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# “Compendium of best practices on standards and technologies for energy efficiency in buildings in the UNECE region”

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# Introduction

## Objectives of the Study

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- Research is aimed to identify best practices on adopting, implementing and enforcing energy efficiency standards and energy efficiency technologies for the building sector in the UNECE region and prepare a compendium of best practices.
- Basis to improve the knowledge of UNECE member States concerning energy efficiency best practices related to existing standards and technologies so that they will be able to develop and implement more effective energy efficiency policies in buildings.

# Introduction

## Objectives of the Study

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- Due to the existing old building stock in the UNECE region and the need for retrofitting it, this report “Compendium of best practices on standards and technologies for energy efficiency in buildings in the UNECE region” is more focused on the retrofit of the existing building stock compared to the new constructions and include more case studies related to the residential sector.



The selected best practices have been organized in different sections:

- **Legislative and regulatory framework;**
- **Management of multi-family housing stock;**
- **Awareness raising and behavior change;**
- **Technical measures;**
- **Financial mechanisms.**

# Introduction

## Data collection

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- Information about best case-studies was gathered via desk research and stakeholder outreach, in order to identify relevant best practices on energy efficiency standards and technologies across the UNECE region.
- Collected best practices include, but are not limited to, thermal performance of buildings and their components, construction materials and heating, ventilation and air conditioning (HVAC) systems, with examples on standards and technologies for energy efficiency in buildings.

# Introduction

## Data collection

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52 case studies from 22 countries have been received for the initial review. All of them were verified and evaluated and 36 have been selected to be included in the report.

# Key findings

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- The analysis of the collected case studies shows overall positive trends in energy efficiency in the building sector in all the identified sub-regions. Even countries, which traditionally have low internal energy prices, have significantly increased mandatory energy efficiency requirements, especially for the newly constructed buildings

# Key findings

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- Active work is conducted by Ministries, Regional and municipal level authorities, Local and International Financial institutions, International Organisations and other interested counterparts, resulted in various achievements served for the purposes of energy consumption and CO2 emission level reduction, as well as support penetration and dissemination of financial resources availability and relevant local capacity generation.



# Key findings

## Legislative and regulatory framework chapter

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There were 6 case studies from 6 countries selected in the Legislative and regulatory framework chapter.

Main topics:

- Update of EE oriented legislation and design standards, in terms of harmonization with international (or EU) practice, in order to increase current specific energy efficiency parameters in buildings design and construction.
- Good practice of administrative enforcement of municipal energy management practice.



### Recommendations:

- Additional work should be done on municipal and even micro-district levels.
- Specific laws, regulations and standards are required to be adjusted to the local climatic, primary energy source, overall development level and other parameters.



There were selected 7 cases form 6 countries.

Main topics:

- Advanced renovation and objects management practices were demonstrated, as well as
- Significant role of smart energy data collection and auditing analysis for the purposes of proper building maintenance and operation.
- Improved and more healthy-friendly living infrastructure for the homeowners



### Recommendations:

Continuation of such a work with better focus on introduction of Building Management Systems, including administrative and technical component, will give more sustainable result in terms of building operation life-cycle.



7 cases from 5 countries presented.

Main topics:

- The primary aim of such informational and training campaigns is to involve as much as possible representatives of target audience, into the knowledge sharing and best practices dissemination process.
- Various examples of informational products and educational formats were presented for energy and engineering professionals, homeowners and youth (schools and universities).

# Key findings

Awareness raising, capacity building and behavior change

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## Recommendations:

On-line education is a step forward in EE knowledge exchange, that will allow enhance international cooperation between countries of UNECE region. Successful results all presented cases, confirms possibilities of indirect energy consumption and CO2 emissions levels reduction, and high potential for replication in future.



## 8 cases from 7 countries

### Main topics:

- Focus on modern EE solutions, which are currently available in the markets of UNECE region countries.
- EE technologies and other technical solutions are currently affordable and have reasonable financial interest, even for countries of sub regions E and F, with traditionally low energy prices.



### Recommendations:

Growing amount EE buildings constructed for low-income households or under governmental programs of resettlement, is a positive sign, that gives confirmation about high level of standard EE and basic renewable technologies penetration and implementation.



# Key findings

## Financial Mechanisms

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8 cases from 8 countries.

Main topics:

- Cases could be divided into two main types, non-refundable grants and refundable loans of different variations.
- High efficient EE financial and investment schemes, which are widely used across all countries of UNECE region.

# Key findings

## Financial Mechanisms

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#### Recommendations:

Proper implementation of financial mechanism requires long-term project sustainability.

For this reason, it is preferable to use combination of grant recourses for the apartments and public buildings, in case of extra budgetary financing is required.

Direct financial governmental support retrofitting activities, or guarantees, could help building owners or operators to attract reliable energy service companies or receive special discounted offers from EE equipment suppliers and manufacturers.



Thank you!