



## GAP ANALYSIS

between the performance objectives set forth in the Framework Guidelines for Energy Efficiency Standards in Buildings and current energy efficiency standards and their implementation

in the countries of South-Eastern and Eastern Europe, the Caucasus, Central Asia, and in the Russian Federation

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# Scope of the study

## ENERGY



- One of the activities of project “Enhancing National Capacities to Develop and Implement Energy Efficiency Standards for Buildings in the UNECE Region”
- Builds on studies “Mapping of Existing Energy Efficiency Standards and Technologies in Buildings in the UNECE Region” (2018) and “Mapping of Existing Technologies to Enhance Energy Efficiency in Buildings in the UNECE Region” (2019)
- Addresses situation in 17 countries: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia (**South-Eastern Europe**); Belarus, Republic of Moldova, Ukraine (**Eastern Europe**); Armenia, Azerbaijan, Georgia (**the Caucasus**); Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan (**Central Asia**); and the **Russian Federation**.



This study:

- ✓ looks at the implementation of energy efficiency standards in the countries;
- ✓ analyses whether the actual situation corresponds to the objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings;
- ✓ highlights gaps between the existing requirements for energy efficiency standards in buildings and enforcement of those standards;
- ✓ identifies barriers to adopting and implementing the high-performance standards in buildings in the countries.



### Country profiles for each country:

**Part I:** Policies addressing EE in buildings: (i) framework legislation; (ii) building energy codes; (iii) compliance mechanism; (iv) energy performance certification; (v) energy pricing measures; (vi) financial incentives; (vii) promotion of ESCO; (viii) awareness programmes; (ix) institutions.

**Part II:** Energy performance of new constructions (residential and non-residential), including (i) design envelope; (ii) heating; (iii) ventilation; (iv) cooling; (v) water heating; (vi) appliances and equipment; (vii) lighting.

**Part III:** Energy performance of existing buildings (residential and non-residential), including (i) design envelope; (ii) heating; (iii) ventilation; (iv) cooling; (v) water heating; (vi) appliances and equipment; (vii) lighting.

Information and data collected for this study is based on desktop research of internet and printed sources: the official governmental documents and legal acts, published reports and analytical materials, academic literature, energy databases and news portals.

## Framework Legislation and Policy Documents

### ENERGY



OVERALL	South-Eastern Europe	Eastern Europe and the Russian Federation	The Caucasus	Central Asia
<p>Framework legislation is developed in the majority of countries. It includes energy efficiency and energy saving laws. Relevant secondary legislation, energy development strategies and specific energy efficiency programmes were also considered.</p>	<p>The countries incorporated the EE related EU directives into the legal frameworks. While the EE framework legislation is well developed, the by-laws are less developed.</p>	<p>EE legislation, related by-laws, norms and standards are quite well developed</p>	<p>The countries developed a comprehensive legislation on energy efficiency, with some (but not all) laws being recently updated.</p>	<p>Framework legislation for EE exists in the region. Armenia and Georgia adopted laws on EE, whereas in Azerbaijan a draft law is under consideration. NEEAPs have been developed in Armenia and Georgia.</p>
			<p>Framework legislation for EE exists in the region. Armenia and Georgia adopted laws on EE, whereas in Azerbaijan a draft law is under consideration. NEEAPs have been developed in Armenia and Georgia.</p>	<p>Most of the countries adopted EE legislation in the late 1990s and recently updated some laws and secondary legislation. However, in Tajikistan, there is no specific legislation and standards.</p>

# FINDINGS: Building Energy Codes

## ENERGY



**Building energy codes** have been adopted in most countries:

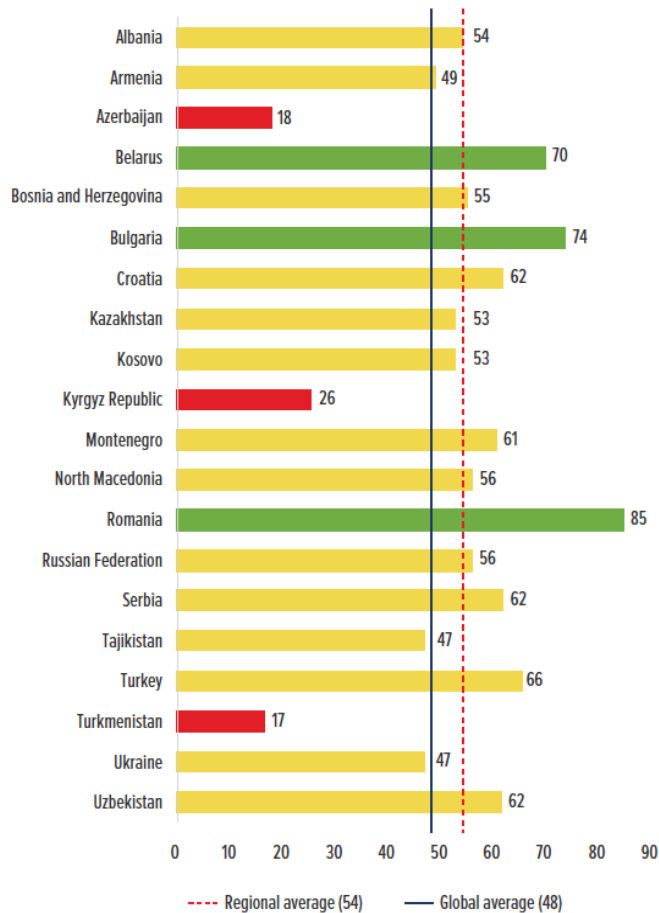
- The countries of South-Eastern Europe transposed the EU directive on Energy Performance of Buildings, adopted energy performance laws and introduced regulations on minimum performance requirements of buildings.
- The countries in Eastern Europe and the Russian Federation have adopted the building codes for different types of buildings.
- In the Caucasus region, Armenia introduced a mandatory building energy code. The reporting requirements for building envelopes are specified in Azerbaijan. In Georgia, there are no mandatory EE standards in the building codes.
- In the Central Asian countries, the building energy codes are adopted, but not recently updated in some countries.

# FINDINGS:

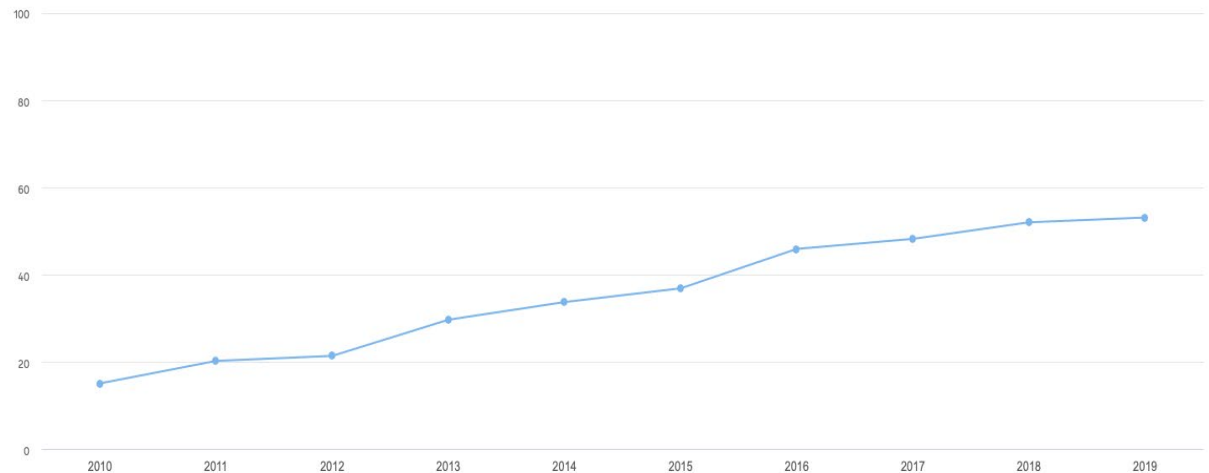
## Progress in energy efficiency in countries (2010-2019)



### ENERGY



The countries made progress on building energy codes, including on sub-indicators as new residential and commercial buildings, compliance system, renovated buildings, building energy information, and building energy efficiency incentives



Source: World Bank, RISE 2020

Source: World Bank, RISE 2020

## SWOT Analysis for Countries of South-Eastern Europe



### ENERGY

<p><b>Strength:</b></p> <ul style="list-style-type: none"> <li>• Well-developed framework legislation, including EE laws, energy development strategies, NEEAPs</li> <li>• Mandatory building energy codes for new and existing buildings</li> <li>• Mandatory EPC of residential and non-residential buildings, in Albania only for non-residential buildings</li> <li>• Relevant legislation on ESCOs</li> <li>• Existence of energy efficiency funds</li> <li>• Requirements for modern insulation and glazing for new constructions</li> </ul>	<p><b>Weakness:</b></p> <ul style="list-style-type: none"> <li>• Residential sector is the largest (in Bosnia and Herzegovina, Montenegro, Serbia) and the 2<sup>nd</sup> largest energy consumer (Albania and North Macedonia)</li> <li>• High energy consumption for heating and cooling</li> <li>• High energy consumption in existing building stock</li> <li>• Absence of central registry for energy passports, or even where exists - still not mandatory</li> <li>• Lack of ESCO activities, except in Serbia</li> </ul>
<p><b>Opportunity:</b></p> <ul style="list-style-type: none"> <li>• Active operations by the dedicated energy agencies in Albania, North Macedonia, Montenegro and Serbia</li> <li>• Further development of measurement and verification systems, use of IPMVP</li> <li>• Introduction of mandatory regular inspections in Albania and in Bosnia and Herzegovina</li> <li>• Introduction of additional financial methods for guaranteeing EE project development</li> <li>• Further development of minimum standards for HVAC</li> <li>• Introduction of compliance programmes</li> </ul>	<p><b>Threat:</b></p> <ul style="list-style-type: none"> <li>• Absence of mandatory energy performance monitoring requirements</li> <li>• Low and cross-subsidized energy prices</li> <li>• Absence of enforcement on mandatory labelling of appliances</li> <li>• Lack of specific incentives for building energy codes enforcement, except for Bosnia and Herzegovina and Montenegro</li> <li>• Lack of commercial financing for energy efficiency projects in buildings</li> </ul>



# FINDINGS: SWOT Analysis

## for Countries of Eastern Europe and the Russian Federation



### ENERGY

<p><b>Strength:</b></p> <ul style="list-style-type: none"> <li>• Developed framework legislation, including laws on energy saving and EE, NEEAPs (for Moldova and Ukraine), state program on EE (for Russian Federation)</li> <li>• Adoption of building energy codes</li> <li>• Laws on energy performance in buildings</li> <li>• Energy labelling requirements</li> <li>• Incentives programmes, including subsidies/grants/soft lending (in Belarus), EE fund (in Moldova); “Warm Loans” programme (in Ukraine), fund for housing and public utilities (in the Russian Federation)</li> </ul>	<p><b>Weakness:</b></p> <ul style="list-style-type: none"> <li>• Absence of EPC in Belarus</li> <li>• Absence of ESCOs in Belarus and Moldova</li> <li>• Residential sector is the largest energy consumer in Belarus, Moldova, and the Russian Federation; and the 2<sup>nd</sup> largest sector in Ukraine</li> <li>• Heat supply system technology is in a transition phase</li> <li>• Increased energy consumption for cooling and ventilation</li> <li>• High energy consumption of existing building stock (esp. constructed during the Soviet time)</li> </ul>
<p><b>Opportunity:</b></p> <ul style="list-style-type: none"> <li>• Increased energy prices in Ukraine providing incentives for higher energy savings</li> <li>• Reductions in energy intensity since 2000</li> <li>• Major access to district heating system where consumption can be easier reduced (up to 45 per cent of energy savings)</li> <li>• Adopted standards and labels for appliances leading to increased EE equipment in households</li> <li>• Requirements for regular inspection of heating systems</li> <li>• Dedicated energy agencies in Moldova, the Russian Federation and Ukraine</li> </ul>	<p><b>Threat:</b></p> <ul style="list-style-type: none"> <li>• Absence of mandatory energy performance monitoring requirements in Belarus, Moldova, and Ukraine</li> <li>• Absence of penalties for non-compliance with building energy codes</li> </ul>

## SWOT Analysis for the Caucasus Countries

### ENERGY



<p><b>Strength:</b></p> <ul style="list-style-type: none"> <li>• Transposition of EE standards in accordance with the EU requirements (in Armenia and Georgia)</li> <li>• Developed legislation, including EE laws, NEAAPs in Armenia and Georgia; Energy Strategy (in Georgia); National Energy Security Concept (in Armenia)</li> <li>• Law on Energy Labelling (in Georgia)</li> <li>• Mandatory building energy codes and requirement for building energy passport (in Armenia)</li> <li>• Mandatory EPC (in Georgia)</li> <li>• Tax exemption on EE equipment (in Azerbaijan and Georgia)</li> <li>• Numerous awareness programmes on energy efficiency</li> </ul>	<p><b>Weakness:</b></p> <ul style="list-style-type: none"> <li>• Primary and secondary EE legislation is not developed (in Azerbaijan)</li> <li>• Absence of mandatory EE standards in building codes (in Georgia)</li> <li>• Absence of financial incentives (in Armenia)</li> <li>• Absence of specific incentives for improving compliance (in Azerbaijan)</li> <li>• Absence of functional ESCO market</li> <li>• Buildings is the largest energy consuming sector in Armenia and Azerbaijan and the 2<sup>nd</sup> largest in Georgia</li> <li>• Lack of energy performance regulations for new constructions (in Georgia)</li> </ul>
<p><b>Opportunity:</b></p> <ul style="list-style-type: none"> <li>• Draft law on energy efficiency in Azerbaijan</li> <li>• New law on energy efficiency in buildings in Georgia</li> <li>• Mandatory state certification of energy-intensive equipment (in Azerbaijan)</li> <li>• Increased energy tariffs in Armenia</li> <li>• Variable tariffs to promote rational use of electricity in Georgia</li> <li>• Efficient lighting for increasing potential for significant energy tariffs reduction in Georgia</li> </ul>	<p><b>Threat:</b></p> <ul style="list-style-type: none"> <li>• Absence of energy agency in Armenia, Azerbaijan and Georgia</li> <li>• Absence of minimum energy performance requirements for buildings (in Azerbaijan)</li> <li>• Absence of energy performance monitoring requirements (in Armenia)</li> <li>• Absence of requirement for regular inspection (in Azerbaijan)</li> <li>• Absence of penalties for non-compliance with building energy codes (in Armenia and Azerbaijan)</li> <li>• Unchanged electricity tariffs (in Azerbaijan)</li> <li>• Abandoning of district heating system (in Georgia and Armenia)</li> </ul>

## SWOT Analysis for the Central Asian Countries

### ENERGY



<p><b>Strength:</b></p> <ul style="list-style-type: none"> <li>• Laws on energy saving and energy efficiency, except in Turkmenistan</li> <li>• Law on EE in Buildings in Kyrgyzstan</li> <li>• State programme on Energy Saving in Kazakhstan; National Sustainable Development Strategy in Kyrgyzstan; Strategy for Transition to a Green Economy in Uzbekistan</li> <li>• Adoption of building energy codes</li> <li>• Minimum energy performance requirements for buildings in Kyrgyzstan and Uzbekistan</li> <li>• Mandatory norms for thermal efficiency of buildings in Kazakhstan</li> <li>• Financial incentives for EE improvements in buildings: subsidies for building retrofits, building-level meter installation, taxation, policies, soft loans, pricing policies</li> <li>• Mandatory demand for energy marking and EE class of appliances in Uzbekistan</li> </ul>	<p><b>Weakness:</b></p> <ul style="list-style-type: none"> <li>• Absence of EE law in Turkmenistan</li> <li>• No ESCO market in Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan</li> <li>• Absence of energy performance contracts in Kazakhstan</li> <li>• Residential sector is the largest energy consumer in Kyrgyzstan, Tajikistan and Uzbekistan; the 2<sup>nd</sup> largest – in Kazakhstan</li> <li>• Absence of requirement for regular inspection for heating and AC system in Kazakhstan</li> <li>• Absence of incentives for improving compliance with building energy codes in Kazakhstan and Turkmenistan</li> <li>• Absence of penalties for non-compliance with EE standards in buildings in Kazakhstan and Uzbekistan</li> </ul>
<p><b>Opportunity:</b></p> <ul style="list-style-type: none"> <li>• Draft Energy Strategy for 2030 in Turkmenistan</li> <li>• Introduction of energy service contract envisaged by Kazakhstan 2050 Strategy</li> <li>• Requirement for regular inspection for heating and AC systems in Turkmenistan and Uzbekistan; periodic monitoring of heating and hot water supply systems in Kyrgyzstan</li> </ul>	<p><b>Threat:</b></p> <ul style="list-style-type: none"> <li>• Low electricity prices</li> <li>• Consumption of district heating is the highest among buildings energy services in Kazakhstan</li> <li>• Unstable electricity supply in winters in Tajikistan</li> <li>• Absence of data on energy performance monitoring, requirement for regular inspection for heating and AC systems Turkmenistan</li> <li>• Absence of dedicated energy agencies</li> </ul>

## Common elements based on sub-regional SWOT analysis

### ENERGY



<p><b>Common strengths:</b></p> <ul style="list-style-type: none"> <li>• The project countries have quite well-developed framework legislation, including energy efficiency laws, energy development strategies and energy efficiency programs, NEEAPs (except in the Central Asian countries).</li> <li>• Building energy codes were adopted, where in many countries they are mandatory.</li> <li>• Some countries have adopted laws on energy performance in buildings and energy efficiency in buildings.</li> <li>• Energy labelling requirements are present in most of the countries.</li> <li>• Financial incentives, such as subsidies, soft loans, tax exemption or reductions are present in most of the countries.</li> </ul>	<p><b>Common weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Out of 17 project countries, the residential sector is the largest energy consumer in eleven countries and the second largest in six countries.</li> <li>• High energy consumption in the existing building stock is a problem in all project countries.</li> <li>• Energy consumption has recently increased for heating and cooling in many countries.</li> <li>• Lack of ESCO activities in some countries, or absence of ESCO market in the other project countries; absence of EPC in many project countries too.</li> <li>• Azerbaijan and Turkmenistan have not adopted energy efficiency legislation.</li> <li>• Specific incentives for improving compliance with building energy codes are absent in some countries.</li> </ul>
<p><b>Common opportunities:</b></p> <ul style="list-style-type: none"> <li>• Operations by the energy agencies to monitor and implement energy efficiency measures and activities are existing in seven countries (out of 17). The agencies are established in South-Eastern Europe, Eastern Europe and in the Russian Federation. In the Caucasus and Central Asian regions, the energy agencies are not established.</li> <li>• Mandatory regular inspections for heating and AC systems have been introduced in most of the project countries.</li> <li>• The energy tariffs have been increased in Armenia, Ukraine and Uzbekistan.</li> <li>• Development on energy efficiency related legislation is on the way in Azerbaijan (draft law on energy efficiency in Azerbaijan), Georgia (new laws on energy efficiency in buildings, on energy efficiency and on energy labeling) and Turkmenistan (draft Energy Strategy for 2030)</li> </ul>	<p><b>Common threats:</b></p> <ul style="list-style-type: none"> <li>• Low energy prices in many countries lead to absence of driving force for energy efficiency improvement in buildings.</li> <li>• Mandatory energy performance monitoring requirements are absent in many project countries.</li> <li>• Penalties for non-compliance with building energy codes are also absent in many project countries.</li> <li>• Energy agencies are not established in Bosnia and Herzegovina, Montenegro, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.</li> </ul>

# FINDINGS: Conformity of Energy Efficiency Standards with the Framework Guidelines

## ENERGY



### Strategic guidance:

- ✓ Framework legislation for EE in buildings was recently updated in many countries.
- ✓ The building energy codes are not recently adopted and thus cannot reflect the recent requirements and technological advances.
- ✓ Some countries, such as Armenia and Georgia, have recently adopted regulatory documents that would allow including the most recent low consumption and performance-based standards in buildings.
- ✓ For the other countries, shifting to higher performance standards for new and existing buildings is required to ensure the contribution to the transition to sustainability in these countries.

# FINDINGS: Conformity of Energy Efficiency Standards with the Framework Guidelines

## ENERGY



Country	Thermal characteristics and geometry of the building (envelope and internal partitions)	Air-tightness	Space heating system and hot water supply units	Air-conditioning system(s)	Mechanical and natural ventilation	Built-in lighting system (mainly in the non-residential sector)	Design position and orientation of buildings	Passive solar systems and solar protection	Indoor and outdoor climatic conditions	Thermal bridge
<b>South-Eastern Europe</b>										
Albania	X	X	X	X	X	X	X	X	X	X
Bosnia and Herzegovina	X	X	X	X	X	X	X	-	X	X
Montenegro	X	X	X	X	X	-	X	X	X	X
North Macedonia	X	X	X	X	X	-	X	X	X	X
Serbia	X	X	X	X	X	-	X	-	-	X
<b>Eastern Europe and the Russian Federation</b>										
Belarus	X	X	X	X	X	X	X	X	X	X
Republic of Moldova	X	X	X	X	X	X	X	X	X	X
Ukraine	X	X	X	X	X	X	X	X	X	X
Russian Federation	X	X	X	X	X	X	X	-	X	X
<b>The Caucasus</b>										
Armenia	X	X	X	X	X	X	X	X	X	X
Azerbaijan	X	X	X	X	X	X	X	X	X	X
Georgia	-	-	-	-	-	-	-	-	-	-
<b>Central Asia</b>										
Kazakhstan	X	X	X	-	-	-	X	-	X	X
Kyrgyzstan	X	-	X	X	X	-	-	X	-	-
Tajikistan	No data									
Turkmenistan	X	-	X	X	-	-	X	-	X	X
Uzbekistan	X	X	X	X	X	-	-	X	X	X

Overview of existing **performance-based requirements** in building energy codes:

- Technical requirements are mostly observed in the countries of South-Eastern Europe, Eastern Europe and in the Russian Federation.
- They are less present in the Central Asian countries.
- Such requirements are not present in Georgia.

# FINDINGS: Conformity of Energy Efficiency Standards with the Framework Guidelines

## ENERGY



Country	Use of IPMVP	Use of Energy Performance in Buildings standards	Use of software used for compliance verification	Assessment of post-construction requirement of the thermal bridge	Air-tightness testing	Use of individual energy metering and control units
<b>South Eastern Europe</b>						
Albania	-	-	-	-	-	-
Bosnia and Herzegovina	X	X	-	-	-	-
Montenegro	-	-	X	-	-	-
North Macedonia	-	-	-	-	-	-
Serbia	-	-	-	-	-	-
<b>Eastern Europe and the Russian Federation</b>						
Belarus	-	-	-	-	-	-
Republic of Moldova	-	-	-	-	-	-
Ukraine	-	X	-	X	-	-
Russian Federation	X	-	X	X	-	-
<b>The Caucasus</b>						
Armenia	-	-	-	-	-	-
Azerbaijan	X	X	-	-	-	-
Georgia	-	X	-	-	-	-
<b>Central Asia</b>						
Kazakhstan	-	-	-	-	-	-
Kyrgyzstan	-	-	-	-	-	-
Tajikistan	No data					
Turkmenistan	-	-	-	-	-	-
Uzbekistan	-	X	X	-	-	-

Overview of requirements to identify the energy performance gap in the countries:

- Requirements for assessment of post-construction requirement of the thermal bridge and air-tightness testing are almost not present in the countries.
- IPMVP is used only in Bosnia and Herzegovina, Russian Federation, and Azerbaijan.
- EPB standards are used in Bosnia and Herzegovina, Azerbaijan, Georgia, Ukraine and Uzbekistan.
- The software for compliance verification is applied in Montenegro, Russian Federation, and Uzbekistan.

# FINDINGS: Conformity of Energy Efficiency Standards with the Framework Guidelines

## ENERGY



### The Framework Guidelines for Energy Efficiency Standards in Buildings:

- Building heating and cooling requirements to 15 kWh/m<sup>2</sup>a in new builds and to 25 kWh/m<sup>2</sup>a for retrofit projects (final energy in conditioned space)...
- Total primary energy use in buildings' conditioned spaces, including heating, ventilation, cooling and hot water, can be limited to 45 kWh/m<sup>2</sup>a or, including plug-in loads (appliances), to 90 kWh/m<sup>2</sup>a.

Country	Building energy codes requirements
<b>South-Eastern Europe</b>	
Albania	Performance based requirements: - for new buildings up to 55 kWh/m <sup>2</sup> a; - for existing buildings up to 80 kWh/m <sup>2</sup> a
Bosnia and Herzegovina	No data
Montenegro	<ul style="list-style-type: none"> <li>• Performance-based requirements for buildings do not exist.</li> <li>• Total primary energy use</li> </ul>
North Macedonia	<ul style="list-style-type: none"> <li>• The national classification of buildings for the needs of energy audits includes: residential sector min "C class" 100 kWh/m<sup>2</sup> annual consumption, public sector min "C class" 150 kWh/m<sup>2</sup> annual consumption. Mandatory for public sector min "D class" after substantial refurbishment</li> </ul>
Serbia	<ul style="list-style-type: none"> <li>• The energy class of the new building shall not be lower than class "C" or higher. The class of energy consumption of existing buildings should be upgraded to at least one class after reconstruction.</li> </ul>
<b>Eastern Europe and the Russian Federation</b>	
Belarus	Technical Code on Thermal protection of buildings defines norms for annual consumption of heat for different types of buildings: (i) residential buildings and hotels: 48-96 kWh/m <sup>2</sup> a; (ii) individual residential houses: 108 kWh/m <sup>2</sup> a; (iii) kindergardens: 38 kWh/m <sup>2</sup> a; (iv) schools: 37 kWh/m <sup>2</sup> a; (v) clinics and hospitals: 35 kWh/m <sup>2</sup> a; (vi) public buildings: 36 kWh/m <sup>2</sup> a.
Republic of Moldova	Energy efficient development systems Details/values of the performance-based requirements: After year 2021, all new buildings must be Nearly Zero Energy Buildings Class A = 50 kWh/m <sup>2</sup> a; B=99 kWh/m <sup>2</sup> a
Russian Federation	No data
Ukraine	No data
<b>The Caucasus</b>	
Armenia	Performance-based requirements for buildings do not exist.
Azerbaijan	Performance-based requirements for buildings do not exist.
Georgia	Performance-based requirements for buildings do not exist.
<b>Central Asia</b>	
Kazakhstan	Performance-based requirements for buildings do not exist.
Kyrgyzstan	No data
Tajikistan	No data
Turkmenistan	<ul style="list-style-type: none"> <li>• The primary indicator for estimating the energy consumption of buildings is the primary energy consumption for heating, cooling and ventilation.</li> <li>• Total primary energy use.</li> </ul>
Uzbekistan	<ul style="list-style-type: none"> <li>• Total primary energy use.</li> </ul>



# FINDINGS: Conformity of Energy Efficiency Standards with the Framework Guidelines



## ENERGY

Framework Guidelines	New buildings	Existing buildings
<ul style="list-style-type: none"> <li>➤ The “total primary energy use in buildings’ conditioned spaces, including heating, ventilation, cooling and hot water, can be limited to <u>45 kWh/m2a</u> or, including plug-in loads (appliances), to <u>90 kWh/m2a</u>.”</li> <li>➤ “Limiting building heating and cooling requirements to <u>15 kWh/m2a</u> in new builds and to <u>25 kWh/m2a</u> for retrofit projects (final energy in conditioned space) each reduces energy needs sufficiently...”</li> </ul>	<p>Construction of the new buildings can lead to energy efficient improvements and staying within the limits indicated in the Framework Guidelines is possible. That will, however, require the observation of the performance-based requirements in the buildings and ensuring the compliance with the building energy codes.</p> <p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>✓ In Belarus, in some recent residential buildings constructed in Minsk a heat demand was indicated as 39,5 kWh/m2a for the entire building, however the recalculated energy demand for the entire building was calculated with 56 kWh/m2a.</li> <li>✓ In the Russian Federation, the heating energy intensity for new multi-family high buildings was 77 kWh/m2a.</li> <li>✓ In Kyrgyzstan, the thermal requirements for multi-apartment buildings, depending on the number of storeys, ranged from 64 to 78 kWh/m2a. However, the average space heat demand for multi-family apartment buildings constructed after 2004 was 100-110 kWh/m2a.</li> </ul>	<p>The existing buildings in all countries consume high amount of energy.</p> <p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>✓ In Bosnia and Herzegovina, on average, residential buildings consumed more than 200 kWh/m2a, while private households consume as much as 350 kWh/m2a.</li> <li>✓ In Armenia, the buildings constructed in 1960s-1980s consume from 140 to 210 kWh/m2a.</li> <li>✓ In Azerbaijan, the average energy consumption of residential buildings in 2017 was 276 kWh/m2a.</li> <li>✓ In Georgia, the energy demand for heating individual houses is between 200-410 kWh/m2a.</li> <li>✓ In Kazakhstan, the consumption of heat by residential buildings is on average 273 kWh/m2a.</li> <li>✓ In Tajikistan, the requirement for heat energy of the buildings was estimated minimum as 148 kWh/m2a. For single-family houses with less efficient space-heating systems the consumption is between 220-244 kWh/m2a.</li> </ul> <p>The examples of residential building retrofits, however, show that the potential to reduce energy consumption is also very high.</p>

# FINDINGS: Existing Barriers

## ENERGY



A gap between energy efficiency policies potential and effective achievement exists mainly due to barriers affecting those energy efficiency policies and measures



Source: Institute for Building Efficiency, WR

The three main categories of barriers were identified:

- regulatory and institutional
- economic (financial and market barriers)
- behavioural (awareness, advice and skills)

# RECOMMENDATIONS: Opportunities to bridge the gap

## ENERGY



### Strategic guidance:

- The Governments should develop a comprehensive and long-term building code strategy, gradually increasing its strictness.
- The Governments should ensure the introduction of performance-based approach in the building energy codes and other energy efficiency standards.
- The building energy codes should be frequently evaluated, revised and improved in order to understand the existing strengths and eliminate weaknesses of energy efficiency policy design and implementation.
- Energy efficiency policies should be developed and adjusted to different regional contexts and institutional realities within each country.
- The Governments should set up targets for increasing the share of new high-performant buildings.
- The Governments should set up the ambitious timeline and targets for renovation of the existing buildings.
- The improved energy performance of building components and systems should be a target to improve the energy performance of all buildings.
- Sustainable high-performance construction know-how should be introduced into the curriculum of educational institutions in the countries.
- Awareness of population on energy efficiency benefits need to be raised through the implemented demonstration projects and media campaigns in the countries.

# RECOMMENDATIONS: Opportunities to bridge the gap

## ENERGY



### Design and construction:

- The Governments should aim for net-zero energy consumption in new buildings.
- Comprehensive retrofits of existing residential and non-residential buildings should be planned and undertaken to reduce energy requirements and increase energy savings in buildings.
- The minimum energy performance standards should be mandatory for both new and existing buildings in all countries.
- The high costs of energy efficiency technologies may discourage consumers to install them. The Governments should introduce tax exemption or reduction to provide the initial incentive for purchase of energy saving technologies.
- Financial incentives should be introduced to encourage investment in the long-lasting high efficiency improvements.
- 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.

# RECOMMENDATIONS: Opportunities to bridge the gap

## ENERGY



### Management:

- Energy agencies should be established in those countries where they do not exist. An energy agency is an institution playing a crucial role in recognition of energy efficiency as a priority action for the country.
- The baseline data on energy demand should be available to measure the success in implementation of energy efficiency policies.
- The energy performance certification of buildings should be applied as an obligatory measure in all countries. The energy rating for buildings should also be introduced.
- The building energy labels or certificates should be required at the sale or rental of properties.
- The efforts to develop or improve the energy service companies (ESCO) market should be undertaken in all countries.
- Energy pricing should be used as an effective tool for influencing the energy use behaviour. The removal of subsidies to energy use and diversification of pricing measures should be used to enhance the attractiveness of investments in energy efficiency.
- Strong compliance mechanisms and proper monitoring mechanisms should be established to ensure the effective building codes enforcement in the countries.
- Low interest loans for energy efficiency technologies and building constructions and retrofits should be introduced as important instrument in promoting energy efficiency.
- Carefully designed and targeted awareness-raising programmes should be developed to encourage energy efficiency improvements.



**Thank you for your attention!**

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