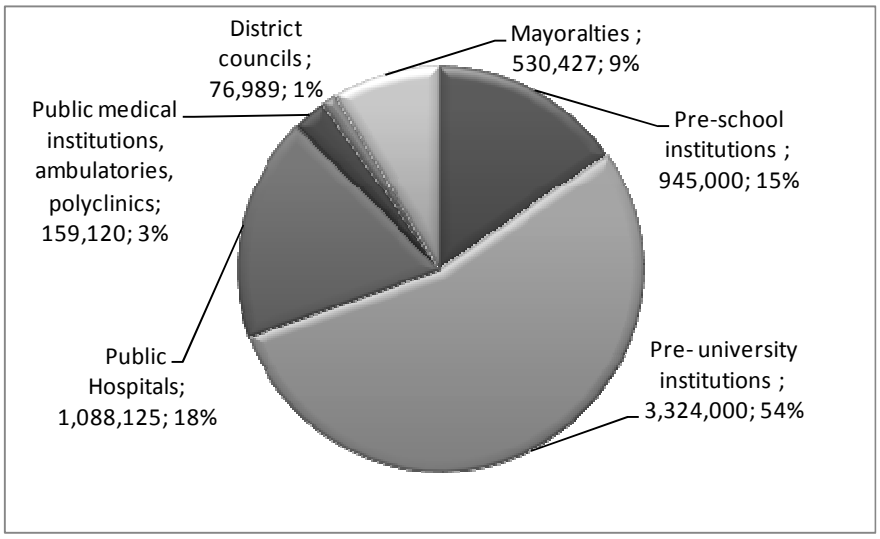
[8] Final energy consumption covers deliveries of commodities to consumers for activities that are not fuel conversion or transformation activities. Energy commodities are considered those consumed and not transformed into others. Source: Energy Statistics Manual, Eurostat 2004

Table 2-4: Public building stock, number of institutions and users at the national level

No	Institution	Units	2003	2004	2005	2006	2007	2008	2009	2010
1	**EDUCATION INSTITUTIONS**									
1.1	Pre-school institutions	No.	1,246	1,269	1,295	1,305	1,334	1,349	1,362	1,381
	Number of children in pre-school institutions	Th.	107	110	113	116	120	124	126	130
	Estimated total surface of pre-school institutions	m^2	798,750	822,750	848,250	871,500	900,750	929,250	945,000	975,000
	Estimated annual energy consumption	MWh	153,094	157,694	162,581	167,038	172,644	178,106	181,125	186,875
1.2	Pre-university institutions (primary schools, gymnasiums and high schools)	No.	1,583	1,577	1,558	1,546	1,541	1,526	1,512	1,489
	Number of pupils	Th.	581	549	519	494	463	436	416	397
	Estimated total surface of primary and secondary general education institutions	m^2	4,644,000	4,388,000	4,152,000	3,948,000	3,702,400	3,488,800	3,324,000	3,172,000
	Estimated annual energy consumption	MWh	866,880	819,093	775,040	736,960	691,115	651,243	620,480	592,107
2	**BUILDINGS IN MEDICAL SECTOR**									
2.1	Public hospitals	No.	100	104	103	73	73	72	73	73
	No. of beds	No.	24,097	23,113	22,961	22,471	21,892	21,798	21,938	22,021
	Estimated total surface of institutions	m^2	1,195,211	1,146,405	1,138,866	1,114,562	1,085,843	1,081,181	1,088,125	1,092,242
	Estimated annual energy consumption	MWh	215,138	206,353	204,996	200,621	195,452	194,613	195,862	196,603
2.2	Public medical institutions, ambulatories, polyclinics	No.	208	235	249	219	232	235	234	255
	Estimated total surface of institutions	m^2	141,440	159,800	169,320	148,920	157,760	159,800	159,120	173,400
	Estimated annual energy consumption	MWh	31,443	35,525	37,641	33,106	35,071	35,525	35,374	38,548

No	Institution	Units	2003	2004	2005	2006	2007	2008	2009	2010
3	**PUBLIC ADMINISTRATION INSTITUTIONS (MAYORALTIES, DISTRICT COUNCILS)**									
3.1	District councils	No.							33	33
	Estimated total surface of institutions	m^2							76,989	76,989
	Estimated annual energy consumption	MWh							14,371	14,371
3.2	Mayoralties	No.							857	857
	Estimated total surface of institutions	m^2							530,427	530,427
	Estimated annual energy consumption	MWh							99,013	99,013
Estimated total energy consumption		MWh							1,146,225	1,127,518
Estimated total surface		m²							6,123,661	6,020,058

Figure 2-5: Floor area in m² of different categories of public buildings in 2009



2.9.2.3 Final energy consumption in public buildings at regional and rayon levels

The Center Development Region comprises 13 districts with a total population of about 1,062,848 people according to 2011 statistics. A population decrease of 18,000 was registered during the period from 2004 to 2008. The main reasons for this decrease were negative natural growth and migration of the population. In the Center DR, the average population density is around 100 persons/km^2. The region's total area is 10,636 km², or 31% of the country's total area, making it the largest region by territory of the three regions of the Republic of Moldova.

Given the lack of reliable data with regard to public buildings in the region, it was necessary to estimate the final energy consumption of the selected categories using several assumptions and indicators; detailed descriptions of methodology, assumptions and indicators are presented in Annex A.

The estimated final energy consumption for public buildings in the Center Development Region in 2009 was 339,878 MWh, representing 29.7% of the estimated energy consumption for public buildings (considered in this plan) at the national level. The total heated floor area was estimated at 1,744,518 m². The rayons of Hincesti, Ungeni and Orhei had the largest final energy consumption in public buildings in the central region.

Table 2-5: Estimated final energy consumption by districts in 2009

			Buildings of education institutions		Buildings of medical institutions		Buildings of administrative institutions		Total	
No.	District	Inhabitants	Energy consumption	Surface	Energy consumption	Surface	Energy consumption	Surface	Total energy consumption	Total surface
		Th.	MWh	m²	MWh	m²	MWh	m²	MWh	m²
1	Anenii Noi	83	19,119	101,788	3,290	13,035	3,439	18,425	25,849	133,248
2	Calarasi	79	15,927	84,920	3,410	13,460	3,670	19,663	23,007	118,044
3	Criuleni	73	17,627	93,879	3,188	12,575	3,324	17,806	24,139	124,260
4	Dubasari	35	7,634	40,663	349	1,572	1,822	9,760	9,805	51,994
5	Hincesti	123	28,473	151,704	8,304	32,284	4,941	26,471	41,718	210,460
6	Ialoveni	98	23,733	126,433	2,707	10,936	3,324	17,806	29,764	155,175
7	Nisporeni	67	15,464	82,448	3,290	12,920	3,093	16,569	21,846	111,937
8	Orhei	126	26,282	139,985	6,888	26,949	4,826	25,853	37,996	192,786
9	Rezina	53	11,939	63,606	2,493	9,806	3,324	17,806	17,756	91,219
10	Straseni	92	21,126	112,558	3,426	13,608	3,555	19,044	28,107	145,210
11	Soldanesti	44	10,247	54,618	2,205	8,652	3,093	16,569	15,545	79,838
12	Telenesti	75	18,365	97,887	3,102	12,263	4,017	21,520	25,484	131,670
13	Ungheni	117	28,600	152,335	6,015	23,585	4,248	22,758	38,863	198,677
Total		**1,065**	**244,536**	**1,302,822**	**48,666**	**191,645**	**46,676**	**250,051**	**339,878**	**1,744,518**

3 Vision for EE in public buildings in the Center Development Region

Based on the overall objective of the Regional Program on energy efficiency in public buildings, the vision for the Center Development Region is to reduce energy consumption by approximately 27,563 MWh by 2020 by rehabilitating approximately 174,452 m^2 of the total floor area of public buildings. This vision is based on the baseline consumption in the region's public buildings and the objective of public rehabilitation of the buildings described below.

3.1 General and specific objectives of the Regional Sector Program

The general objective of the plan outlined in this document is to increase the energy use efficiency of public buildings in the Center Development Region through gradual transition to the new standards required by EU Directives. To achieve this goal, an analysis of the current situation was performed in terms of the energy efficiency of public buildings to establish a regional vision that will lead to the development of the sector. As a result of this analysis, a series of measures has been recommended for increasing the energy use efficiency in public buildings in the Center DR's communities.

The specific objectives of the RSP on EE are the following:

- Strengthen the legislative and institutional frameworks of strategic documents at the local and regional levels in order to improve national legislation in the field;
- Improve the identification, development and implementation of sustainable investment projects;
- Develop the energy efficiency skills of public institutions' representatives;
- Develop energy management infrastructure at the regional level;
- Inform and raise awareness about opportunities to reduce energy consumption at the regional level.

In conclusion, the RSP is a tool that builds the planning and programming capacity of the development regions. The Regional Sector Program is also an operational tool that will be used to further support the development of better investment projects in the Republic of Moldova. It is characterized by the following functions:

- Incorporates (medium-term) sector development needs in accordance with current sector policies, practices and the relevant strategic framework;
- Defines the need for financial investments in the sector at the regional level;
- Helps to make decisions about the need for financial resources for the further development of projects;
- Supports dialogue with potential development partners, presenting a clear view of needs and development perspectives in the field of reference.

At the same time, the working group clearly understands the limitations of regional sector programs. In particular:

- The RSPs are not aimed at creating an additional set of policy documents in DRs;

- RSPs do not take the place of sector policies at the central level, but facilitate the implementation of these policies in the regions;
- RSPs should not be perceived as all-embracing sector programs aimed at comprehensively implementing all aspects of national policy at the regional level;
- RSPs are not “master plans” or “regional programs.”

This document will be the basis for further work to develop projects at the local level and implement the recommended measures in the Center DR, giving priority to projects that can be implemented in the short-to-medium term with a tentative planning horizon of before 2020. The implementation of the recommendations in this document will result in the creation of an energy management system in the Center DR that is consistent with national development goals and EU policies, and which will significantly help regional and national development.

3.2 Baseline consumption

The final energy consumption and total heated floor area of public buildings of the Center Development Region was estimated for 2009, the baseline year referred to in the National Energy Efficiency Action Plan. The baseline final energy consumption was estimated for all rayons at 339,878 MWh and the total heated floor area at 1,744,518 m² in 2009[9].

3.3 Savings target for the Center Development Region

Based on the existing legal framework for energy savings in the public sector and on the recommendations of the working group[10] for this planning document, the national savings targets will focus on the refurbishment rate[11], which uses a simple and straightforward monitoring methodology. Thus, the Center Development Region’s contribution to the national target for increasing energy saving efficiency will be determined indirectly by calculating the energy savings that will be achieved after reaching the refurbishment rate of 10% of public buildings by 2020. The targets set at the regional level will in turn be disaggregated at the rayon level within the Center Development Region.

Table 3-1: Summary of energy consumption savings targets for Center Development Region

Public buildings stock in 2009 (baseline) in m²		1,744,518
Time schedule	**2016**	**2020**
Refurbishment rate in %	4%	10%
Refurbished floor area in m²	69,780	174,452
Estimated annual energy savings in MWh	11,025	27,563

3.4 Rationale for intervention in the Center Development Region

The vision established above has obvious implications for how the region should proceed to cut energy consumption. The outlined savings target of a 10% refurbishment rate by 2020 requires the refurbishment of around 174,452 m² of floor area and will re-

[9] The estimated floor area and the final energy consumption do not reflect the situation of the entire public building sector, but only public buildings within the categories described above.

[10] For the minutes of workshops with the working group, see Annex D.

[11] The refurbishment rate is defined as the number of m² of refurbished floor area.

sult in a final energy demand reduced by approximately 27,452 MWh in 2020 compared to the baseline final consumption in 2009.

The total investment costs are estimated at around 42.5 million EUR. The average area to be renovated is around 13,419 m^2 per rayon, the average savings are around 2,120 MWh/a, and the average investment costs per rayon are estimated at 3.3 million EUR.

The above savings may not be achieved in some individual cases, since some buildings might not currently be sufficiently heated. However, in this case the investment is justified by the increased comfort level after rehabilitation.

Table 3-2 shows the energy savings target for each rayon, the building areas to be refurbished and the estimated investment costs. Calculation details are provided in Annex A.

Table 3-2: Estimation of the building areas to be refurbished, potential savings and costs[12, 13]

No	Rayon	Inhabitants	Total energy consumption	Total surface	Rehabilitation rate by 2020		Energy savings	Investment	
		thousand	MWh	m²	%	m²	MWh/a	MDL	EUR
1	Anenii Noi	83	25,849	133,248	10%	13,325	2,105	51,934,636	3,245,915
2	Calarasi	79	23,007	118,044	10%	11,804	1,865	46,008,691	2,875,543
3	Criuleni	73	24,139	124,260	10%	12,426	1,963	48,431,748	3,026,984
4	Dubasari	35	9,805	51,994	10%	5,199	822	20,265,289	1,266,581
5	Hincesti	123	41,718	210,460	10%	21,046	3,325	82,028,854	5,126,803
6	Ialoveni	98	29,764	155,175	10%	15,518	2,452	60,481,134	3,780,071
7	Nisporeni	67	21,846	111,937	10%	11,194	1,769	43,628,467	2,726,779
8	Orhei	126	37,996	192,786	10%	19,279	3,046	75,140,279	4,696,267
9	Rezina	53	17,756	91,219	10%	9,122	1,441	35,553,376	2,222,086
10	Straseni	92	28,107	145,210	10%	14,521	2,294	56,597,087	3,537,318
11	Soldanesti	44	15,545	79,838	10%	7,984	1,261	31,117,667	1,944,854
12	Telenesti	75	25,484	131,670	10%	13,167	2,080	51,319,534	3,207,471
13	Ungheni	117	38,863	198,677	10%	19,868	3,139	77,436,511	4,839,782
Total		**1,065**	**339,878**	**1,744,518**		**174,452**	**27,563**	**679,943,273**	**42,496,455**

This Program aims at identifying a feasible approach to achieving the long-term targets for each rayon in the Center DR. To achieve substantial savings in a time and resource efficient way, the working group recommends focusing mainly on larger buildings with high utilization hours (economy of scale).

Assuming that the average building selected by the rayons for refurbishment has a total heated floor area of around 2,000 m², around 87 buildings in the Center Development Region should be refurbished to meet the indicated savings target. This is a major challenge with significant organizational, logistical and ultimately financial implications for LPAs, the key stakeholders in the implementation process.

Refurbished floor area: 174,452 m² → 87 buildings → approximately EUR 42.5 million in investment costs

[12] Only around 60% of the investment costs are directly related to energy saving measures, while around 40% of the total investment costs are related to capital repair works such as the refurbishment of roofs, drainage systems, etc.

[13] Including VAT, according to baseline data from 2009

3.5 Monitoring energy savings in public buildings

The energy savings achieved by implementing these projects must be monitored carefully under the current law for each rayon and for the region as a whole. The energy savings will be monitored for each public institution using a standardized methodology by the Energy Efficiency Agency with the participation of the rayon energy managers in the Local Energy Efficiency Programs and Action Plans.

4 Activities for the implementation of the Regional Sector EE Program

To achieve the benchmarks set out in the RSP, an Action Plan was developed to include all activities and measures identified by regional partners as needed to facilitate the further development and implementation of energy efficiency projects in public buildings. These actions range from local and regional practices to national ones. All together, the actions to be implemented at different levels will help to create the best conditions to develop and implement the projects derived from this program. At the same time, the actions identified should not be implemented simultaneously with the project, but integrated in the planning, implementation and verification stages, which will ensure the sustainability and optimization of project results. The Action Plan provides an "agenda for change" to this end.

4.1 Actions at the regional level

4.1.1 Technical measures

To meet the energy savings targets, LPAs as the owners of public buildings will need to make serious efforts to refurbish their main buildings. The refurbishment of each selected building should include the following components:

- Capital repair and preparation measures. These works might be necessary prior to the insulation measures (e.g. refurbishment of the roof, rain management system, demolition works, plinth, sidewalks, lightning protection system, sun protection system, entrance);
- Thermal insulation measures, including thermal insulation of the exterior walls, partial insulation of the top floor and the basement ceiling, partial insulation of external basement walls and window replacement;
- Refurbishment of the internal heating system of the building;
- Refurbishment of the boiler system or installation of a new heating system including ancillary equipment;
- Refurbishment of the lighting system or installation of an energy efficient lighting system.

The required refurbishment measures will differ from building to building and must be carefully considered for each individual case. More detailed information for each potential energy saving measure for public buildings is provided in Annex E.

4.1.2 Complementary measures

In addition to the medium and large investment projects described above, LPAs will initiate several complementary measures in the Development Regions. They will help to meet national energy efficiency targets and in certain cases will optimize the specific results of projects.

The measures at the regional level follow the specific objectives of the RSP and are summarized in the Table 4-1 below.

Table 4-1: Complementary measures at the regional level

Title of measure	Description of measure	Responsibilities	Monitoring Indicators
Specific objective: Strengthen the legislative and institutional frameworks			
LEEPs and LEEAPs	Development of 13 local energy efficiency programs and action plans according to the Law on Energy Efficiency	LPAs Energy Efficiency Agency	Number of LEEPs and LEEAPs developed
Specific objective: Develop energy management infrastructure at the Center Development Region level			
Energy Management system for the LPAs	Introduction of 13 energy management systems for LPAs (including energy monitoring)	LPAs Energy manager of Rayon	Number of LPAs which adopted an Energy Management System
Energy Coordinator in Public Institutions	Appointment of a suitable person (e.g. housekeeper) responsible for energy related issues of the building (e.g. monitoring of existing meter data, etc.)	LPAs	Number of Energy Coordinators at level of institutions
Specific objective: Improve the identification, development and implementation of sustainable investment projects			
Inventory of public buildings/facilities owned by the LPAs	All buildings and facilities will be identified and key information collected.	Energy manager of rayon	Number of rayons which have inventoried their public buildings
Investment project pipeline	Identify possible project concepts to be developed into investment projects. Develop at least one investment project in each district of the Center Development Region.	RDA Energy manager of rayon	Number of investment projects developed
Specific objective: Develop the energy efficiency skills of the representatives of public institutions			
Training of Energy Managers of institutions (buildings), key users, management	Energy Managers of institutions, key users, management, etc. will be trained in efficient use of energy sources in the buildings, energy monitoring, etc. About 50 people will be trained.	Energy manager of rayon	Number of training sessions; Number of trained persons
Training of building/institution energy end users	Building energy end users will be trained in efficient use of energy sources in the buildings. About 200 people will be trained.	LPA Building/institution management Energy Coordinator	Number of training sessions Number of trained persons
Proper maintenance of existing equipment	Energy Managers of institutions will be trained on the proper maintenance and management of building equipment (heating system, ventilation system, etc.). 13 Energy Coordinators will be trained.	Supplier Energy manager of rayon	Number of training sessions Number of trained persons
Specific objective: Inform and raise awareness about opportunities to reduce energy consumption at the regional level			
Awareness raising campaigns	Organizing events (energy days, competitions, etc.), study visits, information campaigns for population, information and programs in schools, etc. 26 events will be conducted.	LPA	Number of campaigns organized; Number of persons involved; Number of beneficiaries

4.2 Actions at the national level

National authorities must set out legislative and financial frameworks to facilitate the implementation of projects at the local level. The measures to be carried out at the national level are summarized in Table 4-2.

4.3 Procedures for reporting and evaluation

Institutions that coordinate the implementation of the projects developed in this document must play a leading role in the monitoring and evaluation process, as they can provide the data needed in the monitoring process, and are, at the same time, the main users of the monitoring and evaluation process.

The monitoring of Regional Sector Program implementation involves the measurement and reporting of relevant indicators. Establishing accurate monitoring and evaluation indicators is the task of the owner of the institution that benefits from the rehabilitation energy project. The methodology used in monitoring and evaluation will be applied in accordance with the law.

Table 4-2: Complementary measures at the national level

No	Title of measure	Description of measure	Responsibilities	Monitoring indicators
1	Legislation on energy performance of the building	Development and introduction of ambitious construction standards; Development and introduction of a process for the development of energy performance certificates in public buildings.	MRDC Energy Efficiency Agency	The law on energy performance of the buildings adopted
2	Adjusting the legislation on public procurement	Development and introduction of energy efficiency criteria in the context of public procurement (construction components such as windows, boilers, office equipment, etc.).	Energy Efficiency Agency MRDC Public Procurement Agency	Number of adjustments performed
3	Development ESCO[14] service market	Development and introduction of a legal framework for energy services provided by companies (ESCOs) in public buildings.	Ministry of Economy Energy Efficiency Agency	Number of ESCO companies
4	National statistics for public buildings	Improvement of national statistics on public building stock and energy consumption.	National Bureau of Statistics	Number of monitored indicators for public buildings
5	Capacity building of Energy Managers of Districts	Include Energy Manager positions in the organizational charts of the districts; Define a clear, results-oriented work plan for each Energy Manager and their role; Energy Managers of rayons will be trained in energy issues related to public buildings; Energy Managers will be trained in conducting training sessions and advising key stakeholders. Preparation of training materials for Energy Managers of rayons which will be used for their training sessions at the local level (brochures, best practice examples); Regular updates on energy related issues (by the Energy Efficiency Agency); Regular training sessions for Energy Managers of rayons (at least every year); Facilitation of knowledge exchange among	Ministry of Finance Ministry of Labor and Social Protection Ministry of Economy Energy Efficiency Agency	Number of districts with a position of Energy Manager in organizational chart; Number of work plans; Number of training sessions; Number of trained energy managers

[14] An Energy Service Company or Energy Savings Company is a commercial or non-profit business providing a broad range of comprehensive energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management. The benefit (savings) is guaranteed to exceed the investments for a certain period of time. The savings in energy costs are often used to pay back the capital investment of the project, or reinvested in the building to allow for capital upgrades that may otherwise be unfeasible. If the project does not provide returns on the investment, the ESCO is often responsible for paying the difference.

No	Title of measure	Description of measure	Responsibilities	Monitoring indicators
		Energy Managers of rayons (e.g study tours, regular events, etc.); 13 Energy Managers of rayons will be trained every year.		
6	Evaluation of services provided by the Energy Managers of rayons; quality control	Independent evaluation of services provided by the Energy Manger; Development of sanctions if an Energy Manager does not perform; 13 Energy Managers of rayons will be evaluated every year.	Energy Efficiency Agency	Number of evaluations
7	Initiating financing of research on Energy Efficiency in public buildings	Initiating/financing research in the field of innovative energy saving technologies for public buildings.	Ministry of Education	Number of research projects conducted; Amount of investments
8	Awareness raising campaigns	Launch an awareness raising campaign for energy related issues in public buildings; Competitions between public institutions (schools, administration building, etc.) and awards for better saving measures, etc.; Promoting the best practice examples; 2 campaigns will be organized every year.	Energy Efficiency Agency	Number of campaigns organized; Number of persons involved; Number of beneficiaries.
9	Development of construction guidelines for public buildings	Development of guidelines for the implementation of construction projects in the public sector; Development of guidelines for the implementation of energy management systems at the LPA level; Development of guidelines on ESCOs; 3 guidelines will be developed.	Energy Efficiency Agency MRDC	Number of developed guidelines
10	Capacity development of LPAs in project management	Training of managers within LPAs on project management of large construction projects in public buildings; 2 training sessions will be provided per year (each with 10-15 participants).	Energy Efficiency Agency	Number of training sessions; Number of trained public servants
11	Financial sources	Providing sufficient financial resources for the implementation of energy efficiency projects in public buildings; Improving the procedures of existing financial instruments such as the Fund for Energy Efficiency (gearing funding mechanisms to larger projects with a greater impact on the achievement of national targets; transparent procedures, framework that supports the implementation of sustainable projects, etc.)	MRDC	The amount of financial resources provided
12	Accessibility of EE and RES technologies on the market	Introducing a facilitation system for importers of EE and RES equipment and technologies such as VAT reductions, exemption of import taxes, etc.	Ministry of Finance Ministry of Economy	Number of facilitation initiatives introduced
13	Consultancy market	Development of consultancy market in energy efficiency at the regional level.	MRDC Ministry of Economy, Energy Efficiency Agency	Number of consulting companies created

Annexes

Annex A	Methodology of calculations
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Annex A

Methodology of calculations

Annex A: Methodology of calculations

Contents

Tables

1 Assumptions, estimation of floor areas and final energy consumption

To estimate total floor areas and final energy consumption, several assumptions were made, as provided in the table below:

Table 1-1: Estimation of total floor areas and final energy consumption

Specific indicators	Source	Units	Value
Preschool education institutions			
Specific normative surface index	NCM C.01.02-99	m²/place (child)	7.50
Specific heating energy demand	Estimated	kWh/m², a	130
Efficiency of heating system	Heizung u. Klimatechnik	%	78%
Specific electricity consumption	Estimated	kWh/m², a	25
Pre-university education institutions			
Specific normative surface index	NCM C.01.03-2000	m²/pupil	8.00
Specific heating energy demand	Estimated	kWh/m², a	130
Efficiency of heating system	Heizung u. Klimatechnik	%	78%
Specific electricity consumption	Estimated	kWh/m², a	20
Medical institutions			
Average floor area	Database: www.geoportal.md	kWh/bed	680
Specific heating energy demand	Estimated	kWh/m², a	150
Efficiency of heating system	Heizung u. Klimatechnik	%	78%
Specific electricity consumption	Estimated	kWh/m², a	30
Hospitals			
Average energy consumption per bed	Projects in hospitals	kWh/bed, a	7,000
Specific heating energy demand	Estimated	kWh/m², a	150
m^2 per bed	Estimated	m²/bed	50
Efficiency of heating system	Heizung u. Klimatechnik	%	64%
Specific electricity consumption	Estimated	kWh/m², a	30
District Councils			
Average floor area	Database: www.geoportal.md	m²	2,333
Specific heating energy demand	Estimated	kWh/m², a	130
Efficiency of heating system	Heizung u. Klimatechnik	%	78%
Specific electricity consumption	Estimated	kWh/m², a	20
Mayoralties			
Average floor area	Database: www.geoportal.md	m²	619
Specific heating energy demand	Estimated	kWh/m², a	130
Efficiency of heating system	Heizung u. Klimatechnik	%	78%
Specific electricity consumption	Estimated	kWh/m², a	20

2 Estimation of energy savings

The energy savings were calculated based on a defined reference building and a set of common energy saving measures such as insulation of the building envelope, refurbishment of the internal heating system, refurbishment of the boiler system, and refurbishment of the lighting system.

The average savings potential per unit of heated floor area per year and the average total investment costs per unit of heated floor area were also determined based on the building model used as a reference.

Characteristics of the reference building:

- Total floor area: 2,100 m², 3 levels, basement (not heated);
- Basic ventilation rate: 0.3, gas boiler system.

Characteristics of the building elements are provided in table 2-1.

2.1 Building envelope measures

The building envelope measures include thermal insulation of the exterior walls, insulation of the top floor and the basement ceiling (partial) and replacement of the windows. Furthermore, several capital repair works must be implemented in parallel with the energy efficiency measures (refurbishment of the roof, rain management system, demolition works, plinth, sidewalks, lightning protection system, entrance, etc.).

Table 2-1: Building envelope measures

	Building element	Before	After
Proposed heat transfer coefficient (U-value) in W/m², K	Exterior walls	1.5	0.30
	Windows/doors	2.5	1.30
	Basement ceiling	2.0	0.35
	Top floor	1.25	0.20
Ventilation rate	-	0.3*	0.3*

*The indicated ventilation rate reflects the current situation in many buildings. Since the introduction of a centralized ventilation system is not a common operation for existing buildings, it is assumed that the ventilation rate will be kept at the same level. Nevertheless, it is strongly recommended to meet the national requirements for building ventilation.

Average savings potential per unit of heated floor area per year is 113 kWh/m².

Average total investment costs per unit of heated floor area are 3,200 MDL/m² including VAT.

It is important to note:

- Savings potential considers only measures for the building envelope;
- Investment costs also include expenditures not directly linked to energy savings but required for a correct refurbishment such as refurbishment of the roof, drainage system, sideways, etc.;

- Investment costs of individual projects may differ from the above mentioned values;
- Total investment costs include capital repair works (approximately 40%).

2.2 Refurbishment of internal heating system

The savings potential and the investment costs were estimated based on the reference building described above and the refurbishment of the internal heating system (installation of a 2-string heating system, balancing valves, radiators, thermostatic valves on radiators, etc.).

Average savings potential per unit of heated floor area per year is 41 kWh/m².

Average total investment costs per unit of heated floor area are 288 MDL/m².

It is important to note:

- Savings potential considers only refurbishment of the boiler system (building envelope and internal heating system not refurbished);
- Investment costs are average numbers and may differ from the investment costs of individual projects.

2.3 Refurbishment of gas boiler system

The savings potential and the investment costs were estimated based on the reference building described above and the refurbishment of the gas boiler system (installation of a new gas boiler, including ancillary equipment).

Average savings potential per unit of heated floor area per year is 36 kWh/m².

Average total investment costs per unit of heated floor area are 128 MDL/m².

It is important to note:

- Savings potential considers only refurbishment of the boiler system (building envelope and internal heating system not refurbished);
- Investment costs are average numbers and may differ from the investment costs of individual projects.

2.4 Refurbishment of lighting system

The savings potential and the investment costs were estimated based on the reference building described above and the refurbishment of the lighting system (installation of new energy saving bulbs).

Average savings potential per unit of heated floor area per year is 10 kWh/m².

Average total investment costs per unit of heated floor area are 160 MDL/m².

It is important to note:

- Investment costs are average numbers and may differ from the investment costs of individual projects.

2.5 Recommended measures to be implemented

Since the energy savings of the first three measures described above are linked to each other, it is recommended that these measures be implemented in the following order:

- Refurbishment of the building envelope;
- Refurbishment of the internal heating system;
- Refurbishment of the boiler system.

Average savings potential per unit of heated floor area per year is 143 kWh/m².

Average total investment costs per unit of heated floor area are 2,656 MDL/m².

It is important to note:

Investment costs are average numbers and may differ from the investment costs of individual projects.

Annex B

Technical regulations for public buildings

Annex B: Technical regulations for public buildings (relevant for EE)

Contents

Tables

1 Technical regulations for public buildings

Technical regulations on the energy efficiency of buildings in the Republic of Moldova are in a period of transition from Soviet to European standards. Therefore, a series of regulations are under development or consultation to be approved at the national level. Below are the most relevant and used documents in this field.

NCM E.04.01-2006 Heat protection of buildings - This norm refers to the thermal protection of residential, public, industrial and agricultural buildings. It sets the energy efficiency classes of buildings and the indices of various thermal and technical parameters for different types of buildings and different operating conditions.

CP E.04.05-2006 Design of thermal protection for buildings - This document has a status of practical code and contains methods on the design and calculation of thermal and technical characteristics of building envelope elements, recommendations and informative materials. It also formulates requirements for construction and architectural solutions related to the thermal protection of buildings.

NCM E.04.03-2008 Energy conservation in buildings – This norm refers to residential buildings and public buildings (preschools, general culture institutions, medical institutions and clinics, administrative institutions) with prescribed temperature and relative humidity of the internal air. All requirements in the document are designed for the construction of buildings with efficient use of energy to ensure comfortable conditions.

CP G.04.01 – 2002 Energy passport of building - This document explains the building energy certificate, including rules on its contents and instructions on how to develop the energy certificate, the building energy certificate form, and the cover sheet for recording field tests and model registry examination events. According to the standard, the energy certificate should include identification data of the building and the energy expert, the building energy classification, and data of the organization that issued the certificate.

NCM A.09.02-05 Maintenance, repair and reconstruction services of residential, communal and socio-cultural buildings - This standard provides many measures for maintaining and improving the thermal insulation of the building envelope, and keeping in good condition the technical systems for heating, hot water, and electricity as well as the control systems for energy consumption. It provides a detailed list of works and measures needed to maintain and improve the technical condition of buildings, including energy performance. It indicates the frequency of inspection of building elements required to determine needed repairs.

CP E.04.02-2003 Technical implementation rules for exterior/interior thermal insulation of buildings with fine plaster on insulation - This standard puts forward technological procedures for different elements of the building envelope and different materials. It also proposes a number of control parameters for materials and works.

NCM A.07.02-99 Instructions on the procedure for development, endorsement, approval and content framework of project documentation for construction - Instruction provisions are mandatory for planners, public authorities, investors, individuals and businesses. These instructions require that project documentation include a section on energy conservation and refer to the provision of norms, standards and regulations.

G.04.08 NCM-2006 Thermal insulation of equipment and pipes - This standard specifies requirements for construction and insulation materials - density coefficient,

thermal conductivity, resistance to inflammation, etc. It recommends insulation constructive solutions, based on "cost heat." It refers to the conditions of the Russian Federation.

NCM C.01.03-2000 Design of schools – This standard contains instructions, rules, regulations and recommendations for the design and verification of building projects for general education schools. It also establishes the requirements for comfort conditions in the building.

RD 34.09.255-97 Methodology on assessment of heat losses in water heating networks - These methodological guidelines establish the content and order of the work to determine heat loss through the thermal insulation of water heating systems. These guidelines are designed to determine the actual situation of heat loss through the thermal insulation of heating systems and their development on the basis of standardized operational heat loss.

Additional standards relating to energy efficiency in public buildings include:

- NCM G.04.10-2009. Boiler houses;
- CP G.04.05-2006. Design of heat insulation for equipment and pipes;
- CM C.01.02-99 Design of buildings for kindergartens.

Draft Regulation on Energy Performance and Minimum Energy Requirements of Buildings is one of the main documents establishing the calculation particulars, contents of energy performance certificates and energy class intervals, templates for energy certificates and energy labels, and the tightening of energy performance level requirements. The new requirements established by this regulation differ significantly from the old ones and have provisions similar to those in the community sector documents.

The regulation establishes new requirements for U-values of building structural elements for new and significantly renovated buildings:

Table 1-1: Requirements for U-values of structural elements

Building structural elements	UN W/(m².K)	2009 German Energy Saving Regulation
External wall or pitched roof - slope > 45°	0.32	0.24
Flat roof or pitched roof - slope ≤ 45°	0.20	0.20
Ceiling over the exterior	0.20	-
Ceiling under the loft	0.25	-
Windows in the external wall, roof windows and doors to spaces where people permanently stay	≤1.5	1.3 for windows and 1.8 for doors

Annex C

Responsibilities for EE in public buildings

Annex C: Responsibilities for EE in public buildings

Contents

Tables

1 Responsibilities for EE in public buildings

Table 1-1: Responsibilities for EE in public buildings

Authority	Responsibilities
Ministry of Economy	• Develop state policy for energy efficiency.
Energy Efficiency Agency	• Implement state policy for energy efficiency and renewable energy; • Approve energy efficiency and renewable energy projects; • Coordinate the programs and action plans developed by local authorities.
Ministry of Regional Development and Construction[1] Ministry of Economy Energy Efficiency Agency	• Develop, promote and monitor the implementation of state policy for energy efficiency in buildings; • Develop and approve normative documents on energy efficiency of buildings harmonized with European standards; • Develop together with the central public authorities programs and plans of action to improve the energy performance of buildings, including the National Plan to increase the number of buildings with energy consumption close to zero; • Develop and approve the methodology for determining the price of services of energy efficiency in buildings; • Acknowledge the adjustments to local conditions and implement the existing systems of voluntary certification of energy performance of buildings based on international and European standards; • Create and manage the integrated national system of governance in the energy performance of buildings; • Create and implement, including through subordinate institutions, an independent control system of building energy performance certificates and inspection reports for heating and air conditioning systems; • Perform the technical and professional certification of energy evaluators, inspectors of heating and air conditioning systems, and installers of windows and technical systems in buildings; • Provide the informational support needed to encourage improvements in the energy performance of buildings; • Exercise, including through subordinate institutions, control over the execution of the law; • Promote the implementation of solutions and modern technologies for energy efficiency in design, construction and operation of buildings; • Promote the implementation of international experience and practice to improve the energy performance of buildings; • Approve programs to train and improve the knowledge of energy evaluators, inspectors of heating and air conditioning systems, and installers of windows and technical systems in buildings.
Regional Development Agencies	• Perform an analysis of socio-economic development in the region, and develop regional development strategies, plans, programs and projects; • Coordinate the implementation of regional development strategies, plans, programs and projects; • Monitor and evaluate the implementation of regional development strategies, plans, programs and projects; • Submit annual reports on the implementation of regional development strategies to the Regional Development Council, the authority in charge of implementation of the regional development policy, and to the National Council for Regional Development Coordination; • Attract non-budgetary resources for the implementation of regional development strategies, programs and projects; • Inform the secretariat of the Regional Development Councils' activities.

[1] According to the draft Law on Energy Performance of Buildings

Authority	Responsibilities
District councils and municipal councils (local public authorities of tier II)	• Ensure the development, coordination and approval of their plans and programs to improve energy efficiency; • Approve the annual report on the implementation of local programs and submit it to the Energy Efficiency Agency; • Nominate certified energy managers; • Administer public and private assets of the district; • Plan and administer construction, maintenance and management works of public units of local interest; • Administer municipal enterprises of district interest; • Develop and manage community social services for socially vulnerable people; • Maintain secondary education institutions serving the population of one or more administrative units of tier I; • Maintain secondary education institutions and orphanages; • Maintain theaters and local public television.
Mayoralties (local public authorities of tier I)	• Ensure public street lighting; • Administer local public and private assets; • Administer preschools and extra-school institutions; • Administer and maintain urban networks for gas and heat distribution; • Operate municipal enterprises; • Maintain preschools and complementary (extra-school) institutions; • Maintain cultural institutions (houses of culture, other cultural places); • Maintain libraries, museums, and sport institutions.

Annex D

Methodology for project pipeline development

Annex D: Methodology for project pipeline development

Content

Table

Figure

1 Methodology for developing the project pipeline

The project pipeline will be developed on the basis of this regional plan. The pipeline is designed to help achieve the regional/district target in terms of energy savings in public buildings.

Each district has been asked to indicate three large public buildings on their territory that meet the following criteria, established by the working group during the workshops held in each region from February-June 2013:

- Public buildings according to the outlined categories – Categories will be established according to national priorities;
- Buildings with the largest area (at least 1,500 m^2) – Buildings with larger areas have higher potential for energy use efficiency;
- Buildings must remain in public ownership for the next 10 years – This criterion is important to avoid investments in buildings likely to be privatized and changed with regard to their designation;
- Substantial demand for thermal refurbishments (no insulation and no more than 30% of old windows changed) – To achieve high energy savings, priority is given to buildings with low efficiency;
- Buildings with good structural resistance – This criterion is needed to avoid making energy investments in the rehabilitation of buildings with reduced life;
- The building should not be a monument of architecture – Rehabilitation of such buildings requires special procedures.

The key steps of project identification are presented in the table below.

Table 1-1: Key steps for identification of possible project concepts

	Steps/measures
1.	MRDC sends a letter and annexes to RDAs to be forwarded to chairpersons of their districts.
2.	RDAs forward the letter and annexes to chairpersons of their districts.
3.	GOPA 2/GIZ staff (RPPS), together with the RDA contact point, invites district representatives to a meeting at the RDA to clarify any points in process.
4.	Any telephone queries are directed: (i) to RDAs in the case of general questions and (ii) to EE experts in the case of technical questions.
5.	Documentation is centralized at RDAs, then forwarded to GOPA 2 staff for desk review.
6.	Desk review and calculations. The projects of each district are ranked according to level of energy savings.
7.	Presentation of preliminary results to the MRDC.
8.	Workshop with 2 representatives of the highest ranked Possible Project Concept (presentation of findings).
9.	Project list is presented to next Working Group.
10.	Presentation of project list to MRDC for consultation.
11.	Presentation of project list to RDC for approval.
12.	Start conceptualization and outline design stages of Possible Project Concepts (start bringing them to stage of viable project concepts).

The identified buildings will then undergo preliminary assessment and their savings potentials will be analyzed. The assessments will be conducted with the consultation of building owners.

By the end of this process, two lists will be developed:

- List A – Proposed Possible Project Concepts (including only the highest ranked projects, one per district);
- List B – All other project concepts.

The Working Group will consider the list of Possible Project Concepts and the MRDC will approve it. RDAs and their consultants will then work on the project concepts included in List A. As such progress continues, further assistance in decision making and project development will be provided. The aim is to ensure that one project will be ready for funding in each district after approximately 12-18 months.

A plan to manage and monitor the development of the regional project pipeline in the Center Development Region will be created and will involve the RDAs. A reporting system will be put in place to ensure that key EE stakeholders and especially energy managers are aware of the progress of the project pipeline and to outline further steps to extend the project pipeline beyond the first list of project concepts.

2 Time schedule for project implementation

The development and implementation of comprehensive projects for the refurbishment of public buildings for energy efficiency will require substantial time and expertise. The average duration of the full preparation cycle will be around 15 months[1], while the duration of the implementation will be around six (6) months. Where some preliminary working results and documents are already available, the project development time could be shortened. To prepare and implement such projects, the following development steps will be taken (as indicated in Figure 1-1).

Figure 2-1: Tentative time schedule of an energy project

		Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		Who	project preparation (up to 16 month)															project implementation (6 month)					
Task 0	Project Management	BO																					
Task 1	Project identification	PC																					
Task 2	Preparation of a feasibility study (project concept)	PC																					
Task 3	Application for funding, approval	BO																					
Task 4	Elaboration of final project design, tender documen	PC																					
Task 5	Authority approval, other approvals	PC, BO																					
Task 6	Tendering construction w orks	PC																					
Task 7	Implementation (in average)	CC																					
Task 8	Supervision of construction w orks	PC																					
Task 9	Approval of invoices, final acceptance	PC, BO																					

PC: Project Consultant
BO: Building Owner
CC: Construction Company

Due to the limited experience of LPAs in implementing large refurbishment projects, it has been decided to begin with one significant project in each district before progressing to others. This approach will allow the LPAs to incorporate the lessons learned from one project into the next project.

[1] Please note that several external factors will influence the time for project development, such as time requirements of decision makers, time requirements for project funding, etc.

Annex E

Potential energy efficiency measures in public buildings

Annex E: Potential energy efficiency measures in public buildings

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Tables

1 Potential energy efficiency measures in public buildings

1.1 Thermal insulation of exterior walls

For the thermal insulation of exterior walls using a thermal composite insulation system, the insulation material (polystyrene or mineral fiber boards, thickness > 10 cm) is attached to the walls and coated with a final layer. This method is widely employed in retrofit projects in central Europe. The installation must be carried out according national norms, installation guidelines and European standards.

Proposed heat transfer coefficient (U-value) of the walls after refurbishment: 0.30 W/m², K.

Table 1-1: Indices for thermal insulation of exterior walls

Investment level	Savings	Operational costs
High	High	Low

1.2 Thermal insulation of top floor and basement

Thermal insulation of the top floor or technical level will be carried out using insulation boards. The insulation design should allow access to both the technical level and the basement. If the technical level is intended for housing technical equipment, the floor construction and insulation must be designed accordingly.

Proposed heat transfer coefficient (U-value) of the top floor/technical level after refurbishment: 0.20 W/m², K.

Table 1-2: Indices for thermal insulation of top floor and basement

Investment level	Savings	Operational costs
Medium	High	Low

1.3 Replacement of old windows/doors

Old windows will be replaced by energy efficient windows, including window sills. The installation must be carried out according to national norms, installation guidelines and European standards.

Proposed heat transfer coefficient (U-value) of windows after refurbishment: 1.30 W/m², K.

Table 1-3: Indices for replacement of old windows/doors

Investment level	Savings	Operational costs
High	High	Low

1.4 Refurbishment of the internal heating system

The existing 1-string heating system will be replaced with a 2-string heating system, including radiators, thermostatic valves, balancing valves, heat insulation of all pipes, etc. The thermostatic valve enables users to regulate the indoor temperature according to their actual needs.

Option: An automatic control system reduces the heating level during non-operational times, e.g. during weekends or nights, where feasible.

Table 1-4: Indices for refurbishment of the internal heating system

Investment level	Savings	Operational costs
Medium	Medium	Low

1.5 Replacement of boiler and heating equipment

Existing boilers will be replaced with energy efficient natural gas boilers, including ancillary heating equipment (control system, pumps, valves, meters, etc.).

- Option 1: Installation of an automatic biomass boiler system (wood chips or pellets);
- Option 2: Connection to a district (municipal) heating system;
- Option 3: Installation of a heat pump system.

Proposed boiler efficiency after refurbishment: > 90%.

Table 1-5: Indices for replacement of boiler and heating equipment

Investment level	Savings	Operational costs
High	Medium/high	Medium

1.6 Domestic hot water production with centralized systems

Individual electrical boilers will be replaced with a centralized hot water system in buildings with a certain level of demand for domestic hot water. A centralized system usually consists of buffer storage including a heat source (district heating, gas boiler, solar water heaters, etc.) and a pipe distribution system in the building. All components must be heat insulated.

Table 1-6: Indices for domestic hot water production with centralized systems

Investment level	Savings	Operational costs
Medium	Medium	Low

1.7 Refurbishment of the lighting system

Refurbishment of the lighting system requires replacing light bulbs and old fluorescent lamps with conventional ballasts with energy saving lighting systems and maintaining/adapting the existing lighting system (e.g. cleaning of bulbs, installation of reflectors, motion sensors, etc.).

Option: Implementation of automatic control systems, where feasible.

Table 1-7: Indices for refurbishment of the lighting system

Investment level	Savings	Operational costs
Medium	Low/medium	Low

1.8 Implementation of a monitoring system

Energy meters will be installed to monitor the energy consumption of the building (e.g. electricity, natural gas, heat energy, hot water, and cold water). The collected data will be analyzed to identify additional energy saving measures.

Option: Installation of energy monitoring software.

Table 1-8: Indices for implementation of a monitoring system

Investment level	Savings	Operational costs
Low	Low/medium	Low

1.9 Implementation of an energy management system

The successful implementation and maintenance of an energy management system involves organizational, technical and behavior changes to minimize energy consumption in a structured way. The involvement of the energy manager is crucial in this process.

Table 1-9: Indices for implementation of an energy management system

Investment level	Savings	Operational costs
Low	Medium	Medium

Annex F

Energy profiles of districts

Annex F: Energy profiles of the districts

Contents

Tables

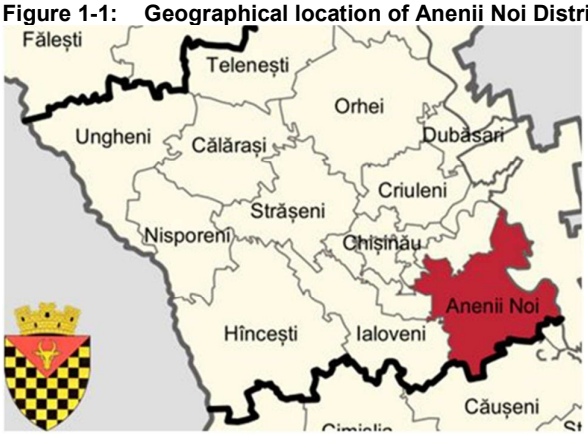
Figures

1 Anenii Noi District

1.1 Geographical location and economic potential

Anenii Noi District covers an area of 887.6 km^2 with a population of 83.1 thousand people, 48.77% men and 51.23% women, of which 58.22 thousand are employable. About 9.99% of the population lives in urban areas and 90.01% in rural areas. The climate is temperate continental, with a mean annual temperature of +9.5°C. Over 122 enterprises and production units operate in the district, generating a production volume of about 1,115 million MDL. The total floor surface of the district's housing stock is 1,980 thousand m^2. The executed budget in 2012 was 188.21 million MDL.

Figure 1-1: Geographical location of Anenii Noi District



1.2 Energy balance

The annual energy consumption by the enterprises and organizations in Anenii Noi District is about 404 tons of coal, 6,150 thousand m^3 of natural gas and about 519 m^3 of wood.

1.3 Energy consumption in public buildings

In 2009, there were 36 pre-university educational facilities and 35 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 101,788 m^2. The energy consumption by the educational facilities is estimated at about 19,119 thousand kWh per year. The Anenii Noi District hospital has a capacity of approximately 188 beds and an estimated energy consumption of 2,465 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 133,248 m^2 with an annual heating and electricity consumption of approximately 25,849 MWh.

1.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

1.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

1.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Anenii Noi District is expected to carry out the energetic rehabilitation of approximately 13,325 m^2 of public buildings, or about 9 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 51.93 million MDL. Such investments could result in an annual savings of about 2,105 MWh, the equivalent of up to 2.7 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Anenii Noi District develops a sufficient number of projects up to the financing stage in the coming years.

Table 1-1: Data about Anenii Noi District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			887.6
Population in 2010, thousand people	8.28	74.80	83.10
Population density, inh./km^2			93.62
Floor surface of the housing stock, thousand m^2	291.90	1,688	1,980
Average consumption, toe/year			52,380
Production value in 2011, mln MDL			1,115
Public Budget, mln MDL			188.21
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			6,150
Coal, tons			404
Wood, m^3			519
Liquefied petroleum gas (LPG), tons			452
Oil fuel, tons			2,524
Motor gasoline, tons			983
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			9
Floor surface to be rehabilitated, m^2			13,325
Annual savings, MWh			2,105

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

1.7 Vision

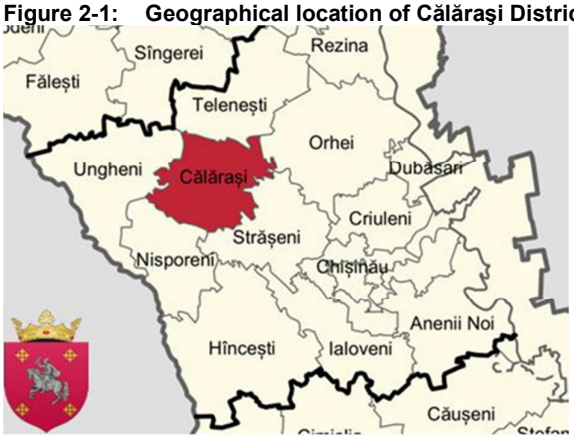
The district's vision for energy efficiency is to increase the comfort of the users of at least 9 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 2,105 MWh, and financial savings to the local budget of up to 2.7 million MDL.

2 Călăraşi District

2.1 Geographical location and economic potential

Călăraşi District covers an area of 753.54 km^2 with a population of 79.1 thousand people, 49.17% men and 50.83% women, of which 53.70 thousand are employable. About 20.23% of the population lives in urban areas and 79.77% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 75 enterprises and production units operate in the district, generating a production volume of about 269.7 million MDL. The total floor surface of the district's housing stock is 1,669 thousand m^2. The executed budget in 2012 was 177.08 million MDL.

Figure 2-1: Geographical location of Călăraşi District



2.2 Energy balance

The annual energy consumption by the enterprises and organizations in Călăraşi District is about 830 tons of coal, 3,658 thousand m^3 of natural gas and about 1,204 m^3 of wood.

2.3 Energy consumption in public buildings

In 2009, there were 42 pre-university educational facilities and 31 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 84,920 m^2. The energy consumption by the educational facilities is estimated at about 15,927 thousand kWh per year. The Călăraşi District hospital has a capacity of approximately 200 beds and an estimated energy consumption of 2,623 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 118,044 m^2 with an annual heating and electricity consumption of approximately 23,007 MWh.

2.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

2.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

2.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Călăraşi District is expected to carry out the energetic rehabilitation of approximately 11,804 m^2 of public buildings, or about 9 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 46.00 million MDL. Such investments could result in an annual savings of about 1,865 MWh, the equivalent of up to 2.4 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Călăraşi District develops a sufficient number of projects up to the financing stage in the coming years.

Table 2-1: Data about Călăraşi District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			753.54
Population in 2010, thousand people	16.00	63.10	79.1
Population density, inh./km^2			104.59
Floor surface of the housing stock, thousand m^2	305.40	1,364	1,669
Average consumption, toe/year			49,657
Production value in 2011, mln MDL			269.70
Public Budget, mln MDL			177.08
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			3,658
Coal, tons			830
Wood, m^3			1,204
Liquefied petroleum gas (LPG), tons			169
Oil fuel, tons			281
Motor gasoline, tons			470
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			8
Floor surface to be rehabilitated, m^2			11,804
Annual savings, MWh			1,865

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

2.7 Vision

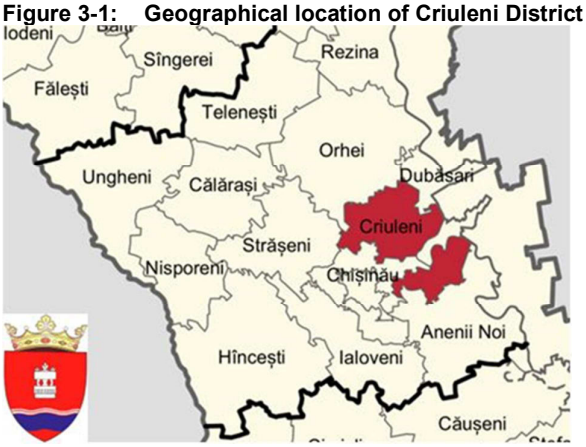
The district's vision for energy efficiency is to increase the comfort of the users of at least 8 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 1,865 MWh, and financial savings to the local budget of up to 2.4 million MDL.

3 Criuleni District

3.1 Geographical location and economic potential

Criuleni District covers an area of 687.6 km^2 with a population of 73.0 thousand people, 51.21% men and 48.79% women, of which 47.00 thousand are employable. About 11.4% live in urban areas and 88.6% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 71 enterprises and production units operate in the district, generating a production volume of about 136.80 million MDL. The total floor surface of the district's housing stock is 2,110 thousand m^2. The executed budget in 2012 was 172.58 million MDL.

Figure 3-1: Geographical location of Criuleni District



3.2 Energy balance

The annual energy consumption by the enterprises and organizations in Criuleni District is about 376 tons of coal, 3,220 thousand m^3 of natural gas and about 87 m^3 of wood.

3.3 Energy consumption in public buildings

In 2009, there were 34 pre-university educational facilities and 30 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 93,879 m^2. The energy consumption by the educational facilities is estimated at about 17,627 thousand kWh per year. The Criuleni District hospital has a capacity of approximately 191 beds and an estimated energy consumption of 2,465 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 124,260 m^2 with an annual heating and electricity consumption of approximately 24,139 MWh.

3.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

3.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

3.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Criuleni District is expected to carry out the energetic rehabilitation of approximately 12,426 m^2 of public buildings, or about 8 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 48.43 million MDL. Such investments could result in an annual savings of about 1,713 MWh, the equivalent of up to 2.5 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Criuleni District develops a sufficient number of projects up to the financing stage in the coming years.

Table 3-1: Data about Criuleni District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			687.6
Population in 2010, thousand people	8.3	64.7	73.0
Population density, inh./km^2			106.1
Floor surface of the housing stock, thousand m^2	199.40	1,910	2,110
Average consumption, toe/year			46,062
Production value in 2011, mln MDL			136.80
Public Budget, mln MDL			172.58
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			3,220
Coal, tons			376
Wood, m^3			87
Liquefied petroleum gas (LPG), tons			60
Oil fuel, tons			5
Motor gasoline, tons			523
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			8
Floor surface to be rehabilitated, m^2			12,426
Annual savings, MWh			1,713

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

3.7 Vision

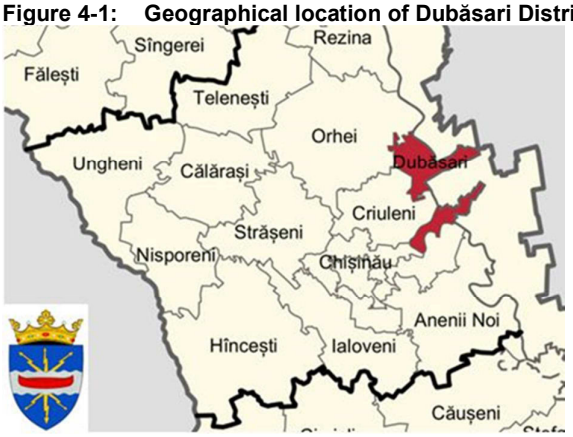
The district's vision for energy efficiency is to increase the comfort of the users of at least 8 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 1,713 MWh, and financial savings to the local budget of up to 2.5 million MDL.

4 Dubăsari District

4.1 Geographical location and economic potential

Dubăsari District covers an area of 309.22 km^2 with a population of 35.19 thousand people living in rural areas, 49.07% men and 50.93% women, of which 24.60 thousand are employable. The climate is temperate continental, with a mean annual temperature of +9°C. Over 22 enterprises and production units operate in the district, generating a production volume of about 49.4 million MDL. The total floor surface of the district's housing stock is 776.1 thousand m^2. The executed budget in 2012 was 114.76 million MDL.

Figure 4-1: Geographical location of Dubăsari District



4.2 Energy balance

The annual energy consumption by the enterprises and organizations in Dubăsari District is about 35 tons of coal, 2,349 thousand m^3 of natural gas and about 3 m^3 of wood.

4.3 Energy consumption in public buildings

In 2009, there were 13 pre-university educational facilities and 12 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 40,663 m^2. The energy consumption by the educational facilities is estimated at about 7,634 thousand kWh per year. The Dubăsari District hospital has a capacity of approximately 200 beds and an estimated energy consumption of 2,623 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 51,994 m^2 with an annual heating and electricity consumption of approximately 9,805 MWh.

4.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

4.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the

resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

4.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Dubăsari District is expected to carry out the energetic rehabilitation of approximately 5,199 m^2 of public buildings, or about 3 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 20.26 million MDL. Such investments could result in an annual savings of about 822 MWh, the equivalent of up to 1.0 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Dubăsari District develops a sufficient number of projects up to the financing stage in the coming years.

Table 4-1: Data about Dubăsari District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			309.22
Population in 2010, thousand people		35.19	35.19
Population density, inh./km^2			113.8
Floor surface of the housing stock, thousand m^2		776.10	776.1
Average consumption, toe/year			22,168
Production value in 2011, mln MDL			49.40
Public Budget, mln MDL			114.76
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			2,349
Coal, tons			35
Wood, m^3			3
Liquefied petroleum gas (LPG), tons			7
Oil fuel, tons			0
Motor gasoline, tons			257
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			3
Floor surface to be rehabilitated, m^2			5,199
Annual savings, MWh			822

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

4.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 3 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 822 MWh, and financial savings to the local budget of up to 1.0 million MDL.

5 Hînceşti District

5.1 Geographical location and economic potential

Hînceşti District covers an area of 1,483 km^2 with a population of 122.79 thousand people, 49.37% men and 50.63% women, of which 84.28 thousand are employable. About 13.69% of the population lives in urban areas and 86.31% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 107 enterprises and production units operate in the district, generating a production volume of about 205.10 million MDL. The total floor surface of the district's housing stock is 2,668 thousand m^2. The executed budget in 2012 was 282.04 million MDL.

Figure 5-1: Geographical location of Hînceşti District

5.2 Energy balance

The annual energy consumption by the enterprises and organizations in Hînceşti District is about 3,271 tons of coal, 2,980 thousand m^3 of natural gas and about 4,100 m^3 of wood.

5.3 Energy consumption in public buildings

In 2009, there were 54 pre-university educational facilities and 53 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 151,704 m^2. The energy consumption by the educational facilities is estimated at about 28,473 thousand kWh per year. The Hînceşti District hospital has a capacity of approximately 540 beds and an estimated energy consumption of 7,081 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 210,470 m^2 with an annual heating and electricity consumption of approximately 41,718 MWh.

5.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

5.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

5.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Hînceşti District is expected to carry out the energetic rehabilitation of approximately 21,046 m^2 of public buildings, or about 14 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 82.02 million MDL. Such investments could result in an annual savings of about 3,325 MWh, the equivalent of up to 4.30 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Hînceşti District develops a sufficient number of projects up to the financing stage in the coming years.

Table 5-1: Data about Hînceşti District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			1,483
Population in 2010, thousand people	16.79	105.00	122.79
Population density, inh./km^2			82.79
Floor surface of the housing stock, thousand m^2	355.40	2,313	2,668
Average consumption, toe/year			76,887
Production value in 2011, mln MDL			205.10
Public Budget, mln MDL			282.04
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			2,980
Coal, tons			3,271
Wood, m^3			4,100
Liquefied petroleum gas (LPG), tons			261
Oil fuel, tons			3
Motor gasoline, tons			1,168
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			14
Floor surface to be rehabilitated, m^2			21,046
Annual savings, MWh			3,325

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

5.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 14 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 3,325 MWh, and financial savings to the local budget of up to 4.3 million MDL.

6 Ialoveni District

6.1 Geographical location and economic potential

Ialoveni District covers an area of 783.48 km^2 with a population of 98.6 thousand people, 49.36% men and 50.64% women, of which 69.93 thousand are employable. About 15.52% of the population lives in urban areas and 84.48% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 81 enterprises and production units operate in the district, generating a production volume of about 538.20 million MDL. The total floor surface of the district's housing stock is 2,239 thousand m^2. The executed budget in 2012 was 236.238 million MDL.

Figure 6-1: Geographical location of Ialoveni District

6.2 Energy balance

The annual energy consumption by the enterprises and organizations in Ialoveni District is about 2,606 tons of coal, 9,255 thousand m^3 of natural gas and about 441 m^3 of wood.

6.3 Energy consumption in public buildings

In 2009, there were 37 pre-university educational facilities and 30 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 126,433 m^2. The energy consumption by the educational facilities is estimated at about 23,733 thousand kWh per year. The Ialoveni District hospital has a capacity of approximately 132 beds and an estimated energy consumption of 1,731 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 155,175 m^2 with an annual heating and electricity consumption of approximately 29,764 MWh.

6.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

6.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

6.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Ialoveni District is expected to carry out the energetic rehabilitation of approximately 15,518 m^2 of public buildings, or about 10 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 60.48 million MDL. Such investments could result in an annual savings of about 2,452 MWh, the equivalent of up to 3.10 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Ialoveni District develops a sufficient number of projects up to the financing stage in the coming years.

Table 6-1: Data about Ialoveni District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			783.48
Population in 2010, thousand people	15.3	83.3	98.6
Population density, inh./km^2			125.8
Floor surface of the housing stock, thousand m^2	363.7	1,875	2,239
Average consumption, toe/year			62,438
Production value in 2011, mln MDL			538.2
Public Budget, mln MDL			236.23
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			9,255
Coal, tons			2,606
Wood, m^3			441
Liquefied petroleum gas (LPG), tons			510
Oil fuel, tons			3
Motor gasoline, tons			873
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			10
Floor surface to be rehabilitated, m^2			15,518
Annual savings, MWh			2,452

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

6.7 Vision

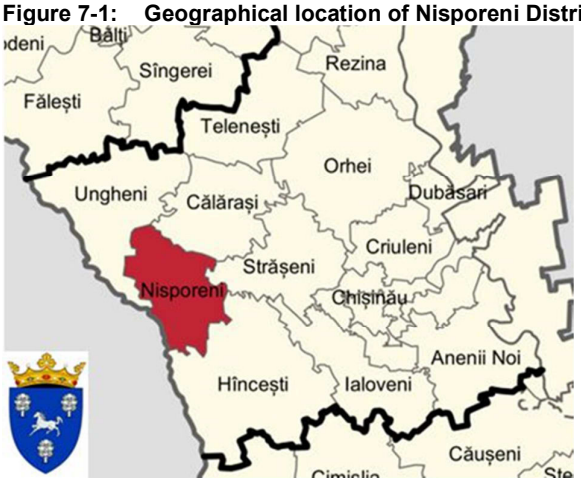
The district's vision for energy efficiency is to increase the comfort of the users of at least 10 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 2,452 MWh, and financial savings to the local budget of up to 3.10 million MDL.

7 Nisporeni District

7.1 Geographical location and economic potential

Nisporeni District covers an area of 629.01 km^2 with a population of 67.2 thousand people, 49% men and 51% women, of which 66.4% are employable. About 22.03% of the population lives in urban areas and 77.97% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 50 enterprises and production units operate in the district, generating a production volume of about 98.1 million MDL. The total floor surface of the district's housing stock is 1,300 thousand m^2. The executed budget in 2012 was 158.61 million MDL.

Figure 7-1: Geographical location of Nisporeni District



7.2 Energy balance

The annual energy consumption by the enterprises and organizations in Nisporeni District is about 1,300 tons of coal, 1,093 thousand m^3 of natural gas and about 863 m^3 of wood.

7.3 Energy consumption in public buildings

In 2009, there were 35 pre-university educational facilities and 24 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 82,448 m^2. The energy consumption by the educational facilities is estimated at about 15,464 thousand kWh per year. The Nisporeni District hospital has a capacity of approximately 200 beds and an estimated energy consumption of 2,623 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 111,937 m^2 with an annual heating and electricity consumption of approximately 22,000 MWh.

7.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

7.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

7.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Nisporeni District is expected to carry out the energetic rehabilitation of approximately 11,194 m^2 of public buildings, or about 7 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 31.52 million MDL. Such investments could result in an annual savings of about 1,713 MWh, the equivalent of up to 2.20 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Nisporeni District develops a sufficient number of projects up to the financing stage in the coming years.

Table 7-1: Data about Nisporeni District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			629.01
Population in 2010, thousand people	14.70	52.50	67.20
Population density, inh./km^2			106.8
Floor surface of the housing stock, thousand m^2			1,300
Average consumption, toe/year			42,060
Production value in 2011, mln MDL			98.10
Public Budget, mln MDL			158.61
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			1,093
Coal, tons			1,300
Wood, m^3			863
Liquefied petroleum gas (LPG), tons			184
Oil fuel, tons			2,524
Motor gasoline, tons			310
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			7
Floor surface to be rehabilitated, m^2			11,194
Annual savings, MWh			1,713

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

7.7 Vision

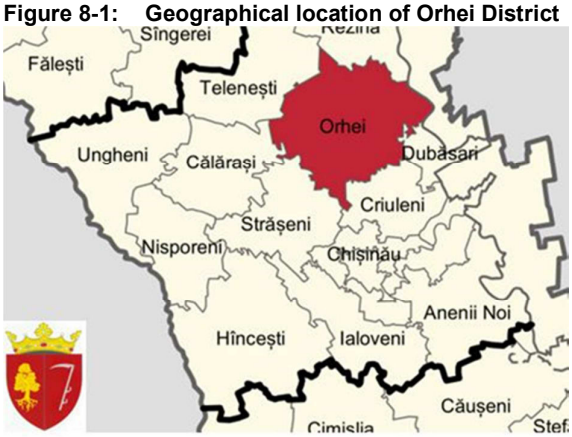
The district's vision for energy efficiency is to increase the comfort of the users of at least 7 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 1,713 MWh, and financial savings to the local budget of up to 2.20 million MDL.

8 Orhei District

8.1 Geographical location and economic potential

Orhei District covers an area of 1,228 km^2 with a population of 125.86 thousand people, 47.97% men and 52.03% women, of which 87.60 thousand are employable. About 26.44% of the population lives in urban areas and 73.56% in rural areas. The climate is temperate continental, characterized by winters with large and frequent changes in air temperature with a mean annual temperature of +9°C. Over 145 enterprises and production units operate in the district, generating a production volume of about 478.00 million MDL. The total floor surface of the district's housing stock is 2,566 thousand m^2. The executed budget in 2012 was 251.32 million MDL.

Figure 8-1: Geographical location of Orhei District



8.2 Energy balance

The annual energy consumption by the enterprises and organizations in Orhei District is about 1,972 tons of coal, 9,098 thousand m^3 of natural gas and about 1,284 m^3 of wood.

8.3 Energy consumption in public buildings

In 2009, there were 65 pre-university educational facilities and 58 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 139,985 m^2. The energy consumption by the educational facilities is estimated at about 26,282 thousand kWh per year. The Orhei District hospital has a capacity of approximately 430 beds and an estimated energy consumption of 5,639 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 192,786 m^2 with an annual heating and electricity consumption of approximately 37,996 MWh.

8.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

8.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

8.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Orhei District is expected to carry out the energetic rehabilitation of approximately 19,279 m^2 of public buildings, or about 13 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 75.14 million MDL. Such investment could result in an annual savings of about 3,046 MWh, the equivalent of up to 3.90 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Orhei District develops a sufficient number of projects up to the financing stage in the coming years.

Table 8-1: Data about Orhei District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			1,228
Population in 2010, thousand people	33.27	92.59	125.86
Population density, inh./km^2			102.49
Floor surface of the housing stock, thousand m^2	762.70	1,803	2,566
Average consumption, toe/year			79.29
Production value in 2011, mln MDL			478.00
Public Budget, mln MDL			251.32
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			9,098
Coal, tons			1,972
Wood, m^3			1,284
Liquefied petroleum gas (LPG), tons			223
Oil fuel, tons			56
Motor gasoline, tons			1,195
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			13
Floor surface to be rehabilitated, m^2			19,279
Annual savings, MWh			3,046

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

8.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 13 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 3,046 MWh, and financial savings to the local budget of up to 3.90 million MDL.

9 Rezina District

9.1 Geographical location and economic potential

Rezina District covers an area of 621.79 km^2 with a population of 52.93 thousand people, 49.14% men and 50.86% women, of which 36.55 thousand are employable. About 25.58% of the population lives in urban areas and 74.42% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 43 enterprises and production units operate in the district, generating a production volume of about 651.7 million MDL. The total floor surface of the district's housing stock is 1,026 thousand m^2. The executed budget in 2012 was 129.53 million MDL.

Figure 9-1: Geographical location of Rezina District

9.2 Energy balance

The annual energy consumption by the enterprises and organizations in Rezina District is about 69,862 tons of coal, 5,038 thousand m^3 of natural gas and about 606 m^3 of wood.

9.3 Energy consumption in public buildings

In 2009, there were 40 pre-university educational facilities and 31 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 63,606 m^2. The energy consumption by the educational facilities is estimated at about 11,939 thousand kWh per year. The Rezina District hospital has a capacity of approximately 150 beds and an estimated energy consumption of 1,964 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 91,219 m^2 with an annual heating and electricity consumption of approximately 17,756 MWh.

9.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

9.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential

for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

9.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Rezina District is expected to carry out the energetic rehabilitation of approximately 9,122 m^2 of public buildings, or about 6 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 35.55 million MDL. Such investment could result in an annual savings of about 1,441 MWh, the equivalent of up to 1.80 million MDL in savings to the local budget. This level of investments would require funding sources, including external grants and loans. To access funding sources, it is important that Rezina District develops a sufficient number of projects up to the financing stage in the coming years.

Table 9-1: Data about Rezina District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			621.79
Population in 2010, thousand people	13.54	39.39	52.93
Population density, inh./km^2			85.12
Floor surface of the housing stock, thousand m^2	380.20	646.40	1,026.8
Average consumption, toe/year			33,136
Production value in 2011, mln MDL			478.0
Public Budget, mln MDL			129.53
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			5,038
Coal, tons			69,862
Wood, m^3			606
Liquefied petroleum gas (LPG), tons			29
Oil fuel, tons			0
Motor gasoline, tons			398
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			6
Floor surface to be rehabilitated, m^2			9,122
Annual savings, MWh			1,441

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

9.7 Vision

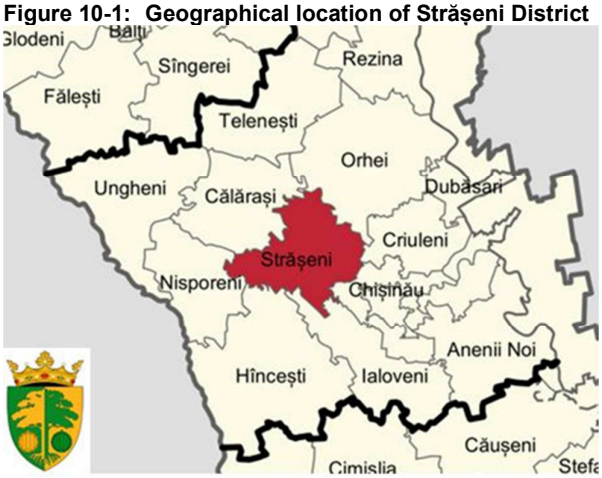
The district's vision for energy efficiency is to increase the comfort of the users of at least 6 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 1,441 MWh, and financial savings to the local budget of up to 1.8 million MDL.

10 Străşeni District

10.1 Geographical location and economic potential

Străşeni District covers an area of 729.12 km^2 with a population of 91.34 thousand people, 49% men and 51% women, of which 63.68 thousand are employable. About 23.48% of the population lives in urban areas and 76.52% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 98 enterprises and production units operate in the district, generating a production volume of about 342.9 million MDL. The total floor surface of the district's housing stock is 1,026.6 thousand m^2. The executed budget in 2012 was 212.65 million MDL.

Figure 10-1: Geographical location of Străşeni District



10.2 Energy balance

The annual energy consumption by the enterprises and organizations in Străşeni District is about 1,724 tons of coal, 3,484 thousand m^3 of natural gas and about 730 m^3 of wood.

10.3 Energy consumption in public buildings

In 2009, there were 39 pre-university educational facilities and 33 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 112,558 m^2. The energy consumption by the educational facilities is estimated at about 21,126 thousand kWh per year. The Străşeni District hospital has a capacity of approximately 192 beds and an estimated energy consumption of 2,518 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 145,210 m^2 with an annual heating and electricity consumption of approximately 28,107 MWh.

10.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

10.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

10.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Străşeni District is expected to carry out the energetic rehabilitation of approximately 14,521 m^2 of public buildings, or about 10 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 56.59 million MDL. Such investment could result in an annual savings of about 2,294 MWh, the equivalent of up to 2.90 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Străşeni District develop a sufficient number of projects up to the financing stage in the coming years.

Table 10-1: Data about Străşeni District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			729.12
Population in 2010, thousand people	21.45	69.89	91.34
Population density, inh./km^2			125.27
Floor surface of the housing stock, thousand m^2	380.20	646.40	1,026
Average consumption, toe/year			57,547
Production value in 2011, mln MDL			342.90
Public Budget, mln MDL			212.65
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			3,484
Coal, tons			1,724
Wood, m^3			730
Liquefied petroleum gas (LPG), tons			218
Oil fuel, tons			0
Motor gasoline, tons			616
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			10
Floor surface to be rehabilitated, m^2			14,521
Annual savings, MWh			2,294

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

10.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 10 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 2,294 MWh, and financial savings to the local budget of up to 2.9 million MDL.

11 Şoldăneşti District

11.1 Geographical location and economic potential

Şoldăneşti District covers an area of 598.36 km^2 with a population of 43.29 thousand people, 48.7% men and 51.3% women, of which 28.31 thousand are employable. About 17.54% of the population lives in urban areas and 82.46% in rural areas. The climate is temperate continental, with a mean temperature in January of -4.5°C and +21ºC in July. Over 21 enterprises and production units operate in the district, generating a production volume of about 14.9 million MDL. The total floor surface of the district's housing stock is 971.20 thousand m^2. The executed budget in 2012 was 104.94 million MDL.

Figure 11-1: Geographical location of Şoldăneşti District

11.2 Energy balance

The annual energy consumption by the enterprises and organizations in Şoldăneşti District is about 521 tons of coal, 898 thousand m^3 of natural gas and about 682 m^3 of wood.

11.3 Energy consumption in public buildings

In 2009, there were 31 pre-university educational facilities and 29 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 54,618 m^2. The energy consumption by the educational facilities is estimated at about 10,247 thousand kWh per year. The Şoldăneşti District hospital has a capacity of approximately 135 beds and an estimated energy consumption of 1,770 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 79,838 m^2 with an annual heating and electricity consumption of approximately 15,545 MWh.

11.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

11.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

11.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Şoldăneşti District is expected to carry out the energetic rehabilitation of approximately 7,984 m^2 of public buildings, or about 5 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 31.11 million MDL. Such investment could result in an annual savings of about 1,261 MWh, the equivalent of up to 1.60 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Şoldăneşti District develops a sufficient number of projects up to the financing stage in the coming years.

Table 11-1: Data about Şoldăneşti District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			598.36
Population in 2010, thousand people	7.59	35.7	43.29
Population density, inh./km^2			72.34
Floor surface of the housing stock, thousand m^2	182.40	788.90	971.20
Average consumption, toe/year			27,273
Production value in 2011, mln MDL			14.90
Public Budget, mln MDL			104.94
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			898
Coal, tons			521
Wood, m^3			682
Liquefied petroleum gas (LPG), tons			1
Oil fuel, tons			43
Motor gasoline, tons			366
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			5
Floor surface to be rehabilitated, m^2			7,984
Annual savings, MWh			1,261

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

11.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 5 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 1,261 MWh, and financial savings to the local budget of up to 1.6 million MDL.

12 Teleneşti District

12.1 Geographical location and economic potential

Teleneşti District covers an area of 849 km^2 with a population of 74.63 thousand people, 49.7% men and 50.3% women, of which 50.32 thousand are employable. About 11.02% of the population lives in urban areas and 88.98% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 59 enterprises and production units operate in the district, generating a production volume of about 76.9 million MDL. The total floor surface of the district's housing stock is 1,632 thousand m^2. The executed budget in 2012 was 173.41 million MDL.

Figure 12-1: Geographical location of Telenești District

12.2 Energy balance

The annual energy consumption by the enterprises and organizations in Teleneşti District is about 2,206 tons of coal, 1,508 thousand m^3 of natural gas and about 1,277 m^3 of wood.

12.3 Energy consumption in public buildings

In 2009, there were 42 pre-university educational facilities and 33 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 97,887 m^2. The energy consumption by the educational facilities is estimated at about 18,365 thousand kWh per year. The Teleneşti District hospital has a capacity of approximately 180 beds and an estimated energy consumption of 2,360 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 131,670 m^2 with an annual heating and electricity consumption of approximately 25,484 MWh.

12.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

12.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

12.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Teleneşti District is expected to carry out the energetic rehabilitation of approximately 13,167 m^2 of public buildings, or about 9 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 51.31 million MDL. Such investment could result in an annual savings of about 2,080 MWh, the equivalent of up to 2.70 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Teleneşti District develops a sufficient number of projects up to the financing stage in the coming years.

Table 12-1: Data about Teleneşti District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			849
Population in 2010, thousand people	8.22	66.41	74.63
Population density, inh./km^2			87.90
Floor surface of the housing stock, thousand m^2	175.10	1,457	1,632
Average consumption, toe/year			46,731
Production value in 2011, mln MDL			76.90
Public Budget, mln MDL			173.41
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			1,508
Coal, tons			2,206
Wood, m^3			1,277
Liquefied petroleum gas (LPG), tons			31
Oil fuel, tons			28
Motor gasoline, tons			391
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			9
Floor surface to be rehabilitated, m^2			13,167
Annual savings, MWh			2,080

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

12.7 Vision

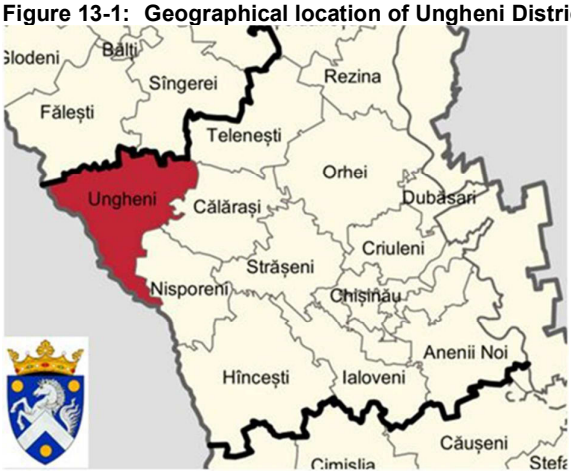
The district's vision for energy efficiency is to increase the comfort of the users of at least 9 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 2,080 MWh, and financial savings to the local budget of up to 2.7 million MDL.

13 Ungheni District

13.1 Geographical location and economic potential

Ungheni District covers an area of 1,083 km^2 with a population of 117.4 thousand people, 47.9% men and 52.1% women, of which 79.93 thousand are employable. About 34.66% of the population lives in urban areas and 65.34% in rural areas. The climate is temperate continental, with a mean annual temperature of +9°C. Over 111 enterprises and production units operate in the district, generating a production volume of about 1,137 million MDL. The total floor surface of the district's housing stock is 2,373 thousand m^2. The executed budget in 2012 was 274.37 million MDL.

Figure 13-1: Geographical location of Ungheni District



13.2 Energy balance

The annual energy consumption by the enterprises and organizations in Ungheni District is about 2,926 tons of coal, 6,802 thousand m^3 of natural gas and about 1,008 m^3 of wood.

13.3 Energy consumption in public buildings

In 2009, there were 62 pre-university educational facilities and 43 pre-school educational facilities in the district. The estimated floor surface of the educational facilities is approximately 152,335 m^2. The energy consumption by the educational facilities is estimated at about 28,600 thousand kWh per year. The Ungheni District hospital has a capacity of approximately 370 beds and an estimated energy consumption of 4,852 thousand kWh per year. The total stock of public educational (pre-school and secondary), medical (hospitals, outpatient facilities and polyclinics) and administrative (mayor's offices and district councils) buildings is estimated at about 198,677 m^2 with an annual heating and electricity consumption of approximately 38,863 MWh.

13.4 Energy management

The Energy Manager plays a very important role in the development and implementation of technical and complementary measures at the local level. Moreover, the Energy Manager must act as a connection point between the partners at the national and local levels, including partners from the private sector and NGOs.

13.5 Key challenges

Local Public Authorities play a very important role in the achievement of energy savings goals at the regional and national levels. The lack of planning documents on energy efficiency at the district level is a major obstacle to identifying local priorities and the resources needed to achieve the proposed objectives. Despite the substantial potential for improving energy efficiency, currently there is a major need for capacity development at the district level for the elaboration and implementation of sustainable investment projects in energy efficiency.

13.6 Prospects for development

Under the 2020 Regional Sector Program on Energy Efficiency in Public Buildings, Ungheni District is expected to carry out the energetic rehabilitation of approximately 19,868 m^2 of public buildings, or about 13 public buildings with an average size of 1,500 m^2. The estimated cost of the investment needed to achieve this objective is approximately 77.43 million MDL. Such investment could result in an annual savings of about 3,139 MWh, the equivalent of up to 4.0 million MDL in savings to the local budget. This level of investment would require funding sources, including external grants and loans. To access funding sources, it is important that Ungheni District develops a sufficient number of projects up to the financing stage in the coming years.

Table 13-1: Data about Ungheni District

Data about the district			
	Urban	**Rural**	**Total**
Background information[1)]			
District area [km^2]			1,083
Population in 2010, thousand people	40.69	76.71	117.40
Population density, inh./km^2			108.40
Floor surface of the housing stock, thousand m^2	692.60	1,681	2,373
Average consumption, toe/year			73,954
Production value in 2011, mln MDL			1,137
Public Budget, mln MDL			274.37
Energy balance (Fuel consumption by enterprises and organizations in the district), 2011[2)]			
Gas, thousand m^3			6,802
Coal, tons			2,926
Wood, m^3			1,008
Liquefied petroleum gas (LPG), tons			56
Oil fuel, tons			13
Motor gasoline, tons			636
Prospects for Energy Efficiency by 2020			
Rehabilitation of public buildings (min. 1,500 m^2), un.			13
Floor surface to be rehabilitated, m^2			19,868
Annual savings, MWh			3,139

Notes: 1). National Bureau of Statistics, Ministry of Finance;
2). National Bureau of Statistics.

13.7 Vision

The district's vision for energy efficiency is to increase the comfort of the users of at least 13 public buildings through energy rehabilitation works by 2020. At the same time, this will result in energy savings of about 3,139 MWh, and financial savings to the local budget of up to 4.0 million MDL.