

Mapping of Energy Efficiency Standards in Buildings in the UNECE Region

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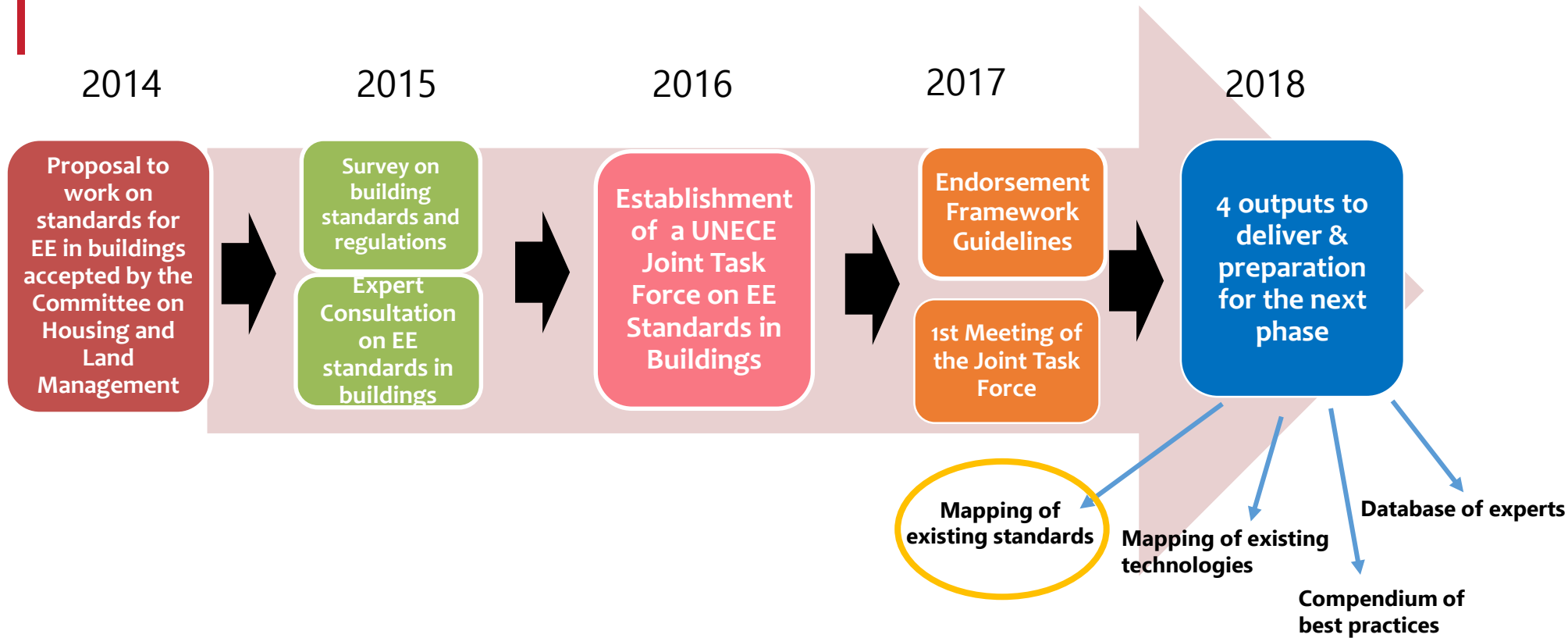
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Energy Efficiency Standards in Buildings Project & the Joint Task Force

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Cooperation: Committee on Housing and Land Management and Committee on Sustainable Energy and Working Party 6



Mapping of Energy Efficiency Standards in Buildings: objectives

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To examine the current status of the energy efficiency standards in buildings in the UNECE region

To form a basis to improve knowledge of UNECE member States of existing energy efficiency standards in buildings

To collect best practices related to existing standards

To provide a gap analysis and harmonization of data and standards

To prepare an initial assessment of energy efficiency technologies in buildings in relation to the existing standards (currently is being prepared)

Mapping of Energy Efficiency Standards in Buildings: methodology

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Questionnaire (26 January-28 February 2018)

Collecting information from 56 member States on the current status of the energy efficiency requirements and technologies in building codes

Desktop Study

Review of relevant policy documents, previously published studies, technological developments and best practices related to existing standards across countries of the UNECE region

Consultation with the members of the JTF

Collection of feedback and comments from the members of the Joint Task Force on Energy Efficiency in Buildings

Mapping of Energy Efficiency Standards in Buildings: survey

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- name
- address
- contact details
- country
- organization

Part 1 general information

- Existing standards
- Type of building covered
- Stringency
- Energy performance gap
- Prescriptive requirements
- Inspections

Part 2: Building Energy Codes

- Type of buildings covered by EPC
- Policy requirements level for EPC
- Existence of national registry database for EPC

Part 3: Energy Performance Certification

- Existence of requirements
- Requirements to test the building materials

Part 4: Building Materials and Products

- Existence of incentives for compliance
- Penalties for non compliance
- Monitoring of energy performance in building energy codes

Part 5: Requirements for enforcement & compliance

- Deployment of technologies
- Which technologies exist
- Recent trends

Part Six – Energy Efficiency Technologies



Mapping of Energy Efficiency Standards in Buildings: gap analysis

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Objective: to evaluate the most effective policies and identify best practices to help member States learn from one another



Comprehensiveness and stringency of the building energy codes

Technical requirements of the building energy codes

Comprehensiveness and stringency of the EPC

Enforcement mechanisms, including incentive packages and penalties

Energy efficiency materials and products requirements in building energy codes

Mapping of Energy Efficiency Standards in Buildings: country profiles

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Poland

The residential sector in Poland is dominated by individual property (~ 60%), followed by Cooperative property (~20%). In addition to relevant government agencies, energy agencies, such as the National Energy Efficiency Agency, play an important role in promoting energy efficiency in the country's housing stock. In Poland, as early as 1994, a law was adopted that establishes requirements for buildings in terms of minimum requirements for energy efficiency, thermal insulation and other requirements relating to energy saving. In the development of the use of renewable energy in 2012, a Resolution that prescribes to analyse the possibility of the use of decentralized systems of energy supply based on renewable energy sources [37, 38].

Main regulatory documents related to building energy codes	Building Energy Codes Stringency and Coverage
<p>Technical regulations: Energy Savings and Thermal Insulation (2002) The Act of 7 July 1994, Concessions Law The Act of 18 August 2014, The Energy Performance of Buildings Law Regulation of the Minister of Transport, Construction and Maritime Economy of 25 April 2012 concerning the detailed scope and form of construction</p> <ul style="list-style-type: none"> - 2002-2014 - Climate zones 	<p>Coverage:</p> <ul style="list-style-type: none"> - Family residential building - Single-family residential building - Multi-family residential building - Collective residential building (apartment blocks) - Commercial buildings (Health-care building, Warehouse and production buildings) - Public buildings (Health-care building, Warehouse and production buildings) - new residential - non-residential - existing residential - existing non-residential <p>Stringency: Mandatory</p> <p>Prescriptive requirements in building energy codes</p> <ul style="list-style-type: none"> - Thermal insulation (including U-values for walls, floor, roof and windows) - Daylighting - Ventilation or air quality - Daylighting requirements - Specified thermal comfort levels for summer and winter - Solar gains (G-values) - Artificial lighting system, lighting density - Solar/AC system - Renewables <p>Insulation (2017): U-values (W/m²K): Roof: 0.14-0.17; External Wall: 0.10 - 0.23-0.8; Internal Wall-0; Floor on the ground: 0.10-1.5; Windows: 0.80 - 1.1-1.4; Door - 1.5; Daylighting: 0.80 - 1.1-1.4; Space heating system (2017): EP_{req} Values (kWh/m²year) for heating, ventilation and hot/cold water: Single-family residential building-60; Multi-family residential building-60; Collective residential building-60; Health-care building-60; Public buildings-60; Warehouse and production buildings-60; Space Cooling System (2017): EP_{req} Values (kWh/m²year): Single-family residential building and Multi-family residential building-10; Collective residential building, Health-care building and Public building-25. Water Heating System: EP_{req} Values, mean partial EP maximum value ratio for heating, ventilation and hot/cold water: Lighting (2017): EP_{req} Values (kWh/m²year): Single-family residential building and Multi-family residential building-0; Collective residential building, Health-care building, Public buildings and Warehouse and production buildings - For ≤ 2500 EP_{req} = 20; for > 2500 EP_{req} = 100.</p>
Performance-based requirements in building energy codes	
<ul style="list-style-type: none"> - Thermal characteristics and geometry of the building (envelope and internal partitions, etc.) - Daylighting - Space heating system and hot/cold water supply units - Air-conditioning systems - Mechanical and natural ventilation - Built-in lighting system - Design position and orientation of buildings - Passive solar systems and solar protection - Indoor and outdoor climatic conditions - Passive cooling - Heat recovery - Thermal bridges 	
Software: No data	
Energy Performance Certification (EPC)/Energy Labelling/Energy Passport of the building	
<p>Coverage:</p> <ul style="list-style-type: none"> - Single family houses - Apartment blocks - Commercial buildings - Public buildings - new residential - non-residential - existing residential - existing non-residential <p>Stringency: Mandatory</p> <p>EPBD Energy Performance Certificate (2006) Passive House (1992), Maximum cooling demand (kWh/m²year): cooling-15; space heating-15; total primary energy-100. Voluntary Methodology for calculating the energy performance of buildings</p> <p>Distance of national registry database for EPC in your country: Yes</p>	
Building Materials and Products	
<p>Rating/certification of building materials: No data</p> <p>Harmonization with other technical standards: No data</p> <p>Requirements to test building materials and products by certified test laboratories: No data</p>	
Requirements for enforcement and compliance	
<p>Requirements for regular inspection of heating and air conditioning (A/C) systems: No data</p> <p>Penalties, incentives and other mechanisms for improving compliance with building energy codes in your country: bonuses, grants</p> <p>Energy performance monitoring requirements: No data</p>	

Slovakia

Main regulatory documents related to building energy codes	Building Energy Codes Stringency and Coverage
<p>NTC SR: 555/2005 Coll. Act on the Energy Performance of Buildings and on Amendments to Certain Acts 2005/2012 Coll. Act amending Act No. 555/2005 Coll. on the Energy Performance of Buildings and on Amendments to some Acts as amended and amending ISO, European and Slovak Technical norms, Plan for the restoration of relevant (public) buildings, Update of the Energy Performance of Building Concept/2010 with a view to 2020.</p> <ul style="list-style-type: none"> - The first law act to energy performance of buildings was adopted by 2005 	<p>Coverage:</p> <ul style="list-style-type: none"> - Single family houses - Apartment blocks - Commercial - Public buildings - new non-residential - new residential - Existing residential (e.g. after substantial refurbishment) - Existing non-residential (e.g. after substantial refurbishment) <p>The buildings covered by the energy codes. They are separated by residential and nonresidential for the means of certification. For the needs of energy audits, there is more detailed breakdown.</p> <p>Stringency: Mandatory</p>
Performance-based requirements in building energy codes	
<p>Thermal characteristics and geometry of the building (envelope and internal partitions, etc.)</p> <ul style="list-style-type: none"> - Space heating system and hot/cold water supply units - Air-conditioning systems - 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, mandatory requirement to assess post-construction requirement of the thermal bridge. Yes <p>Non-renewable primary energy use</p> <p>The existing standards for determining the energy characteristics of the buildings in operation are sufficiently accurate. Yes</p>	
Prescriptive requirements in building energy codes	
<p>Thermal insulation (including U-values for walls, floor, roof and windows)</p> <ul style="list-style-type: none"> - Daylighting - Ventilation or air quality - Daylighting requirements - Specified thermal comfort levels for winter and summer - Solar gains (G-values) - Artificial lighting system, lighting density - Solar/AC system - Renewables - Thermal bridges 	
Energy Performance Certification (EPC)/Energy Labelling/Energy Passport of the building	
<p>Coverage:</p> <ul style="list-style-type: none"> - Single family houses - Apartment blocks - Commercial buildings - Public buildings - new non-residential - non-residential - existing residential - new residential <p>Stringency: Mandatory</p> <p>Distance of national registry database for EPC: Yes Type of energy that the EPC refer to: Total primary energy, Non-renewable primary energy.</p> <p>Distance of national registry database for EPC: Yes</p>	
Building Materials and Products	
<p>Rating/certification of building materials: Yes</p> <p>Harmonization with other technical standards: European Union standards used for CE Marking</p> <p>Requirements to test building materials and products by certified test laboratories: Yes</p>	
Requirements for enforcement and compliance	
<p>Requirements for regular inspection of heating and A/C systems: Yes, for both heating and A/C systems</p> <p>Your country has specific incentives that complement or motivate compliance with building energy codes. Yes, financial support, fines for non-compliance, Also possible: Refusal for occupancy or construction permit</p> <p>Energy performance monitoring requirements: Yes</p>	

Armenia

Main regulatory documents related to building energy codes	Building Energy Codes Stringency and Coverage
<p>Law on Standardization, 20-01 (06.03.2015) Law on Technical Regulation, 21-19 (06.03.2015) Law on Licensing, the 21-149 (20.05.2007) Law on Energy Saving and Renewable Energy, 21-133 (2004) National Program on Energy Saving and Renewable Energy (2007) National Energy Efficiency Action Plan (2014) Amendments to RA Energy Saving and Renewable Energy Law (2016): - 2014-2017 - Climate zones, sub-region</p>	<p>Armenia introduced in 2016 a mandatory building energy code with the adoption of a new regulation "Thermal Protection of Buildings", which was developed based on Russian Building Energy Code from 2003 (updated in 2012) and European codes and methodologies. It links building envelope construction and heat losses with established energy limits, taking into account differences in climatic conditions. It also includes a requirement for a building energy passport and an energy efficiency label with energy efficiency classes (C).</p> <p>Coverage:</p> <ul style="list-style-type: none"> - Single family houses - Apartment blocks - Commercial - Public buildings - new non-residential - new residential - Existing residential (e.g. after substantial refurbishment) - Existing non-residential (e.g. after substantial refurbishment) <p>Stringency: Mixed (both voluntary and mandatory)</p> <p>The construction objects in the Republic of Armenia are divided into the categories depending on their scale, significance, importance and complexity, as well as the safety of citizens and the environment. 1) low-risk objects: Category I); 2) objects of medium risk: category II); category (I) high-risk objects - category III); 3) objects with the highest degree of risk - category IV). Mandatory measures to ensure the energy efficiency of buildings are established by the Decree of the Government of the Republic of Armenia. Indicators for assessing energy efficiency and energy consumption in building codes have not yet established.</p> <p>(Residential and public buildings: walls - 0.04-0.24 floors - 0.02-0.37 roofs -0.23-0.42 windows - 1.04-0.34)</p> <p>Energy Use for heating, cooling, hot water, lighting, ventilation, Total primary energy:</p> <ul style="list-style-type: none"> - Thermal characteristics and geometry of the building (envelope and internal partitions, etc.) - Daylighting - Air-conditioning systems - Space heating system and hot/cold water supply units - 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 <p>The subset of ISO 696 standards: Full set of ISO 696 standards, a subset of ISO 696 standards</p> <p>Software used for compliance verification: Yes</p> <p>The gap between predicted and actual performance levels: 60-90% There is mandatory requirement to assess post-construction requirement of the thermal bridge: Yes There is a mandatory requirement for air-tightness testing: Yes</p>
Performance-based requirements in building energy codes	
<ul style="list-style-type: none"> - Thermal characteristics and geometry of the building (envelope and internal partitions, etc.) - Daylighting - Air-conditioning systems - Space heating system and hot/cold water supply units - 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 	
Prescriptive requirements in building energy codes	
<ul style="list-style-type: none"> - Thermal insulation (including U-values for walls, floor, roof and windows) - Daylighting - Ventilation or air quality - Daylighting requirements - Specified thermal comfort levels for winter and winter - Solar gains (G-values) - Artificial lighting system, lighting density - Solar/AC system - Renewables - Thermal bridges 	
Energy Performance Certification (EPC)/Energy Labelling/Energy Passport of the building	
<p>Coverage:</p> <ul style="list-style-type: none"> - Single family houses - Apartment blocks - Commercial - Public buildings - new non-residential - non-residential - existing residential - existing non-residential <p>Stringency: Mixed (both voluntary and mandatory)</p> <p>Distance of national registry database for EPC: No</p>	
Building Materials and Products	
<p>Rating/certification of building materials: Yes</p> <p>Harmonization with other technical standards: European Union standards used for CE Marking</p> <p>Requirements to test building materials and products by certified test laboratories: Yes</p>	
Requirements for enforcement and compliance	
<p>Requirements for regular inspection of heating and A/C systems: Yes, for heating systems only</p> <p>Penalties, incentives and other mechanisms for improving compliance: Yes</p> <p>Energy performance monitoring requirements: No</p>	

Mapping of Energy Efficiency Standards in Buildings: recommendations

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1. To harmonize building codes and coverage of all kinds of buildings
2. To create a national EE target
3. To strengthen the requirements for insulation, ventilation and technical installations
4. To introduce or strengthen quality assurance measures, especially during the early stage of the certification process
5. To establish proper (electronic) monitoring systems of compliance, enforcement and quality control processes through a qualified workforce
6. To establish a regular inspection of boilers and air-conditioning systems
7. To continuously monitor, analyze and adjust energy usage in building energy codes
8. To create incentives for companies for improving EE through appropriate policies, tax incentives and low-interest loans
9. To facilitate the harmonization process of energy efficient materials and products testing and certification
10. To assist in the establishment of new harmonized building materials test mechanisms
11. To make codes publicly available

Thank you!

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