

UNECE Sustainable Energy Division

**Gap analysis between the performance objectives of the  
Framework Guidelines for Energy Efficiency Standards in  
Buildings and implementation of current building energy efficiency  
standards in the Republic of Moldova**

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## Acronyms and abbreviations

HDD	Heating Degree Day
EE	Energy Efficiency
RES	Renewable Energy Sources
VAT	Value added tax
NDC2	The second Nationally Determined Contribution
LEDS	Low Emissions Development Strategy
GHG	Green House Gases
UNFCCC	United Nations Framework Convention of Climate Change
NECP	National Energy and Climate Plan
EC	European Commission
NEEP	National Energy Efficiency Program
NEEAP	National Energy Efficiency Action Plans
NREAP	National Renewable Energy Action Plan
EEA	Energy Efficiency Agency
CHP	Combined Heat and Power Plants
PV	Photo voltaic
HPP	Hydro Power Plant
TA	Technical Assistance
NFRD	National Fund for Regional Development
EBRD	European Bank for Reconstruction and Development
GCF	Green Climate Fund
MAIB	Moldova Agroindbank SA
GEFF	Green Economy Financing Facility
SMEs	Small and medium-sized enterprises
NEFCO	Nordic Environment Finance Corporation
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (English: German Corporation for International Cooperation GmbH)
EU	European Union
JICA	Japanese International Cooperation Agency
USAID	United States Agency for International Development,
UNDP	United Nations Development Programme,
TIKA	Turkish Cooperation and Coordination Agency
COM	Covenant of Mayors
AEER	Alliance for Energy Efficiency and Renewables
ESCO	Energy Service Company
EPCs	Energy performance contracts
NZEB	Nearly zero-energy buildings
LNG	Liqified Natural Gas
DH	District Heating
IFI	International Financing Institutions
NGO	Non-governmental organization



## Signs and Measures

Gcal	Giga calories
GJ	Giga Joule
ktce	Kilotons of coal equivalent
kW	Kilowatt
kWh	Kilowatt hours
m <sup>2</sup>	Square meter
MW	Megawatt
MWh	Megawatt hours
TJ	Tera Joule
U-value	U-value measures the thermal conductivity of materials in W/(m <sup>2</sup> K)
W/(m <sup>2</sup> K)	Watts per square meter Kelvin

## Currency

Euro	21.4604 Lei
US Dollar	17.7992 Lei

Source: National Bank of Moldova, [www.bnm.md](http://www.bnm.md) (on 3 May 2021)



## Glossary of Terms<sup>1</sup>

<b>The energy performance certificate</b>	Regulated document confirming the energy performance of a building or building unit, calculated using the methodology of calculating take the energy performance of buildings
<b>Energy class</b>	Measuring system, from "A" to "G" to indicate the energy performance of building. In order to classify buildings with a very high energy performance, class "A" can be divided into subclasses
<b>The energy performance of the building</b>	Measured amount of energy essential to ensures the energy requirement under the standard building use, which includes, among other things, the energy used for heating, cooling, ventilation, hot water and lighting
<b>Energy performance indicator</b>	Quantity of energy measured relative to the total area of the building
<b>Primary energy</b>	Renewable and non-renewable energy which has not undergone any process of conversion or transformation

<sup>1</sup> Derived from Law on Energy Performance of the Buildings



## Executive Summary

The existing policies to enhance energy efficiency in buildings (including framework legislation, building energy codes, energy performance certification, utility-demand-side management programmes, energy pricing measures, financial incentives, promotion of ESCO, awareness programmes) of the Republic of Moldova represent the basis for implementation of the proposed principles of the Framework Guidelines.

However, there is a need to take more actions in order to implement national targets into the high-performance building projects. The country's new economy-wide unconditional target is to reduce its greenhouse gas emissions by 70 per cent below its 1990 level in 2030. At national level, there is an overlapping of the climate and energy planning processes, especially those related to the LEDS 2030 and the NECP's Decarbonization dimension. In order to comply with the energy efficiency targets (including on building's) set forth in the UNECE Framework Guidelines, the activities of the Ministry of Economy and Infrastructure needs to be updated in accordance with the NDC2 climate targets.

Secondary legislation is not updated to new decarbonization commitment, and this is a major obstacle to implement the performance objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings. The requirements of existing energy efficiency standards in buildings in the Republic of Moldova are aligned to the EU norms. The objectives set forth in the Framework Guidelines are higher. However, the cost for implementation of energy efficiency measures according to the Framework Guidelines is very high, and cost-based measures limit the possibilities of substantial reduction of energy consumption in buildings. As of 2021, all new buildings in the Republic of Moldova must be nearly zero-energy buildings if economically feasible solutions are identified. However, implementation of this objective is difficult due to financial and technical limitations. The initial incentive for purchase of energy saving technologies should be introduced. Financial incentives should be introduced to encourage investment in the long-lasting high efficiency improvements, including ESCO contracting.

It important to consider mandatory renewable energy for building design and certification. Certification of existing residential and non-residential buildings should be implemented in market model in order to secure sustainability of implementation of national energy and climate targets. The minimum energy performance standards should be updated and implemented for both new and existing buildings.

Digital tools should be considered to enhance flexibility and clean energy deployment. Digitalization, with right policies, enables a progression to optimizing the efficiency of the whole energy system. Digitalization of energy consumption in building will connects and coordinates devices and equipment, leading to greater energy efficiency. Digitally connected buildings communicate with the grid, providing new sources of flexible load. As result, more intermittent renewables are able to be used when they are available, making the system more efficient and stable.

Finally but not the last, the stakeholders in the building sector should be educated on the importance of building energy codes in order to increase support for compliance and effective implementation of energy efficiency policy.



## Introduction

The objective of this study is to assess the gap between the performance objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings and implementation of current energy efficiency standards in buildings, with a focus on residential buildings.

In the Republic of Moldova, buildings (residential, service, commercial) have consumed in 2019 about 78 per cent of the electricity and about 56 per cent of the final energy, and are responsible for 53 per cent of CO<sub>2</sub> emissions. Figure 1 and Figure 2 below shows breakdown of electricity and energy consumption in Moldova.

The country imports 74 per cent of its primary energy<sup>2</sup> needs, and 75 per cent of its electricity needs; hence it is exposed to significant energy security risks. About 50 per cent of natural gas is consumed in the buildings sector. Thus, the sector is important to address energy challenges from the demand side perspective. Further, the energy use per capita in Moldova is about one-fourth of the one in OECD countries and is likely to increase further as incomes rise.

While the country will need to accommodate future new urban residents by 2050, about 80 per cent of buildings standing today are expected to remain in use in 2050. Renewable energy technology can meet a part of energy demand and contribute to the carbon reduction requirements.

The energy performance of buildings is the cheapest option and must be managed, the technological and human resources to meet this challenge are available today.

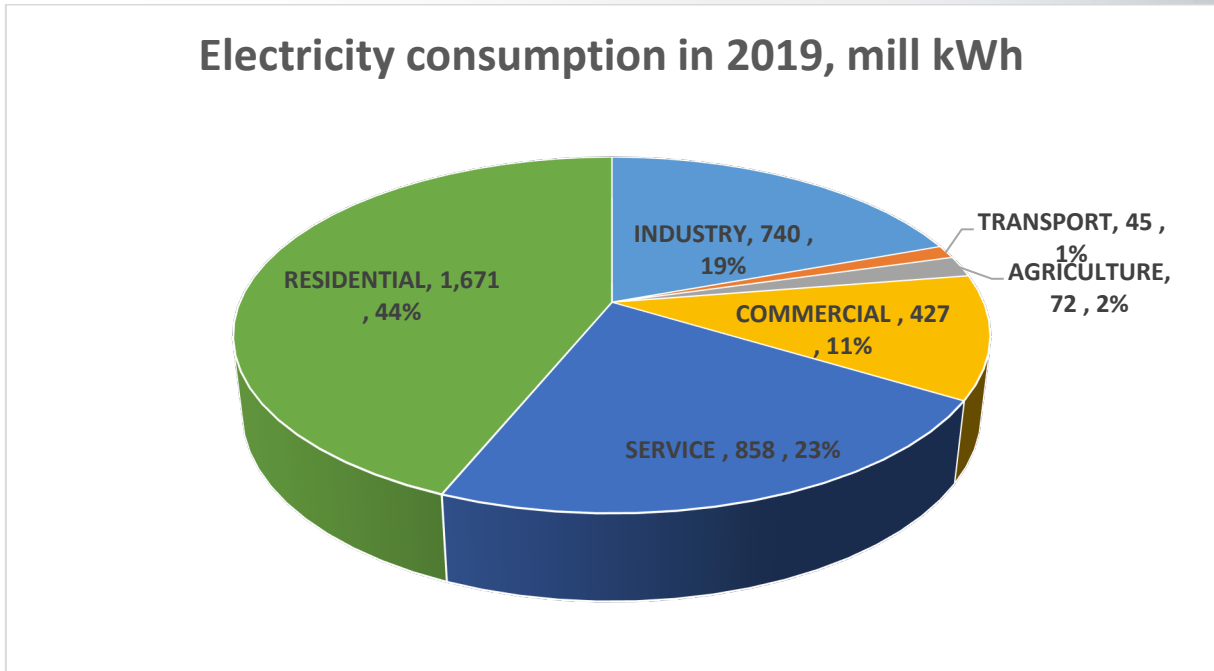
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<sup>2</sup> Energy Balance of Moldova 2020. Statistics of Moldova, [www.statistica.md](http://www.statistica.md) (accessed on 27.03.2021)



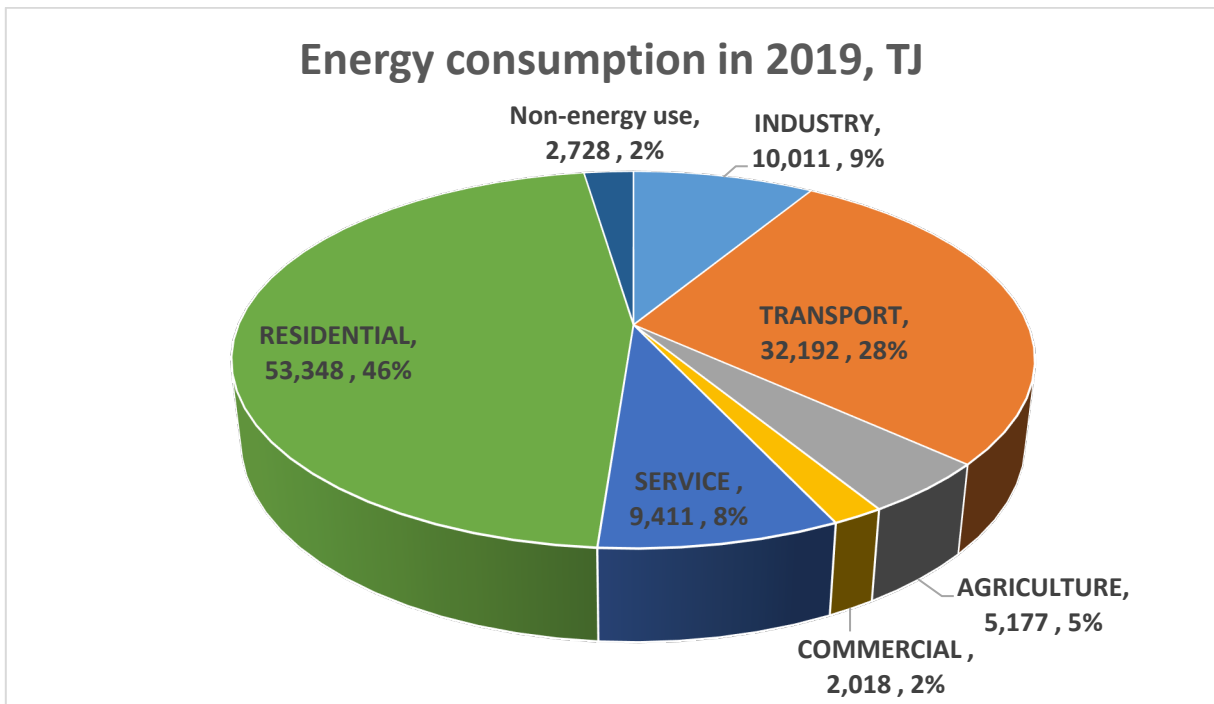


Figure 1. Electricity consumption by sector in Moldova, 2019, million kWh.



Source: Compilation by the author based on data from Energy Balance of Moldova, [www.statistica.md](http://www.statistica.md)

Figure 2. Energy consumption by sector in Moldova, 2019, TJ.



Source: Compilation by the author based on data from Energy Balance of Moldova, [www.statistica.md](http://www.statistica.md)



# 1 Policies on Energy Efficiency in Buildings

The Republic of Moldova has strong international commitment to achieve climate neutrality of the national economy, including the building sector.

The Ministry of Agriculture, Regional Development and Environment presented, in March 2020, to the Secretariat of the UNFCCC the second Nationally Determined Contribution<sup>3</sup> (NDC2) of the Republic of Moldova. The country's new economy-wide unconditional target is to reduce its greenhouse gas emissions by 70 per cent below its 1990 level in 2030. As to the new economy-wide conditional target, the reduction commitment could be increased in NDC2 up to 88 per cent below the 1990 level. Achieving this target demands climate change mainstreaming into development policies, plans and programmes.

Moldova's Low Emissions Development Strategy (LEDS) 2030 establishes a GHG reduction target from the energy sector of 74 per cent as unconditional scenario and 82 per cent conditioned, compared to 1990. Thus, the energy sector is the one with the most ambitious GHG reduction targets, and building sector is the main energy consumer.

The National Energy and Climate Plan (NECP) is under development by the Ministry of Economy and Infrastructure, and represents a tool for the strategic energy and climate policy planning for implementation of the Energy Union Strategy.

Currently, there is an overlapping of the climate and energy planning processes, especially those related to the LEDS 2030 and the NECP's Decarbonisation dimension. Apparently, LEDS can be treated as decarbonisation dimension of the NECP. Thus, the LEDS 2030 content can be used as a direct input to the Decarbonisation dimension of the NECP, given the significant content and objective overlapping. Due to different methodologies applied, the GHG emission reduction targets for energy sector established in the updated NDC2 and LEDS 2030 are different from those calculated for and to be established in the NECP (less ambitious). If this situation will be accepted and different targets will be established for the same sector, the Republic of Moldova would have two national planning documents which plan in a different way the energy sector (including building's energy demand). More than this, the targets will derogate from general target established in the Moldova's updated NDC.

It is worth to mention that, the Governmental Decision<sup>4</sup> on the planning, development, approval, implementation, monitoring and evaluation of the public policies documents states the procedures for approving the new policy documents. During the elaboration of a new policy document it is necessary to identify the existing public policy documents in the process of implementation or implemented that contain provisions related to the new policy document. This procedure is important to follow in order to ensure the continuity and synergy of interventions and avoid duplications and opposable provisions.

## 1.1 Framework legislation

The existing policies to enhance energy efficiency in buildings (including framework legislation, building energy codes, energy performance certification, utility-demand-side management programmes, energy pricing measures, financial incentives, promotion of ESCO, awareness programmes) in the Republic of Moldova are presented in the following documents:

<sup>3</sup>[https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Republic%20of%20Moldova%20First/MD\\_Updated\\_NDC\\_final\\_version\\_EN.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Republic%20of%20Moldova%20First/MD_Updated_NDC_final_version_EN.pdf)

<sup>4</sup> Governmental Decision #386/2020 [https://www.legis.md/cautare/getResults?doc\\_id=121921&lang=ro](https://www.legis.md/cautare/getResults?doc_id=121921&lang=ro)



**Law No.139 on Energy Efficiency** - This Law implements Directive 2012/27/EU of the European Parliament and the Council on energy efficiency and Directive 2009/125/EC of the European Parliament and the Council establishing a framework for the setting of ecodesign requirements for energy-related products. The purpose of this Law is to create the legal framework necessary to promote and improve energy efficiency through the implementation of energy efficiency action plans, the development of energy services market. The main elements of the Law are:

- Energy efficiency obligation scheme;
- Exemplary role of public buildings of central government;
- Obligatory energy audit for big companies;
- Strengthening the capacities of energy managers, and the role of local EE Action Plan;
- Creation and strengthening of local energy services market;
- Sustainable public procurement;
- Public awareness and promotion of efficient energy use;
- Strengthening the capacity of institutions responsible for energy efficiency policies implementation.

**Action Plan for 2014-2020 on harmonization of buildings sector** - The Action Plan for 2014-2020 on harmonization of buildings sector' technical regulations and national standards with the European regulations and standards was adopted on 1 November 2014 (GD No. 933).

**Law No.75 on Dwellings** - The Law No. 75 on Dwellings was adopted on 30.04.2015 and entered into force on 29 November 2015, except for the provisions related to the energy performance of buildings with reference to ventilation, cooling and lighting (entered into force on 1 January 2017).

**Regulation (GD No.1325 of 12.12.2016) on the “Periodic Inspection of the Heating Systems in Buildings”** establishes the organization and conducting of the inspection process, its periodicity depending on the category of building, the type and nominal power of the heating system and other conditions, taking into account the costs of the inspection and the estimated energy savings that could result from the inspection.

**Voluntary Energy Efficiency in Heating Utilities (2014)** - Heating utilities have to choose either to implement Energy Audits every four years, or to implement the Energy Management Systems as per ISO50001.

**Energy Strategy of the Republic of Moldova until 2030** - The Energy Strategy of Moldova until 2030 provides guidelines for national energy sector development, in order to ensure the necessary grounds for economic growth and social welfare. Through this document, the government presented its vision and identified strategic national opportunities in a rapidly changing energy context. The Strategy defined general policy goals from 2013 to 2030 as well as specific policy objectives for 2013-2020 period and for 2021-2030, specifying measures for their implementation.

**Law on eco-design requirements applicable for energy-related products (Law No. 151 as of 01.07.2016)** is being supported by the Regulation 750/2016 which establishes requirements for equipment, such as household dishwashers, air conditioners, etc.



**Regulation (GD No.750 of 13.06.2016) on the “Requirements on eco-design applicable to products with an energy impact”** transposes the EC Regulation No 643/2009 of 22 July 2009 on implementing Directive 2005/32/EC of the European Parliament and the Council on eco-design requirements for household refrigerating appliances (Official Journal of the European Union L 191/53 of 23 July 2009), as well as amendments and additions made by the European Commission (EC) Regulation 2016/2282 of 30 November 2016.

**National Energy Efficiency Action Plan (NEEAP 2019-2021) (G.D. No. 698 of 27.19.2019)** aims to facilitate energy efficient retrofits of public buildings with cumulative savings of 58 ktoe by the end of 2021; and energy efficient retrofits of multi-apartment residential buildings in framework of a separate programme by the end of 2021 with average annual savings of 83,6 ktoe (cumulative savings of 193,6 ktoe by the end of 2021).

**National Programme on Energy Efficiency 2011-2020** aims for 20 per cent reduction in overall primary energy consumption by 2020 compared to 2009 levels.

Complementing the Energy Strategy of Moldova until 2030 are the National Energy Efficiency Program (NEEP) 2011-2020, the National Energy Efficiency Action Plans (NEEAP) 2013-2015, 2016-2018, 2019-2021, and the National Renewable Energy Action Plan (NREAP) 2013-2020. The NEEP, NEEAPs and NREAP were designed in accordance with Moldova’s commitments under the Energy Community Treaty.

With the new 2018 Law 139 of 2019 on energy efficiency (which transposes the Energy Efficiency Directive 27/2012/EU), the Moldovan authorities plan to abolish the NEEP as a planning document, further relying exclusively on NEEAPs (IEA,2017).

**Law on Energy Performance of buildings (Law No. 128 as of 11.07.2014) - Near Zero Buildings-** this law was adopted on 11 July 2014 and entered into force on 1 January 2015. Nearly zero-energy buildings requirement will follow the timeline below:

- (1) After 30 June, 2019, new public buildings must be buildings whose energy consumption is nearly zero;
- (2) After 30 June, 2021, all new buildings must be buildings whose energy consumption is nearly zero.

**Law on energy labelling of energy-related products (Law No. 44 as of 27.03.2014)** is being supported by the Regulation 1003/2014 which establishes a set of labelling requirements for the following appliances: household tumble driers, air conditioners, domestic ovens and range hoods, electrical lamps and luminaries, household washing machines, household dishwashers, household refrigerating appliances and TV sets.

**Low Emissions Development Strategy 2030 (GD No. 1470, 30.12.2016)** establishes the vision to develop a mechanism for reduction of the greenhouse gas emissions and increasing financial support to promote adequate investment policies and projects to mitigate GHG in all sectors of the national economy. In its updated NDC (NDC2), the Republic of Moldova intends to achieve more ambitious targets than in its NDC1. The country’s new economy-wide unconditional target is to reduce its greenhouse gas emissions by 70 per cent below its 1990 level in 2030, instead of 64-67 per cent as committed in NDC1.



As to the new economy-wide conditional target, instead of 78 per cent as committed in NDC1, the reduction commitment expressed above could be increased in NDC2 up to 88 per cent below 1990 level, provided that a global agreement addressing important topics, including low-cost financial resources, technology transfer, and technical cooperation accessible to all at a scale commensurate to the challenge of global climate change, is insured.

## 1.2 Building energy codes

The energy performance in residential and non-residential buildings (including design envelope of buildings, heating, ventilation, HVAC, water heating, appliances and equipment, and lighting) in the Republic of Moldova is regulated by the following documents:

**The Law of the Republic of Moldova No. 128 of 11 July, 2014** on energy performance of buildings transposes the Directive 2010/31/EC. Energy class – the system of measurement from "A" to "G" for specifying of energy efficiency of the building. In case of classification of buildings with very outstanding energy performance, the class "A" can be subdivided into sub-classes. According to the Law - after year 2021, all new buildings must be NZEB.

**Building Code (NCM M.01.04: 2016) Methodology for calculating cost-optimal levels, minimum energy performance requirements for buildings and their components** (heating component and domestic hot water preparation) – the document describes the performance-based requirements in building energy codes as well as code's stringency and coverage.

**NCM M.01.02:2016 Energy Performance of Buildings. Methodology for calculation of the Energy Performance of Buildings** - this document presents the methodology and conversion factors for energy units for calculation of the Energy Performance of Buildings.

**NCM E.04.03-2008 Energy conservation in building** - 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.

**NCM M.01.01:2016, Energy Performance and Minimum Energy Requirements of Buildings** - is one of the main documents establishing methodology for the calculation, contents of energy performance certificates and energy class intervals, templates of energy performance certificates and energy labels, as well as energy efficiency improvement requirements. The new requirements established by this Regulation differ significantly from the old ones since it has the 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. Requirements for U-values of structural elements:

Building structural elements	U-value, W / (m <sup>2</sup> K)	2009 German Energy Saving Regulation
Exterior wall or pitched roof - slope > 45°	0.32	0.24
Flat or pitched roof - slope ≤ 45°	0.20	0.20
Ceiling over the exterior	0.20	-
Ceiling under the loft	0.25	-
Windows in the exterior wall, roof windows and doors for premises where people permanently stay	≤1.5	1.3 for windows and 1.8 for doors

Source: Compilation by the author based on the Law on Energy Performance of the Building and German Energy Saving Regulation

### 1.3 Energy performance certification

The energy performance certification based on the European standards was implemented in the Republic of Moldova through the Government Decision No.896 of 21.07.2016 on the “Procedure of energy performance certification of buildings and of building units”.

**NCM M.01.02:2016 „Energy Performance of Buildings. Methodology for calculation of the Energy Performance of Buildings”**- the document presents the methodology and conversion factors for energy units for calculation of the Energy Performance of Buildings.

**Energy Audits, 2020** - the normative document CP G.04.02-2003 "Regulation on energy audits of existing buildings and the heating and domestic hot water" provide the basis for conducting energy audit of existing buildings: requirements, content, energy audit documentation and the way for approval. When central and local public authorities apply for funding by Energy Efficiency Agency (EEA), from state or local public authorities budgets, the project has to be accompanied by an energy audit that has to be deployed by experienced energy auditors.

**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.

**CP E.04.02-2003 Technical implementation rules for exterior/interior thermal insulation of buildings** - - 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.



## **Regulation on energy audits of existing buildings and the heating and domestic hot water** – establish the structure of an energy audit.

Demonstration of compliance with minimum energy performance of buildings is carried out as follows:

- a) the design phase of the new building or a new unit of an existing building or major renovation work to existing buildings - by applying project documentation technical solutions that will ensure compliance with minimum energy performance set out in this normative document and assessing future energy performance of the building or building unit, according to NCM M.01.02. Report on assessment of future energy performance of the building is part of the project documentation, according to NCM A.07.02.
- b) At the commissioning stage of the new building, the new unit of an existing building or the existing building which has been subjected to major renovation - by issuing energy performance certificate of the building or building unit according to Government Decision No.896 and NCM M.01.02 .

### **1.4 Utility-demand-side management programmes**

The big companies and Electricity and Gas Utilities in Moldova either implement the Energy Audits every four years, or the Energy Management Systems as per ISO50001 (Law on Energy Efficiency 139, 2018). The preferred choice for many utility companies remains the implementation of the Energy Management Systems ISO50001, as one of management standard together with other standards: Safety Standard ISO450001, Environmental Standard ISO140001, Quality Standard ISO90001, and others.

### **1.5 Energy pricing measures**

The energy pricing methodology and tariffs approval are in the area of activity of the National Agency for Energy Regulations of the Republic of Moldova.

Natural Gas tariffs depends on the level of connection to the network and for household non-households consumers: 3910 Lei/1000 m<sup>3</sup> (without VAT) or 182.2 Euro/1000 m<sup>3</sup> – for users connected to high pressure networks; 4018 Lei/1000 m<sup>3</sup> (without VAT) or 187.23 Euro/1000 m<sup>3</sup> – for users connected to the medium pressure networks; 4298 Lei/1000 m<sup>3</sup> (without VAT) or 230 Euro/1000 m<sup>3</sup> – for users connected to the low pressure networks. (1 Euro = 21.4604 Lei, source: [Banca Națională a Moldovei | \(bnm.md\)](http://banca.nationala.md), 3 May 2021)).

Electricity tariffs depend on the voltage level of connection to the network and are different for household and non-household consumers; and for different regions of the country (operated by „Premier Energy” JSC in Center and South; and by „Furnizarea Energiei Electrice Nord” JSC in the North of Moldova).

For the household consumers of „Premier Energy”, connected to low voltage electrical distribution networks (0.4 kV) – 1,51 Lei/kWh (without VAT) or 0.07 Euro/kWh. For the final consumers, connected to medium voltage electrical distribution networks (6; 10kV) – 1,25 Lei/kWh (without VAT), or 0.06 Euro/kWh.

For the household consumers of „Furnizarea Energiei Electrice Nord” JSC, connected to low voltage electrical distribution networks (0.4 kV) – 2,04 Lei/kWh (without VAT), or 0.09 Euro/kWh. For the final consumers, connected to medium voltage electrical distribution networks (6; 10kV) – 1,43 Lei/kWh (without VAT), or 0.07 Euro/kWh



District heating produced by Combined Heat and Power Plants CHP are in operation in the Chisinau and Balti city of Moldova. District heating in Chisinau city is supplied by two companies: „Termoelectrica” JSC - 1122 Lei/Gcal (without VAT), or 52.28 Euro/Gcal, and from „Apă-Canal Chişinău” JSC - 1132 Lei/Gcal (without VAT) , or 52.74 Euro/Gcal; District heating in Balti city is supplied by two companies: “CET-Nord”JSC - 1220 Lei/Gcal (without VAT) , or 56.85 Euro/Gcal, and “Termogaz-Balti”JSC - 1083Lei/Gcal (without VAT) , or 50.46 Euro/Gcal.

Heat only boilers are in operation by small district heating networks in other small cities of the country.

Tariffs for electricity from renewable energy sources are as follows: Photo voltaic (PV) – 1,88 Lei/kWh, or 0.09 Euro/kWh; Wind - 1,55 Lei/kWh, or 0.07 Euro/kWh; HPP - 0,97 Lei/kWh, or 0.05 Euro/kWh; Biogas CHP - 1,84 Lei/kWh, or 0.09 Euro/kWh; Biomass CHP - 1,96 Lei/kWh, or 0.09 Euro/kWh.

The energy policy of the country is supporting promotion of high efficient cogeneration CHP for heat and electricity production, and promotion of energy from renewable energy sources, with consideration of the emission targets.

## 1.6 Financial incentives and project finance

The **Energy Efficiency Agency (EEA)** finances projects in:

- energy-saving measures such as thermal insulation of walls and roofs, replacement of windows and exterior doors;
- rehabilitation of heating and domestic hot water source and distribution systems;
- renewable energy resources;
- public lighting.

The *EEA*<sup>5</sup> offers financing in the form of grants, credits, leasing and guarantees. According to the Law on Energy Efficiency, the Government reorganized the Energy Efficiency Agency by merging (absorption) with the Energy Efficiency Fund. Since its establishment, EEA has been the main local partner for the donor-funded TA projects and frequently works with the government and the private sector. EEA is responsible for the development of the NEEAP 2019-2021. The Energy Efficiency Agency conducted the inventory<sup>6</sup> of public buildings owned by the central public administration. The list of buildings has been developed on the basis of Article 5 of the Energy Efficiency Directive 27/2012/EU (supported by the STARS project).<sup>7</sup> This will be updated annually. Nowadays, the inventory of central government buildings contains 215 units (buildings) with a total useful floor area of 426,056 square meters.

<sup>5</sup> Law on Energy Efficiency, no. 139 of 19.07.2018, (published in the Official Gazette of the Republic of Moldova, no. 309-320 on 17.08.2018),

<sup>6</sup> The list of the buildings owned by central public authorities.  
[http://aee.md/images/Anex%C4%83\\_Invetar\\_cl%C4%83dirii.V1.1.pdf](http://aee.md/images/Anex%C4%83_Invetar_cl%C4%83dirii.V1.1.pdf)

<sup>7</sup> STARS - an EU-funded project, “Support to the Modernisation of the Energy Sector in the Republic of Moldova”, is helping the country reform its energy sector, which has traditionally been heavily dependent on imports. Higher energy efficiency standards and enhanced energy security are expected, while Moldova’s commitments to the Energy Community and its Association Agreement with the EU are also being met. Source: [EU4Energy: Transforming Moldova’s energy sector | EU Neighbours](#)





In order to finance projects in the field of energy efficiency and renewable energy sources, the Agency develops and implements financial instruments in accordance with the provisions of the Law on Energy Efficiency No. 139/2018. The Agency is entitled to develop and implement funding instruments by combining external financial resources with the financial resources it manages in accordance with Article 8 (11) of Law No. 139/2018 on Energy Efficiency.

**National Fund for Regional Development (NFRD)** is a public entity whose objective is to strengthen institutional and financial capacity of regional government. The NFRD becomes operational from 2011 and has a 150-200 million lei annually (equivalent to 7-9 million Euro). It is the largest national source of funding for regional development projects. The fund is managed by Ministry of Agriculture, Regional Development and Environment.

From 2013, NFRD is also implementing the energy efficiency projects. The three regional development agencies (Centre, North and South) are responsible for implementing the projects and reporting to Ministry of Agriculture, Regional Development and Environment. The budget in 2018: 200 million lei, or 9 million Euro. Every 3 years it is published a new call for project proposal for National Fund for Regional Development. Selection is done in 3 stages, and the budget is 1 Bill.Lei(equivalent to 46 million Euro).

**Moldova Social Investment Fund** had available budget in 2018: 106 million lei (equivalent to 5 million Euro). Total amount contracted at 31 December 2018 from Romania (the 1st tranche of GD No. 435 of 10.06.14 and II of Government Decision No 132 of 07.03.17) for the execution of the civil works and delivery of goods is 456 463 150 lei (equivalent to 21 million Euro), of which 370 754 849 (equivalent to 17 million Euro) lei were contracted to carry out civil works, 77 515 515 lei (equivalent to 3 million Euro)- contracted for the procurement of goods, and 8 192 787 lei (equivalent to 380 thousand Euro)- for consultancy services (technical evaluation, drafting of costs)<sup>8</sup>. The investment is carried out in the framework of “Technical and financial assistance program of the Government of Romania for pre-school institutions in the Republic of Moldova.”

**The Green Climate Fund:** Republic of Moldova is able to directly access the financial means of the Fund through the accredited national entities or indirectly via the accredited international entities. The citizens of Moldova will benefit from new green technology thanks to a 5 million Euro loan provided by the European Bank for Reconstruction and Development (EBRD) and the Green Climate Fund (GCF) to Moldova Agroindbank SA (MAIB) under the EBRD's Green Economy Financing Facility (GEFF).

The loan combines 3.75 million Euro of EBRD finance and 1.25 million Euro of GCF concessional co-finance. The financing for Moldova Agroindbank SA is the first loan to be made available under the GEFF in Moldova and is expected to facilitate the country's transition to a more sustainable, low-carbon and climate-resilient economy.

The loan will be used for on-lending to individuals, small and medium-sized enterprises (SMEs) and corporates for investments in climate change mitigation and adaptation technologies and services, such as thermal insulation for buildings, energy-efficient glazing, LED lighting, heat pumps, photovoltaic generation and energy storage systems, electric vehicles as well as drip irrigation lines, conservation agriculture machinery and rainwater harvesting equipment.

<sup>8</sup> FISM [https://fism.gov.md/sites/default/files/document/attachments/raport\\_grant\\_ro\\_decembrie\\_2018.pdf](https://fism.gov.md/sites/default/files/document/attachments/raport_grant_ro_decembrie_2018.pdf)



The EBRD, with funds from the GCF and Turkey, will help MAIB with capacity-building and with the implementation and monitoring of the programme. Experts will provide know-how and raise awareness about climate change mitigation and adaptation technologies among private sector clients. In addition, they will offer project appraisal support and guide sub-borrowers to optimal technology choices.

The loan is expected to help Moldova reduce its annual energy consumption by 108,800 GJ per year, the equivalent of annual energy consumption of more than 6,000 Moldovan households and carbon emissions by 9,880 tons per year, equivalent to taking more than 5,000 passenger vehicles off the streets.

The EBRD will also support activities that aim to enhance women's and men's equal opportunities to access finance for green technologies.

**The NEFCO** - the framework agreement between the Republic of Moldova and Nordic Financial Corporation for Climate is ratified as per Law No.263 of 07.12.2017. NEFCO funding is provided in the form of investments, loans and guarantees provided by NEFCO, and priority investments are considered to be those that have a beneficial impact on the environment. First projects in Moldova were implemented for street lighting systems in Ungheni and Festelita.

In Moldova the active international institutions are the following: the European Bank for Reconstruction and Development, the European Union programmes, GIZ - the German International Cooperation Agency, the World Bank, the European Investment Bank, the Swedish International Development Cooperation Agency, EU's Eastern Partnership programmes, the Japanese International Cooperation Agency (JICA), the U.S. Agency for International Development (USAID), the United Nations Development Programme (UNDP), TIKA Turkish Agency etc. Table 2 below illustrates some key activities in energy efficiency.

*Table 2. Projects implemented in Moldova with international support*

#	Title of the project	Project duration		Implementing agency	Responsible public institution	Source of funding	Total amount invested	Currency
1	Moldova Sustainable Green Cities	2018	2022	UNDP Moldova	Chisinau City	GEF / UNDP	2 719 726	USD
2	ESCO Moldova project - Transforming the market for Urban Energy Efficiency in Moldova by introducing Energy Service Companies	2015	2018	UNDP Moldova	Chisinau City	GEF / UNDP	1 450 000	USD
3	'Modernization of Local Public Services in the Republic of Moldova' phase 2	2016	2020	GIZ Moldova	Ministry of Agriculture, Regional Development and	GIZ	14 616 762	EUR



					Environment			
4	GrCF - EE of public buildings in Chisinau	2017	2020	EBRD Moldova	Chisinau City	EBRD / EIB / E5P	25 000 000	EUR
5	STARS Project (Support to Modernisation of Energy Sector of Moldova)	2018	2022	EU	Ministry of Economy and Infrastructure	EU		
6	Modernisation of street lighting in Ocnita and Cantemir city	2015	2018	Alliance for Energy Efficiency and Renewables (AEER)	Ministry of Economy and Infrastructure	Covenant of Mayors (COM)	500 000	EUR
7	Modernisation of street lighting in Calarasi, Festelita and Cantemir CanTREB	2015	2018	AEER	Ministry of Economy and Infrastructure	Covenant of Mayors (COM)	2 000 000	EUR
8	Energy Efficiency Agency	2018	----	Energy Efficiency Agency	Ministry of Economy and Infrastructure	Government of the Republic of Moldova		

Source: Compilation by the author based on the desk study

## 1.7 Promotion of ESCO

The NEEAP 2019-2021 provides the basic conditions to promote ESCO and Energy Performance Contracts.

The **role of energy service companies (ESCO)** in **Moldova** remains somewhat limited due to a number of barriers. Typically, ESCOs are either companies that provide energy audit services or energy service providers that offer audits and then also a technical solution for a fee. These companies do not provide both a technical and a financial solution, and there is limited experience with energy performance contracts (EPCs) in Moldova – which is made even more problematic by the fact that financing is often difficult to obtain at affordable terms. Energy service providers typically do not like the idea of entering into public-private partnership type relationships with the municipal sector due to their limited payment ability and discipline. Policy, legal, regulatory, awareness and information barriers have all prevented the ESCO market from taking off in Moldova.



## 1.8 Awareness programmes

The awareness programmes in the Republic of Moldova are conducted according to NEEAPs.

**Energy services awareness programmes under NEEAP 2019-2021** include:

- Publishing articles and brochures on energy services;
- Training courses for Energy Managers/ industrial sector;
- Training courses for Energy Management Systems;
- Training for Energy Auditors, Inspector and Evaluators.

**Energy Performance of Buildings awareness programmes under the NEEAP 2019-2021** are:

- Publishing articles on energy performance certifications;
- Publishing articles about regular inspection of heating and air conditioning systems;
- Publishing brochures on energy performance for end-users;
- Conducting training courses for undertaking employees on implementing the Energy Management System EN ISO 50001.

## 2 Energy Performance of Buildings

### 2.1 Objectives set forth in the Framework Guidelines

Improving energy efficiency is one of the most cost-effective options for meeting growing energy demand. It contributes to energy security, a better environment, improved quality of life of both men and women, and their economic well-being. Out of all sectors of economic activity, the buildings sector has the largest potential for cost-effective improvement in energy efficiency and emissions reductions. The principles of the Framework Guidelines<sup>9</sup> shift the building industry paradigm from fragmented and serial to holistic and integrated.

Principles of the Framework Guidelines for Energy Efficiency Standards in Buildings provide guidance for planners, builders, and the entire building delivery and management chain as elements of innovative sustainability strategy, namely:

#### **A. Strategic – Buildings must be:**

- ✓ Science-based: design, construction, and management.
- ✓ Financed through policies recognizing the value of better buildings.
- ✓ Service-oriented: meet the sustainability demands of the populations served.
- ✓ Integrated with their built environment life-cycle to connect buildings as energy generators and consumers.
- ✓ Cost effective to mobilize private investment and entrepreneurs.
- ✓ Performance-monitored with feedback loops to operations and design tools.

<sup>9</sup> UNECE Framework Guidelines for Energy Efficiency Standards in Buildings:  
[https://unece.org/fileadmin/DAM/energy/se/pdfs/geee/geee7\\_Sept2020/ECE\\_ENERGY\\_GE.6\\_2020\\_4e.pdf](https://unece.org/fileadmin/DAM/energy/se/pdfs/geee/geee7_Sept2020/ECE_ENERGY_GE.6_2020_4e.pdf)



- ✓ Performance-based: evaluated by system outcomes, not component prescriptions.

**B. Design and Construction – Conception/delivery of buildings must be:**

- ✓ Holistic and integrated: recognize buildings and their environment are part of a system.
- ✓ Affordable: high performance buildings costing the same as or less than in 2016.
- ✓ Validated: based on energy models that reliably predict actual building performance.
- ✓ Sustainable: made using sustainable materials, equipment, construction, management and retirement practices.
- ✓ Code-driven: with local adaptation of global building standards.
- ✓ Skills based: develop work-forces to provide technology/skills needed for design, construction and operation.

**C. Management – Building must be maintained over their life-cycle:**

- ✓ Commissioning: With commissioning and re-commissioning of active systems.
- ✓ Performance-based: With on-going benchmarking, monitoring & reporting of performance data.
- ✓ Certification: Maintain certification or labelling to ensure energy performance is incorporated in to asset value.
- ✓ Managed: professionally managed large or complex buildings with ethos of sustainability & social responsibility.
- ✓ Data-linked: with advanced building information management capacity, where public infrastructure permits.
- ✓ Evaluated: On going performance evaluation and improvement.
- ✓ City-scaled: information analysis and outcomes.
- ✓ Life cycle-based: with long term analysis.

## 2.2 Existing requirements for energy performance in buildings

The existing requirements of energy performance for windows and walls<sup>10</sup> in buildings in the Republic of Moldova are developed (in support of Law 128) according to the thermotechnical characteristics of building materials on energy performance of buildings, but also to help designers at the stage of establishing the energy efficiency class of the building within the documentation of project, in the case of new or existing buildings undergoing major renovation. The requirements can be used both by energy auditors and energy evaluators in their professional activity. As of 2021 all new buildings must be nearly zero-energy buildings NZEB if economically feasible solutions are identified. The energy supply of new buildings must be provided to a substantial part by renewable energy sources on-site or nearby. This requirement is fulfilled if:

- At least 50 per cent of the final (delivered) energy demand for heating and domestic hot water is supplied by either biomass, district heating or heat pumps;  
or

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<sup>10</sup> [Catalogul caracteristicilor termotehnice ale materialelor de construcții - ednc \(gov.md\)](http://ednc.gov.md)



- At least 10 per cent of the final (delivered) energy demand is supplied by solar thermal, photovoltaics or similar renewable systems.

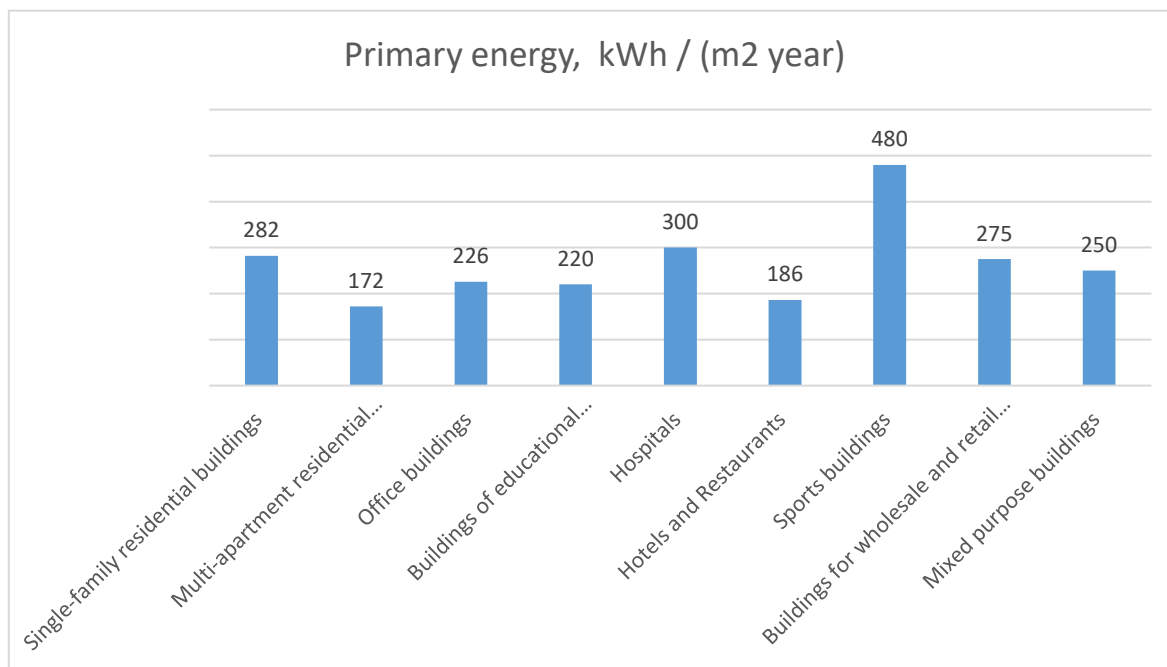
The corresponding normative document “NCM M.01.01: 2019 Energy efficiency of residential buildings” is harmonized with the following European standards in the field of energy performance of buildings:

- MS SR EN 15217: 2013 Energy performance of buildings. Methods of expressing energy performance and energy certification of buildings;
- SR EN 15603: 2011 Energy performance of buildings. Total energy consumption and definition of energy assessments;
- SM EN 15232: 2016 Energy performance of buildings. Impact of automation, control and technical management of the building;
- SR EN 15193: 2011 Energy performance of buildings. Energy requirements for lighting;
- Other specific European standards referenced in the text of the normative document.

The Figure 3 bellow presents the maximum amount of primary energy required for heating and domestic hot water, including auxiliary energy and for lighting

The values in Figure 3 corresponds to the maximum limit of the energy performance class "B" of buildings according to the classification set out in NCM M.01.02.

Figure 3. The maximum amount of primary energy.



Source: Compilation by the author based on the national norms and standards



## 2.3 Actual energy performance of buildings

The energy performance in residential and non-residential buildings is low in the Republic of Moldova.

The **public sector** in Moldova (which includes central government and municipal buildings, as well as facilities and street lighting) is a large user of energy. While there is no centralized database of public buildings or energy use, some data exists at the Energy Efficiency Agency. There are 3303 public institutions of about 5.8 million square meters in Moldova.<sup>11</sup> 4.3 million square meters are in the education sector or 2760 educational institutions, 1.4 million in the healthcare sector or 508 medical institutions, and the rest in public administration and social sector buildings. A substantial amount of the existing building stock was constructed during the Soviet era and has not been properly maintained since then. Most have low thermal performance, and thermal losses account for about 50 per cent of the heat consumption in the country. Moldova also has the 3<sup>rd</sup> National Energy Efficiency Action Plan (NEEAP<sup>12</sup>) which includes EE measures in the public buildings sector.

Many of the public buildings in Moldova (particularly kindergartens and schools) are underheated, and need maintenance and repair. Another challenge is the rate of use of area of public buildings. Many public buildings have broken roofs, windows and floors, and poor insulation. Thus, there is a high technical potential for energy savings in these buildings. For such buildings, the investment costs and typical payback periods of EE investments may be under-estimated in the energy audits.

The Regional Programme<sup>13</sup> for energy efficiency in public buildings has estimated a cost of EUR 200-300/square meter for “deep renovation” and energy efficiency projects of public buildings in Moldova. Underheating and structural rehabilitation are common in the region, and some measures to address this can be included in typical EE investments. However, to recover the full investment cost from EE savings, such investments in structural rehabilitation or upgrading comfort levels need to be limited so that the investment costs can be recovered through energy cost savings in no more than 12 years. If not, some budgetary or grant support would be necessary.

The **household energy consumption**, according to a National Bureau of Statistics<sup>14</sup> of Moldova is driven by: solid biofuels that are mainly used for space heating or 89,9 per cent; oil products - Liquefied Natural Gas (LNG) are used for cooking 73,9 per cent and for water heating 26,1 per cent; coal is used mainly for space heating 83,8 per cent and water heating; natural gas is mainly used for space heating 58,1 per cent and for cooking 32,8 per cent; heat from district heating companies is mainly for space heating 87,2 per

<sup>11</sup> Table 19. IDEER Moldova 2015. [https://energycharter.org/fileadmin/DocumentsMedia/IDEER/IDEER-Moldova\\_2015\\_en.pdf](https://energycharter.org/fileadmin/DocumentsMedia/IDEER/IDEER-Moldova_2015_en.pdf)

<sup>12</sup> NEEAP-3 [HG698/2019 \(legis.md\)](https://legis.md/HG698/2019)

<sup>13</sup> Regional Sector Programme on Energy Efficiency in Public Buildings for the Development Region ATU Gagauzia for 2018-2025.

[http://www.adrgagauzia.md/public/files/2018\\_05\\_07\\_FINAL\\_\\_RSP\\_EE\\_RDA\\_UTAG\\_final\\_ENG.pdf](http://www.adrgagauzia.md/public/files/2018_05_07_FINAL__RSP_EE_RDA_UTAG_final_ENG.pdf)

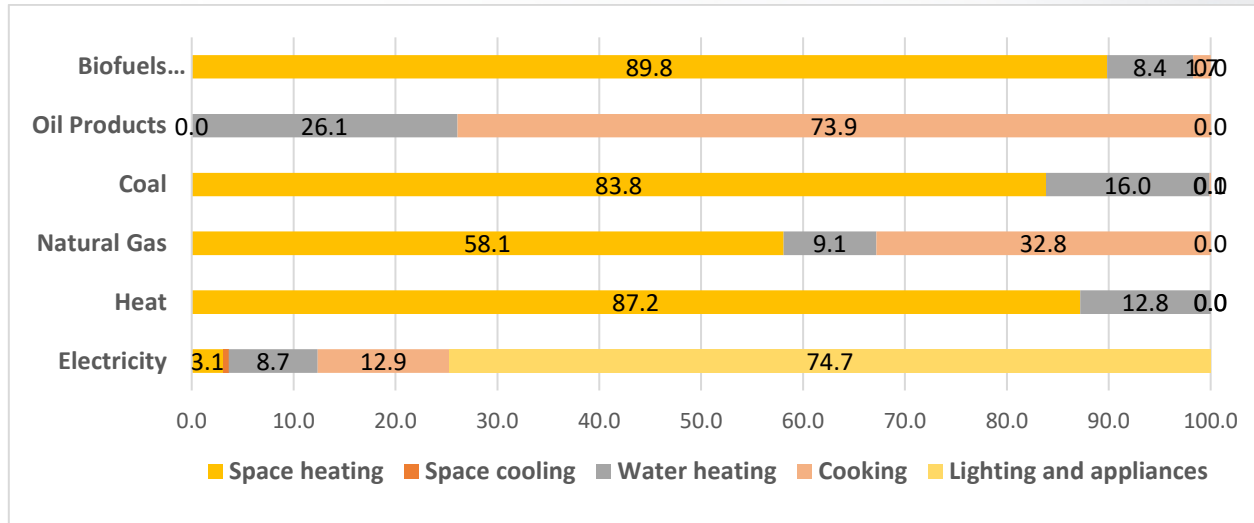
<sup>14</sup> NBS. Energy consumption in households.

[http://www.statistica.md/public/files/publicatii\\_electronice/Consum\\_energie\\_gospoda/Consum\\_energie.pdf](http://www.statistica.md/public/files/publicatii_electronice/Consum_energie_gospoda/Consum_energie.pdf)



cent; electricity is mainly used for lighting 74,7 per cent and appliances. Figure 4 below represents the share of final energy consumption per sectors.

Figure 4. Consumption by final use in Moldova, ktce, 2016



Source: National Bureau of Statistics of Moldova

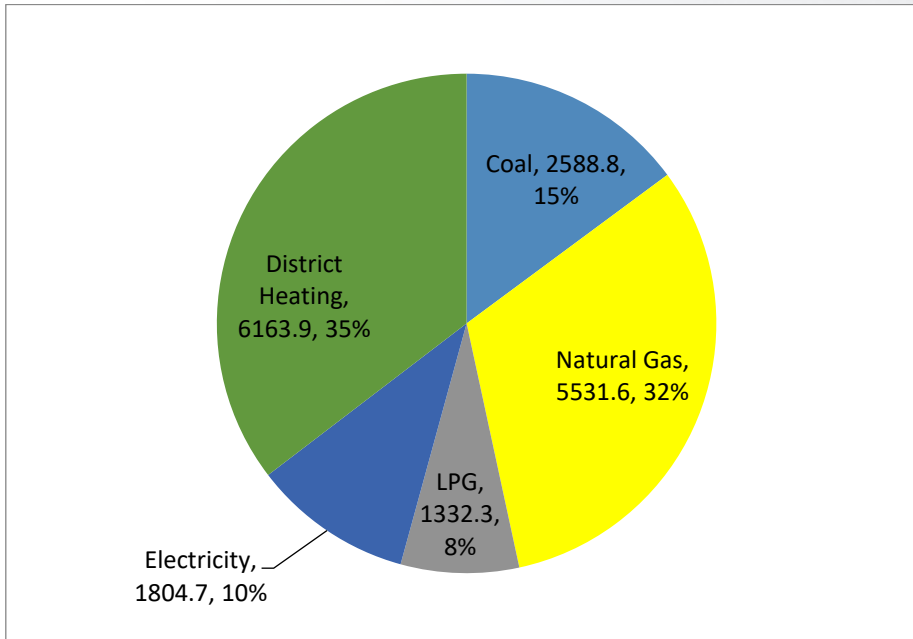
The fuel used for a residential building<sup>13</sup> in urban area is driven by heat consumption from District Heating (DH) System – 35 per cent of total consumption; followed by natural gas – 32 per cent; coal consumption is equivalent to 15 per cent ; and electricity to 10 per cent.

A residential building in rural area has a consumption of 47 per cent of natural gas; followed by 22 per cent of pellets; and 13 per cent coal; 9 per cent electricity and 8 per cent liquified natura gas LNG. Figures 5 and 6 below show energy breakdown.



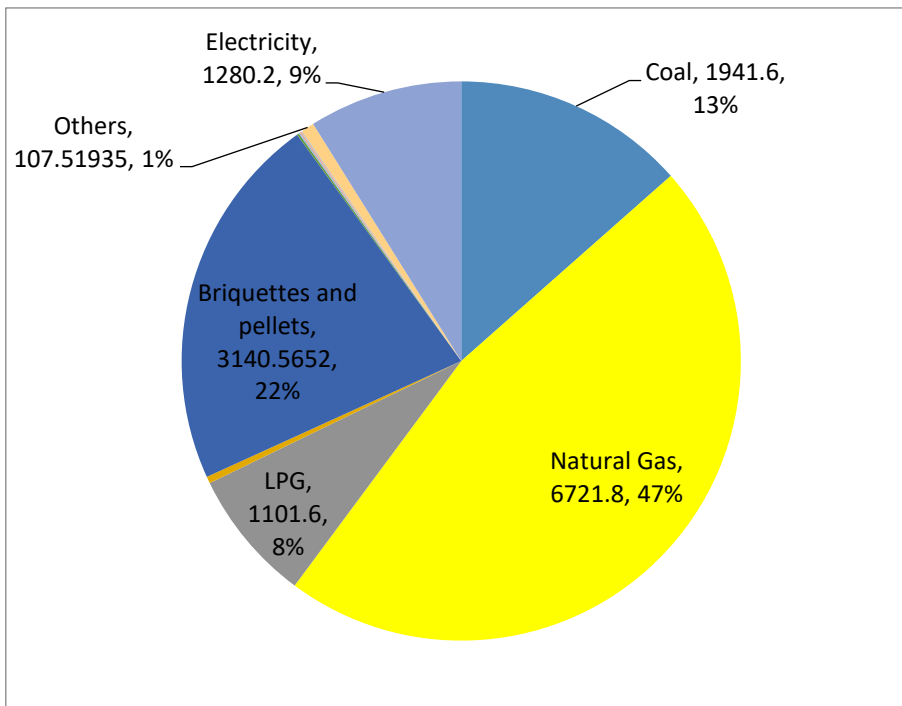


Figure 5. Average energy consumption by a urban houhehold, 2016, kWh



Source: compilation by author based on the Study of energy consumption of households of the National Bureau of Statistics of Moldova

Figure 6. Average energy consumption by a rural houhehold, 2016, kWh.



Source: compilation by author based on the Study of energy consumption of households of the National Bureau of Statistics of Moldova



There are eight district heating companies in the Republic of Moldova, two are in Chisinau municipality, two in Balti municipality, and four small systems in the rest of the country. The small systems are gas fired and located and used in: Ungheni, Comrat, Glodeni, and supply energy to the consumers of the mentioned cities. The Table3 below shows the heat energy delivered. For comparison, in 2010, 10 small district heating systems operated in the Republic of Moldova. The largest producer and supplier of thermal energy in the Republic of Moldova is "Termoelectrica" SA from Chisinau municipality. "Termoelectrica" provides 7151 buildings with thermal energy, out of which 564 are budget institutions, 1679 economic companies, 303 private homes and 207064 apartments located in 4560 multiapartment buildings in Chisinau municipality. The second major supplier of thermal energy is S.A. "CET North" in Bălți city, with a share of over 10 per cent of the district heating in national energy balance, and providing heat energy to the city of Balti.

The public sector, by implementing EE projects, can lead by example while helping to catalyze markets for EE goods and services. Common ownership and public financing facilitates potential bundling of smaller projects, thus lowering purchasing and implementation costs and implementing at a larger scale. And, a scaled-up public sector program can create jobs, fostering a sustainable local ESCO industry—as shown in other countries such as Canada, Germany, Japan, the Republic of Korea and the United States (World Bank). Therefore, a national-scale program to renovate all buildings in Moldova could be developed with the Government and International Financing Institutions IFI partners to realize such benefits.

*Table 3. District heating energy supply to consumers in Moldova in 2019.*

	District Heating supply to consumers, thou. Gcal.	Share of total consumption, %
SA Termoelectrica	1228,11	87,1
SA CET-Nord	137,61	9,8
SA Apa-Canal Chisinau	20,82	1,5
Termogas Balti	9,47	0,7
Comgaz Plus	5,15	0,4
RCT Comrat	6,59	0,5
Thermohouse	0	0
Servicii Comunale Glodeni	1,78	0,1
<b>TOTAL</b>	<b>1409,5</b>	<b>100</b>

Source: compilation by the author based on ANRE Report 2019. [www.anre.md](http://www.anre.md)

*Table 4. District heating supply by consumers, thou. Gcal.*

Consumer	2014	2015	2016	2017	2018	2019
Households	1091.6	1171.6	1225.71	1152.14	1223.6	1082.7
Budgetary Institutions	215.64	216.5	226.55	207.13	226.7	200.2
Economic Entities	117.05	125.2	140.06	127.87	142.5	126.6
<b>TOTAL SUPPLY</b>	<b>1424.3</b>	<b>1513.3</b>	<b>1592.3</b>	<b>1487.1</b>	<b>1592.8</b>	<b>1409.5</b>

Source: compilation by the author based on ANRE Report 2019. [www.anre.md](http://www.anre.md)



### 3 Gap Analysis

SWOT analysis presented below summarises gaps between the performance objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings and implementation of current building energy efficiency standards in the Republic of Moldova. The barriers to adopting and implementing high-performance standards in housing are presented with a focus on financing energy efficiency measures in and maintenance of multiapartment housing. Various types of gaps (knowledge, technical, regulatory, institutional, and financial) are identified.

Table 5. SWOT Analysis:

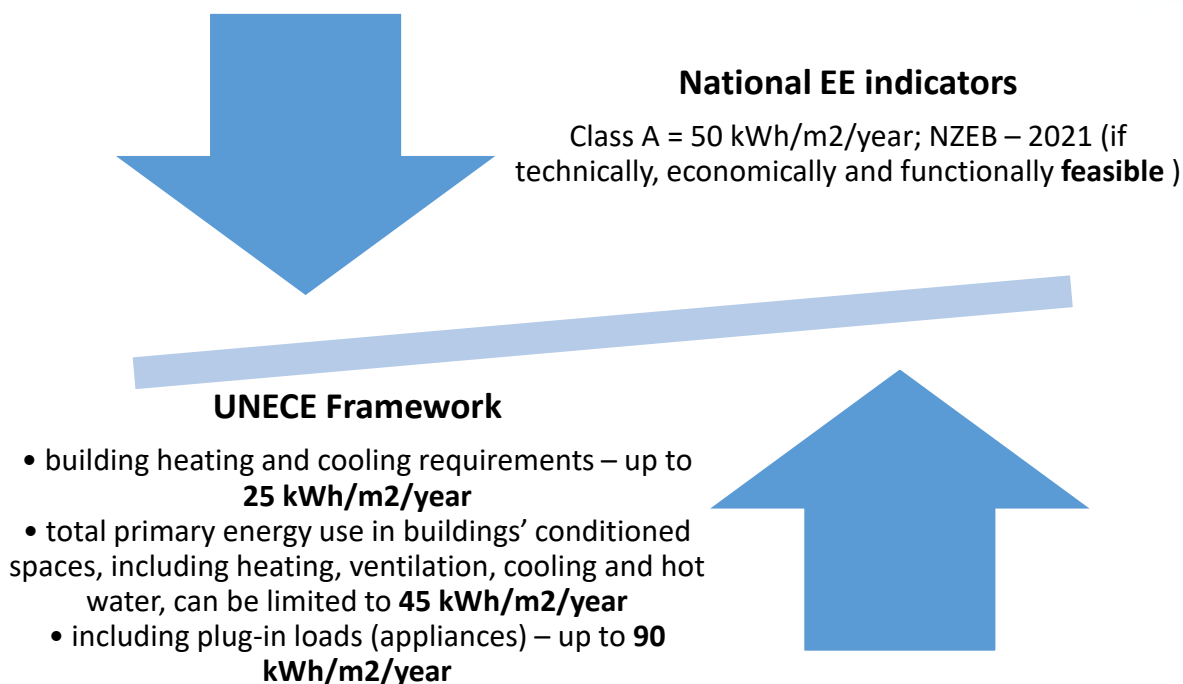
<b>Strength:</b>	<b>Weakness:</b>
<ul style="list-style-type: none"> <li>• Developed framework legislation, including laws on energy efficiency, NEEAPs</li> <li>• Adoption of building energy codes</li> <li>• Law on energy performance in buildings</li> <li>• Energy labelling requirements</li> <li>• Incentives programmes, EE fund</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of ESCOs</li> <li>• Residential sector is the largest energy consumer</li> <li>• Heat supply system technology is in a transition phase</li> <li>• High energy consumption of existing building stock (esp. constructed during the Soviet time)</li> </ul>
<b>Opportunity:</b>	<b>Threat:</b>
<ul style="list-style-type: none"> <li>• Major access to district heating system where consumption can be easier reduced (up to 50 per cent )</li> <li>• Adopted standards and labels for appliances</li> <li>• Requirements for regular inspection of heating systems</li> <li>• Dedicated energy efficiency agency</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of mandatory energy performance monitoring requirements</li> <li>• Absence of penalties for non-compliance with building energy codes</li> <li>• Lack of local knowledge and technical readiness for implementation of new technologies</li> <li>• Lack of affordable financial instruments</li> </ul>



### 3.1 Gap analysis between performance objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings and the requirements of existing energy efficiency standards in buildings

The requirements of existing energy efficiency standards in buildings in the Republic of Moldova are aligned to EU norms. The objectives set forth in the Framework Guidelines are higher. However, the cost for implementation of energy efficiency measures according to the Framework Guidelines is very high, and cost-based measures limit the possibilities of substantial reduction of energy consumption in buildings. No monitoring system is implemented in Moldova for energy performance of the buildings.

Figure 7. National energy efficiency indicators and objectives of the Framework Guidelines



### 3.2 Gap analysis between the requirements of existing energy efficiency standards in buildings and their actual implementation

Based on the analysis of existing energy efficiency standards (see Chapter 1.1) and their actual implementation in the Republic of Moldova (see Chapter 2.3) it is possible to conclude that some gaps exist due to the knowledge, technical, regulatory, institutional, and financial limitations, namely:

- (i) *technical and regulatory gaps*, such as financial and borrowing limitations, restrictive budgeting procedures, public procurement rules, low energy tariffs and implementation monitoring of building and construction codes and regulations;



- (ii) *underdeveloped market conditions*, including limited demand for EE goods and services, high project development costs, limited experience and capabilities of EE service providers and a lack of commercial financing;
- (iii) *institutional constraints*, such as limited incentives of EEA to invest in EE, limited awareness of and knowledge about EE opportunities, lack of credible data, low service levels, lack of implementation capacity;
- (iv) *lack of accessible commercial financing*, including unattractive financing terms, overcollateralization (when the bank requests for placing an asset as collateral on a loan where the value of the asset exceeds the value of the loan), high transaction costs, and informational and behavioral biases among financiers.

### **3.3 Barriers to adopting and implementing the high-performance standards in buildings**

Investments for the high-performance energy efficiency measures in buildings is not implemented in the Republic of Moldova due to several barriers namely:

- Limited government financing for EE investments, and immature EE market which does not have clear guidelines on the treatment of innovative, ESCO-like contracts in the public sector, high project development costs, limited experience and capabilities of EE service providers and a lack of commercial financing;
- Renovations in about 25 per cent of the building stock that need to include capital repairs and basic reconstruction which makes the renovations costly. Moreover, most of the buildings are under-heated. They use 30-40 per cent less energy than required to ensure minimal thermal comfort and improving the basic comfort level increases the payback period of the investments,
- Poor financing environment due to high interest rates, and short repayment periods, and
- Split incentives in which the occupants of buildings are not responsible for paying the energy costs.



## 4 Conclusions and Recommendations

### Conclusions

Conclusions are based on the gap analysis, focusing on priority actions the country can take to bridge the gap and enhance national capacity to develop and implement energy efficiency standards for buildings. The main conclusions are:

#### Legal framework:

- NDC2 is not in line with EE targets;
- Secondary legislation is not updated to new decarbonization commitment;
- Mandatory energy performance monitoring requirements are absent,
- Energy Certificate of the building is not integrated in business model on the market.

#### Capacity development:

- Specific incentives for improving compliance with more ambitious building energy codes are absent;
- Low awareness on the benefits of energy efficiency at the individual level can preclude or limit the introduction of energy efficiency measures both at individual and community level;

#### Technology:

- Low readiness at national level to implement advanced clean technologies.;
- Life-cycle cost is not used to assess the new technologies.

#### Investments and financial incentives:

- ESCO market is underdeveloped due to missing financial instruments;
- Low energy prices (due to subsidy) also make the payback periods for energy efficiency improvements too long to be considered attractive by banks, other financial institutions and population.

### Recommendations

Recommendations include aspects surrounding policy and legislation, investments and financial incentives, technology, and capacity development. The Recommendations are intended for the attention and implementation by the Agency for Energy Efficiency and the Ministry of Economy and Infrastructure, the Ministry of Agriculture, Regional Development and Environment (which also have some responsibilities related to building sector). After the government restructuring in 2017, the Ministry of Economy and Infrastructure took over some of the functions of the Ministry of Regional Development and Constructions.

The main recommendations are:

- Energy efficiency targets (including on building's) need to be updated according to NDC2 climate targets (by the Ministry of Economy and Infrastructure);
- Renewable energy consideration should be mandatory for building design and certification (to be addressed by the Ministry of Economy and Infrastructure, Ministry of Agriculture, Regional Development and Environment );



- Certification of existing residential and non-residential buildings should be implemented in market model (by the Ministry of Economy and Infrastructure, Ministry of Agriculture, Regional Development and Environment );
- The minimum energy performance standards should be more ambitious for both new and existing buildings (to be set up by Ministry of Economy and Infrastructure);
- The initial incentive for purchase of energy saving technologies should be introduced (by Ministry of Economy and Infrastructure, Agency for Energy Efficiency);
- Digital tools should to be considered to enhance flexibility and clean energy deployment;
- Financial incentives should be introduced to encourage investment in the long-lasting high efficiency improvements, including ESCO contracting (by Ministry of Economy and Infrastructure, Agency for Energy Efficiency);
- The stakeholders in the building sector should be educated on the importance of building energy codes in order to increase support for compliance and effective implementation of the energy efficiency policy (by Ministry of Economy and Infrastructure, Agency for Energy Efficiency, Ministry of Agriculture, Regional Development and Environment, home owners associations, suppliers of building products, research institutions, NGO).

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10. United Nations Development Programme in Moldova. [www.undp.md](http://www.undp.md)



## Annex: Technical Norms

- NCM A.07.02-2012 Rev. development, endorsement, approval and content framework of project documentation for construction. Main requirements and provisions
- NCM E.04.01-2006, Thermal protection of buildings
- NCM E.04.03-2008, Energy Conservation in Buildings
- NCM M.01.02: 2016 Energy performance of buildings. Methodology for calculating the energy performance of buildings
- SM SR EN 1154: 2010, Hardware for buildings. Devices for door closure. Requirements and test methods
- SM EN 1434 (standard per part), Thermal energy meters
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