



UNECE

First meeting of the Joint Task Force on Energy Efficiency Standards in Buildings



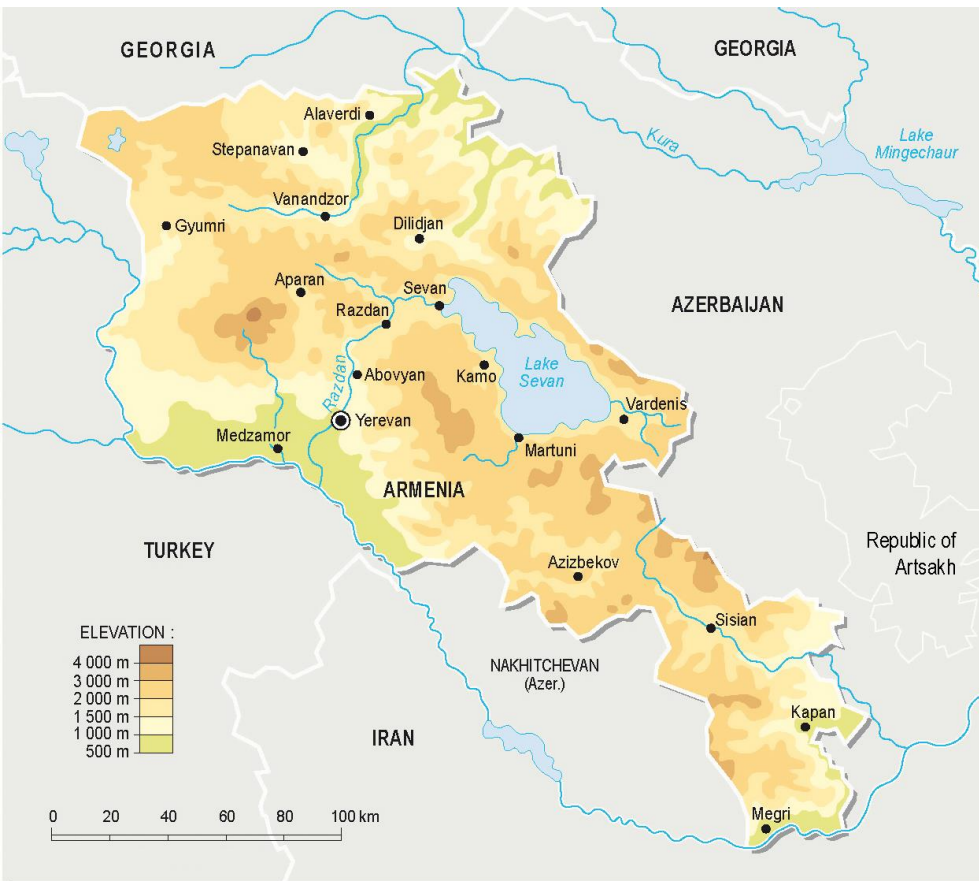
REPUBLIC OF ARMENIA
State Urban Development Committee

Session D:

Challenges and good practices for the implementation of energy efficiency standards in buildings

Armen MINASSIAN, Architect
Advisor to the Chairman

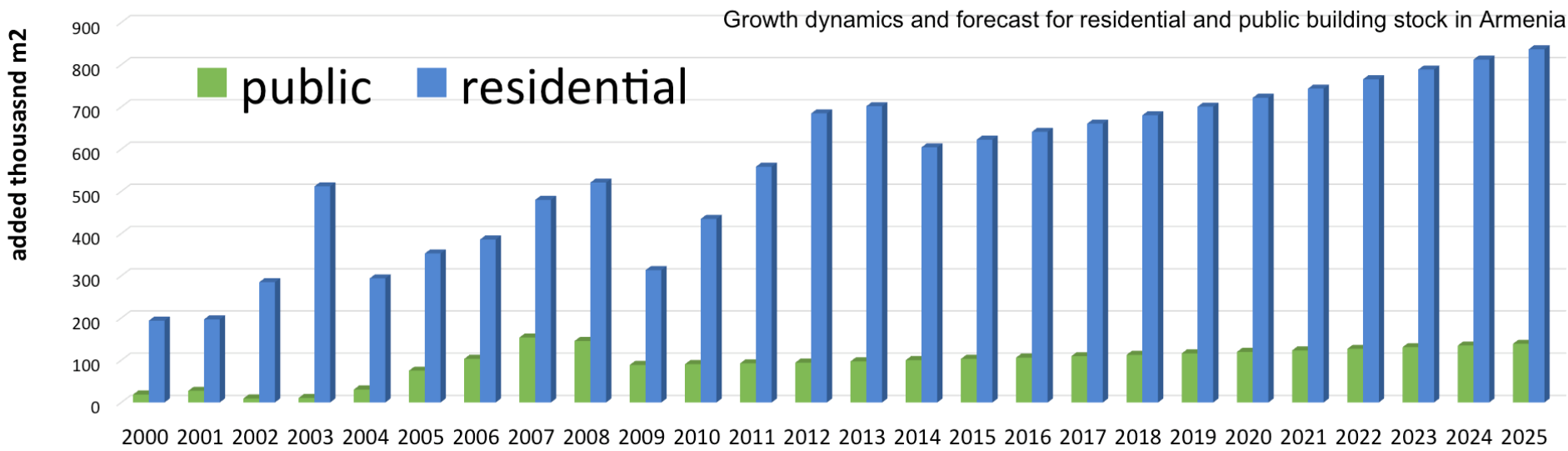
30 - 31 October 2017
Salle VIII, Palais des Nations, Geneva

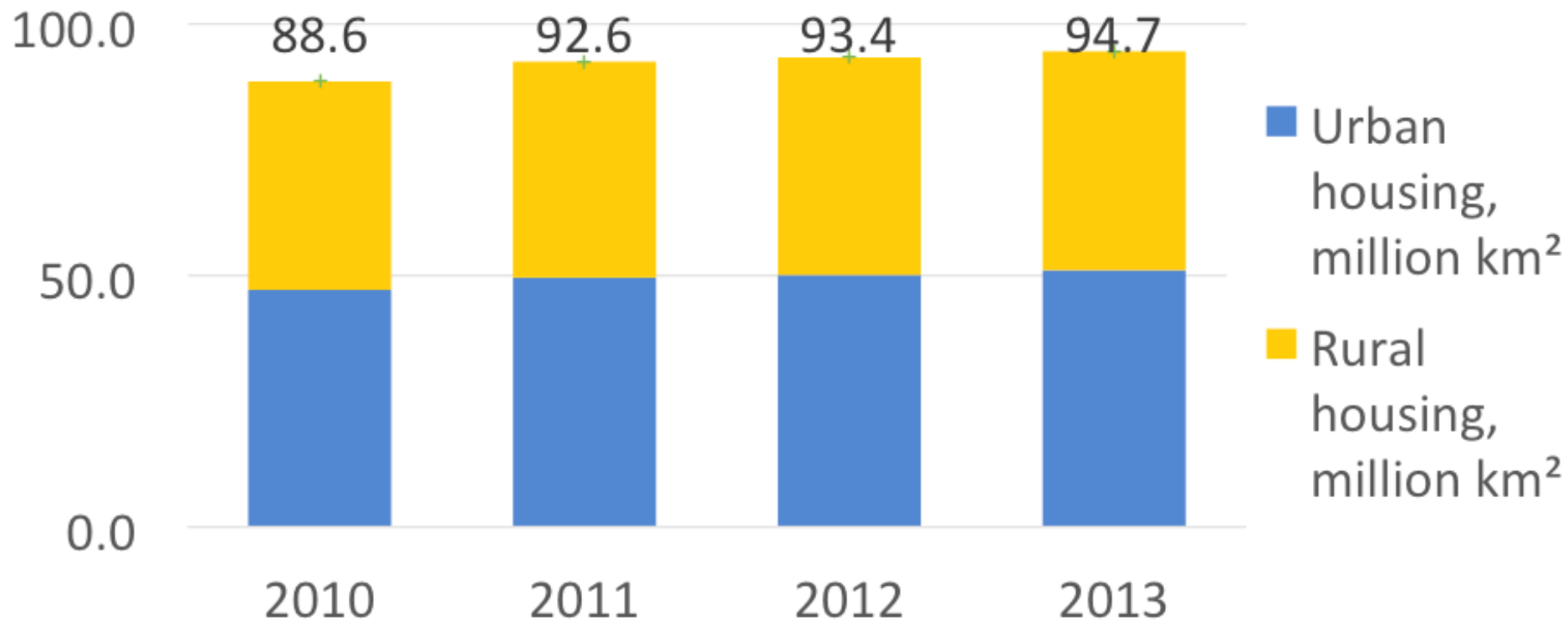


Official name	Republic of Armenia
Capital	Yerevan
Head of state	President
Head of government	Prim Minister
National legislature	National Assembly
Total land area	29,800 square kilometers
Major cities	Yerevan, Gyumri, Vanadzor, Vagharshapat, Abovyan
Population:	3 million
Labour force	63.03%
Literacy	99.80%
Official language	Armenian
Gained independence in	1991
Religion	Christianity (adopted in 301 A.D.)
Currency	Armenian Dram (AMD)
Time zone	GMT +4



Buildings Sector/ New Construction





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Armenia's housing stock

19,000 dwellings, 822,000 units, of which:

In Private houses:

427,000 units

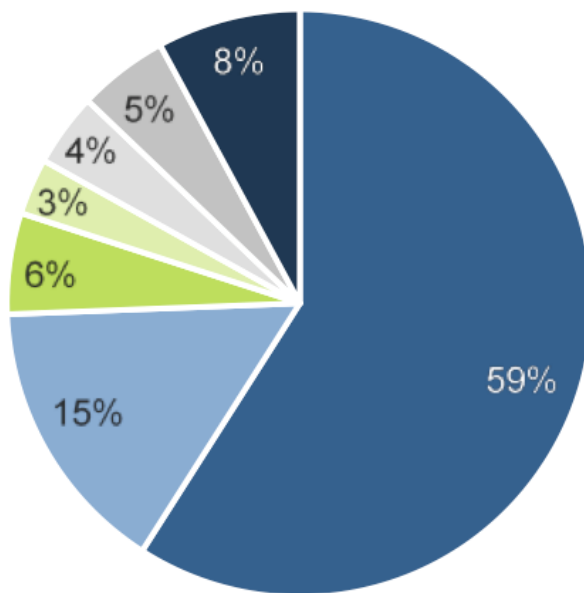
71% of total housing space

in Multi-apartment buildings:

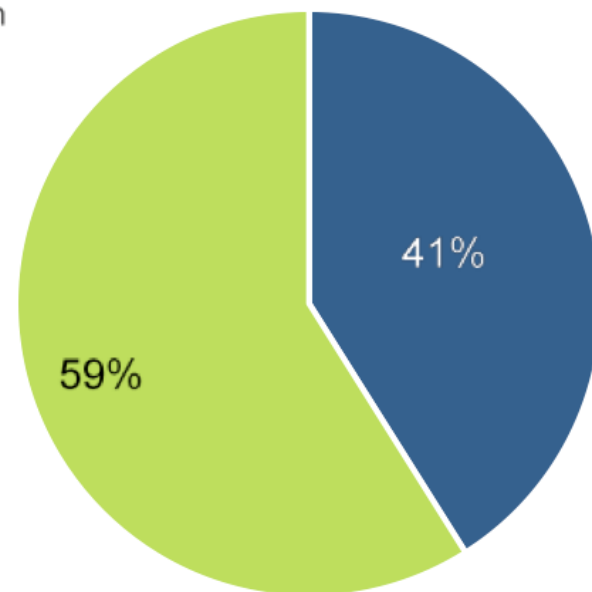
435,000 dwellings (52 %) are in the multi-apartment stock,
29% of total housing space

Public Buildings and Services

- Public & Private Secondary Schools
- Medical Institutions (Ministry of Health)
- Higher Education Institutions
- Middle Professional Training Institutions
- Athletic facilities
- Pre-school Institutions
- Other



- Public Buildings: Yerevan

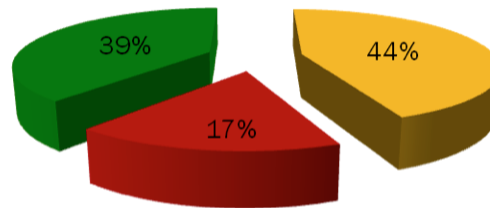


Energy Saving Potential in Public Buildings

Charachteristics of Multi-Apartment Housing Характеристики многоквартирного жилищного фонда

By year of construction

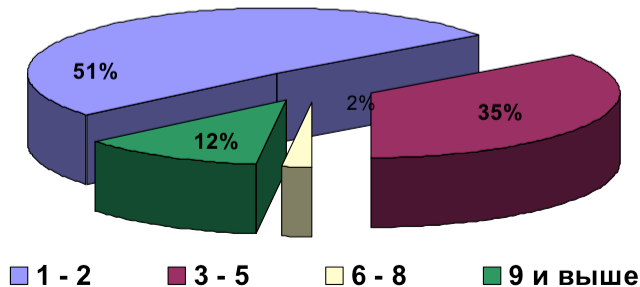
По годам строительства



1970-1990гг. 1970-1990 1970-1990
после 1990г. after 1990
до 1970г. before 1970

By floors

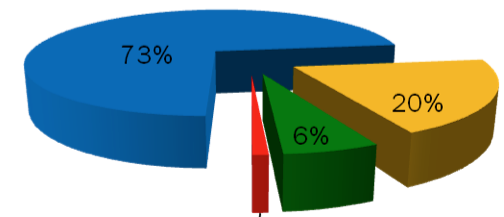
По этажности



1 - 2 3 - 5 6 - 8 9 и выше

By wall structure

По конструкции стен



камень Stone
панель panel
моноклит monolith
прочее other

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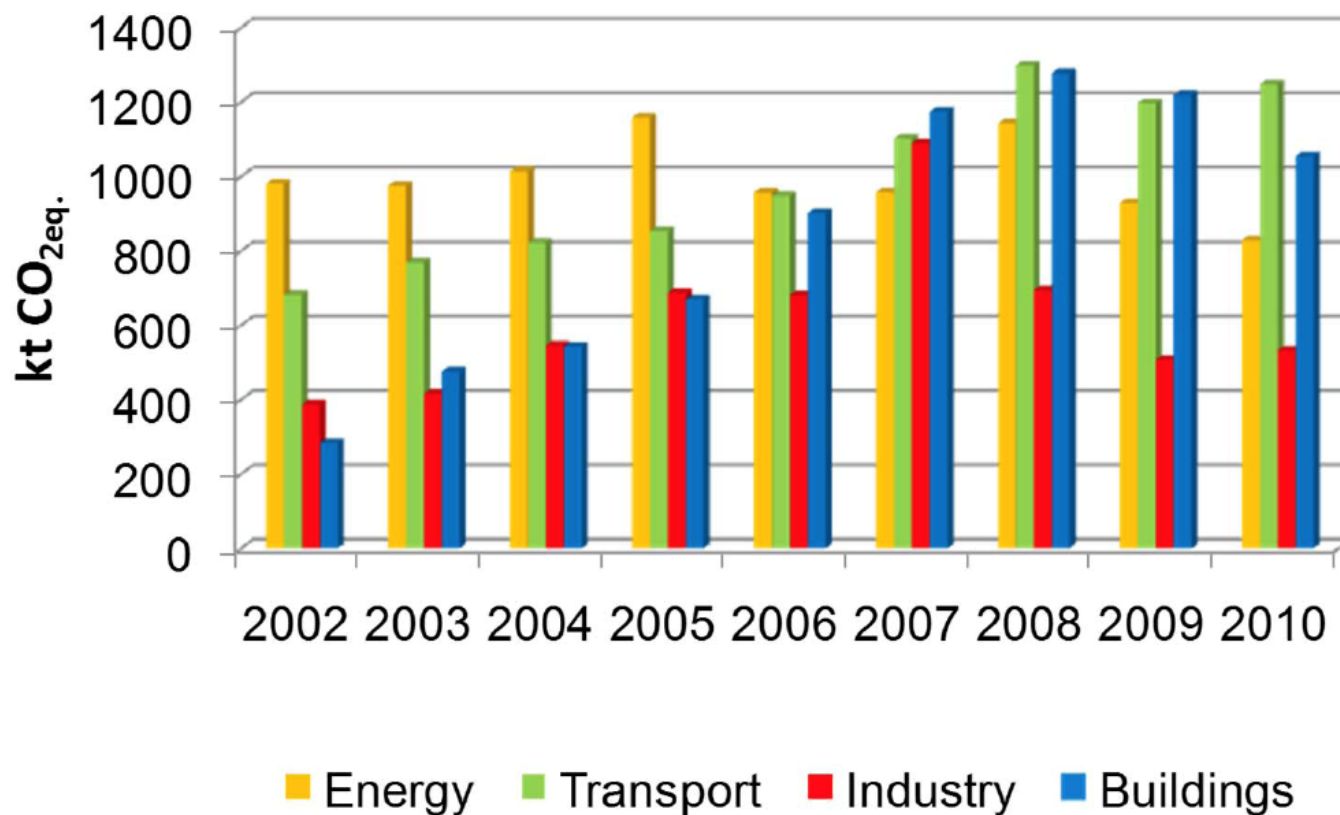
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State Urban Development Committee



Greenhouse Gas Emissions by Sector



Source: "Improving Energy Efficiency in Buildings" UNDP-GEF Project

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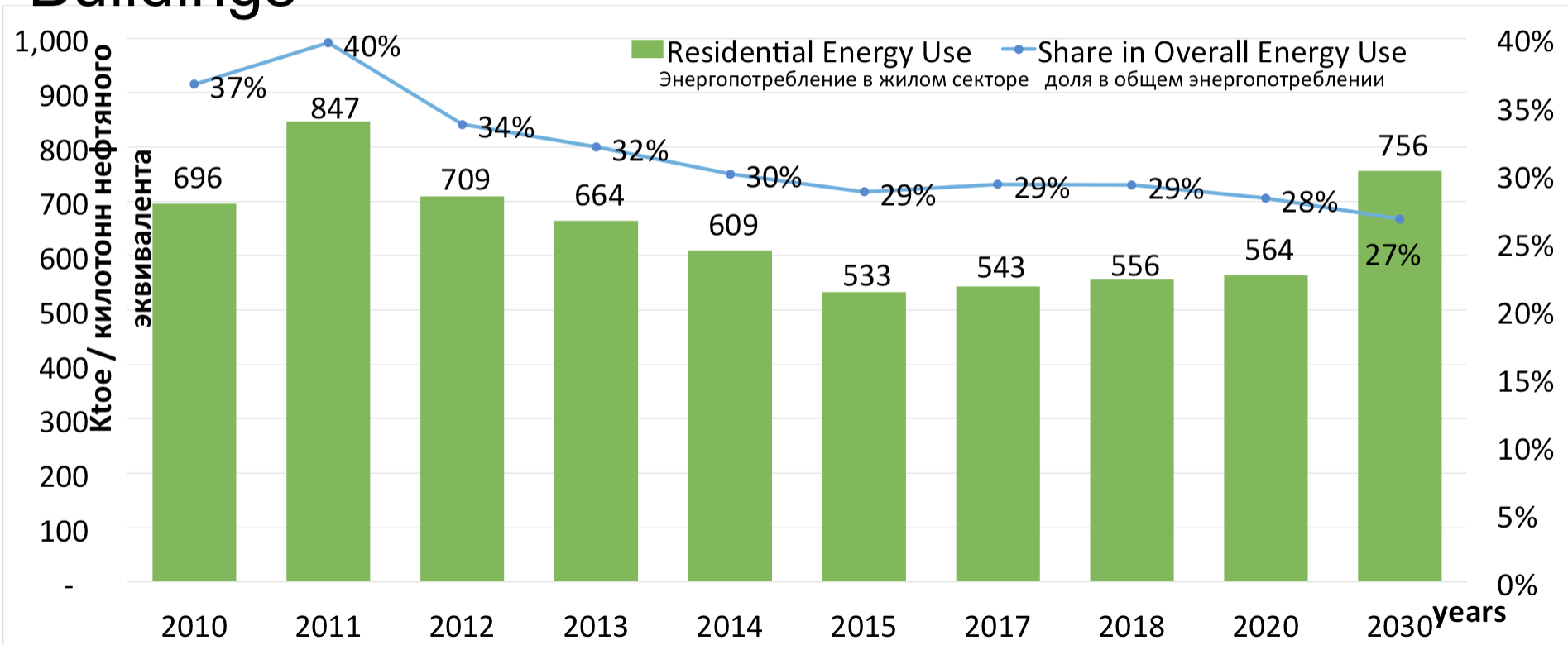
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Buildings Sector/ Existing Residential Buildings

Жилой фонд – существующие здания



Potential in retrofitting housing stock

No of panel buildings is around 4,300.

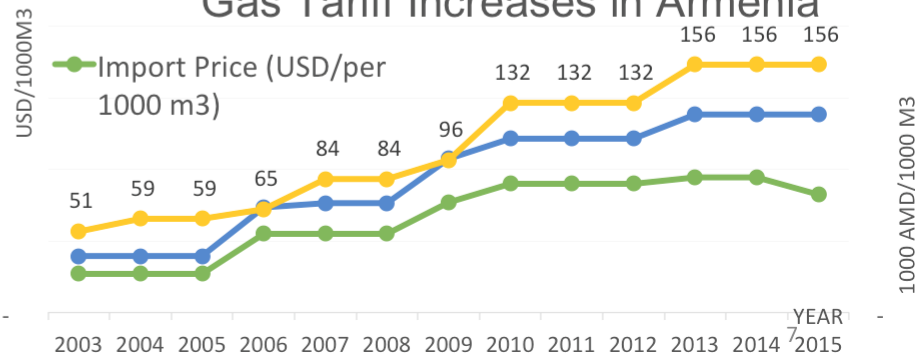
The energy efficiency potential from thermal modernization of panel buildings - 1,260 mln kWh/year.

Energy prices in Armenia are already high enough to generate appropriate return on investment.

The thermal modernization is high priority for development agenda due continuous rising of energy tariffs in recent years (e.g. natural gas tariffs has rose more than twice in the past decade)

Thermal modernization must be accompanied by seismic reinforcement according to revised Seismic Norm of 2014.

Gas Tariff Increases in Armenia



- In Armenia, about 24% of total greenhouse gas emissions originates from energy use in buildings
- About 30% of Armenian residents are considered in energy poverty,
- More than half of energy consumed in buildings comes from imported fuel
- Thermal insulation in buildings can ensure about 50% energy saving in energy consumption



“De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits” UNDP-GCF project

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What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

The legal and normative-technical regulatory framework for increasing energy saving and energy efficiency in buildings in the Republic of Armenia has the following structure:

- RA Law "On Energy Saving and Renewable Energy" (subject to mandatory application)
- It is defined by the law that Designers, developers and exploiters should comply with the technical requirements for energy saving and energy efficiency in newly constructed residential multi-apartment buildings, as well as in objects constructed (reconstructed, renovated) by state means. The mandatory technical requirements for energy saving and energy efficiency are defined by the Government of the Republic of Armenia. (the draft decision on the approval of the technical regulation was submitted to the Government for consideration).



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

- Government Decision N1504-N, dated 25 January, 2014. (subject to mandatory application)

Measures directed towards increasing energy saving and energy efficiency in objects constructed (reconstructed, renovated) by state means are adopted by the Decision and are subject to application in procurement procedures for object design, expertise and construction works.

- Construction Norms (subject to mandatory application), especially Construction Climatology, Thermal Protection of Buildings, Artificial and Natural Lighting.
- There are 48 standards (the list is attached), some of which are localized versions of international (mostly European) standards.



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

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What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

- There are 2 advisory manuals.
 - Technical solutions for thermal insulation of new, constructed and reconstructed residential, public and industrial buildings in the Republic of Armenia
 - A Catalogue of Replicable Energy Efficient Individual Residential Buildings



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

The System of Normative Documents in Construction
Construction Norms of the Republic of Armenia

Thermal Protection of Buildings RACN 24-01-2016

Ministry of Urban Development of the Republic of Armenia

Yerevan
2016



What types of energy efficiency standards in buildings exist in your country?
Provide some examples.
Are they effectively implemented?

The System of Normative Documents in Construction
Construction Norms of the Republic of Armenia

Thermal Protection of Buildings
RACN 24-01-2016

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2016



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

RACN 24-01-2016

Construction Norms RACN 24-01-2016 “Thermal Protection of Buildings”

ISBN

978-9

Keywords average air temperature during the heating season, conventional resistance of laminated conduction heat transfer, heat-protective membrane of the building, thermal protection of buildings, building energy passport, energy efficiency, energy efficiency class

1. **DEVELOPED:** Under the coordination of the Ministry of Nature protection of the Republic of Armenia, financed by the Global Environment Fund and within the framework of the UNDP Project on “The increasing of the Energy Efficiency of the Buildings”.
2. **NOMINATED:** by the Department of Engineering and Technical Work and by the Department of Technical Normative methodology of the RA Urban Development.
3. **APPROVED AND PUT IN ACTION:** by the RA Minister of Urban Development order No. 120-N (July 16, 2016).
4. **REGISTERED:** by the RA Ministry of justice (June 26, 2016, code 11716202).

These norms have been edited within the framework of the UNDP-GEF project “The increasing of the Energy Efficiency of the Buildings”. The project experts are –Anna Qaramyan, Arsen Karapetyan, Apres Nazaryan, Tigran Sekoyan, Mikhayil Vermishev, Arthur Tsughunyan, Vahram Jalayan.

In the final version of the edition the comments (notes) and suggestions were taken into consideration given by the Head of the Department of Engineering and Technical Works and Technical Normative Methodology of the RA Urban Development – Aghasi Hovsepyan, and by the head of the same department’s Technical Normative methodology – Ovsanna Karapetyan.



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

When using these normative documents, it is necessary to take into account approved changes in the acting construction norms, standards and normative legal acts.

INTRODUCTION

Building Energy Efficiency Requirements are gradually becoming an important component in the most countries legislation. These requirements are, first and foremost, considered from the point of view of the protection of the environment as a means of ensuring the effective use of natural non-renewable energy resources and reduction of carbon dioxide and other harmful substances emissions.

The development of the “Building Thermal Protection” RACN 24-01-2016 construction norms was carried out within the framework of the “Building Energy Efficiency Increase” project, implemented by the UN Development Projects financed by the Global Environment Fund.

These Construction norms are applied to the design of the thermal protection of the constructed and reconstructed residential, public, industrial, agricultural, having more than 50m² surface storage area buildings and structures, where certain warm and humid conditions are required.

The construction new norms advantages are:

1. Are in line with the RA Government action plans (Protocol Decision N 43 of the Republic of Armenia, 04.10.2010) and European energy efficiency directives for the implementation for the RA energy saving and national plan of the renewable energy,
2. Are based on the advanced developments of the CIS Interstate construction norms,
 - Is the most important normative document adopted by the RA National Assembly on May 12, 2016; newly constructed residential multi-apartment buildings as defined by the RA Law on making additions and changes to the Law of the Republic of Armenia on “Energy Saving and Renewable Energy”, as well as for the insurance of the implementation of the mandatory requirements of the energy saving and energy efficiency in the (constructed, reconstructed) buildings constructions of which are financed from the State budget (at state expense).



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

1. Define requirements towards the resistance of the thermal transfer of the building envelopes, building energy efficiency indicator, building energy efficiency class and towards building energy passport,
2. Envisage the use of new indicators of building energy efficiency (in particular, specific energy demand for building heating),
3. Envisage the evaluation and classification of building Energy efficiency, both in design and construction, as well as during future operation,
4. Provide the same level of useful thermal energy demand as the RACN II-7.02-95 (through changes,2000), providing wider opportunities, for selection of the norms requirements performance and technical solutions.

In order to meet the requirements of these norms the methods of thermo-technical calculation specifications of buildings envelope and descriptive materials that are necessary for designing should be incorporated into the set of new rules of newly developed “Thermal protection of buildings and constructions” project.

What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

RA MINISTER OF URBAN DEVELOPMENT ORDER ON “APPROVAL OF THERMAL
PROTECTION OF BUILDINGS RACN 24-01-2016 (REPUBLIC OF ARMENIA
CONSTRUCTION NORMS)
AND ON MAKING AN ADDITION INTO THE RA MINISTER OF URBAN DEVELOPMENT
ORDER N 82”

*The norms were registered
by the Ministry of Justice of the RA
on June 26, 2016
State registration code 11716202*

MINISTER OF URBAN DEVELOPMENT OF THE REPUBLIC OF ARMENIA

July 16, 2016
Yerevan
N
N 120-

ORDER

ON APPROVING “THERMAL PROTECTION OF BUILDINGS” RACN 24-01-2016
(REPUBLIC OF ARMENIA CONSTRUCTION NORMS) AND ON MAKING AN ADDITION
INTO THE RA MINISTER OF URBAN DEVELOPMENT ORDER N 82

In accordance with Articles 10 and 16 of the RA Law on Urban Development,
Paragraph 3 of Article 70 of the RA Law on Legal Acts and Governmental Decree No.
156-N dated on 20 February, 2003, as well as based on the Subparagraph 4 of
Paragraph 14 of Appendix N 1 of the RA Government Decision No. 1294-N of July 25,
2002.

I ORDER TO:

1. Approve “Thermal Protection of Buildings” RACN 24-01-2016 Construction
Norms according to the Annex.

What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

2. Make the following addition into the RA Minister of Urban Development Order N 82 on “Regulation of normative-technical acts” dated on 1 October, 2001.

1. after the line defined by the order “The RACN 11-7.02-95 “Thermal physics of building envelopes: Construction norms” add the following sentence.

The provisions of “Thermal physics of the building envelopes. Construction norms” RACN 11-7.02-95 which are not included in the RACN 24-01-20116 "Building Thermal Protection", will have been acting by the set of rules of the RA 24-01-2016 “Thermal Protection of Buildings” enters into force.

Minister

Narek Sargsyan

What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

excerpt

THE LAW OF THE REPUBLIC OF ARMENIA
ON ENERGY SAVING AND RENEWABLE ENERGY

Adopted on November 9, 2004

Article 5. Principles of State Policy in the Area of Energy Saving and Renewable Energy

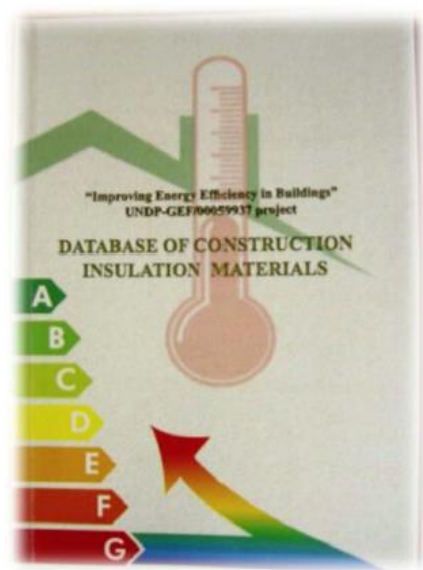
1. The state policy in the area of energy saving and renewable energy is based on the principle of voluntary participation of the involved parties.
2. The principles of state policy in the area of energy saving and renewable energy are:
 - a. Increasing the level of supply of indigenous renewable energy carriers to satisfy the energy demand of the economy;
 - b. Implementation of energy saving, as well as development and enforcement of legal and economic mechanisms for the promotion of renewable energy;
 - c. Ensuring high priority of efficient use of energy given the increasing volumes of imported and extracted energy resources;
 - d. Ensuring increase of renewable energy resources usage as well as application and development of renewable energy new technologies aimed promoting that;
 - e. Ensuring competitiveness of renewable energy resources and protection/enforcement of rights of businesses engaged in the area of renewable energy;
 - f. Ensuring high priority of issues of environmental protection and efficient (economic) usage of natural resources while implementing measures/activities aimed at the development of the energy saving and renewable energy;
 - g. Promotion of energy efficient production of electric and/or heat energy, including for autonomous energy producers;
 - h. Promotion of integrated activities between the autonomous energy producers, using renewable energy resources, and the energy system aimed at the exchange of electric energy;
 - i. Promotion of consumer choices and use of different energy carriers and energy efficiency technologies;
 - j. Implementation of energy saving and renewable energy state (national) targeted programs.
3. **Designers, developers and exploiters should comply with the technical requirements for energy saving and energy efficiency in newly constructed residential multi-apartment buildings, as well as objects constructed (reconstructed, renovated) by state means".** The mandatory technical requirements for energy saving and energy efficiency are defined by the Government of the Republic of Armenia.

(Article 5 was supplemented by RA Law-67-N of 12.05.16)

What types of energy efficiency standards in buildings exist in your country?
Provide some examples.
Are they effectively implemented?

Database of Construction Insulation Materials

Presents construction insulations materials and pre-fabricates available in the Armenian market, both locally produced and imported



2.1.2. «Տեքսթիլ» ՍՊԸ
ՀՀ, Երևան, Անտառի փ., 48ա
Հեռ.՝ (+374 10) 61 68 04
Էլ. փոստ՝ info@textil.am
Պաշտոնական կայքը՝ www.textil.am

Thermoplex

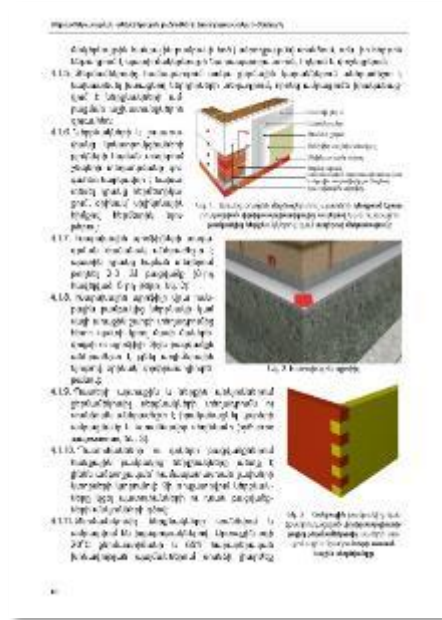
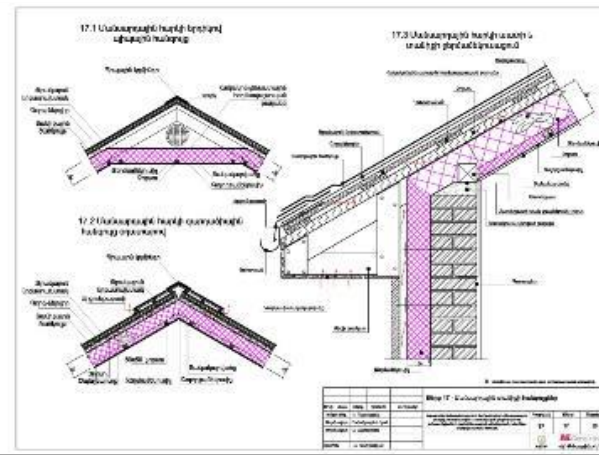
Արտադրատեսակ	Տարբերակիչ ֆակտոր	Խառնուրդի կազմ	Ցածկադիմացումը, °C	Վերականգնողականություն, °C
ՔՄ փայլա-պայծառ արտադրություն	բաց արտադրություն	30-40	0.025-0.030	30-40

1.1.2. «Էկոպոլիս» ՍՊԸ
ՀՀ, Երևան, Անտառի փ., 48ա
Հեռ.՝ (+374 10) 61 68 04
Էլ. փոստ՝ info@ecopolis.am
Պաշտոնական կայքը՝ www.ecopolis.am

Արտադրատեսակ	Տարբերակիչ ֆակտոր	Խառնուրդի կազմ	Ցածկադիմացումը, °C
Պոլիէթիլեն (պարպեղ, մեղմ, խիստ փայլա-պայծառ)	բաց արտադրություն	50-100	0.025-0.030
Պոլիէթիլեն (պարպեղ, մեղմ, խիստ փայլա-պայծառ)	բաց արտադրություն	100-200	0.044-0.050
Պոլիէթիլեն (պարպեղ, մեղմ, խիստ փայլա-պայծառ)	բաց արտադրություն	300-500	0.044-0.050
Պոլիէթիլեն (պարպեղ, մեղմ, խիստ փայլա-պայծառ)	բաց արտադրություն	100-200, 300-500	0.044-0.050
Պոլիէթիլեն (պարպեղ, մեղմ, խիստ փայլա-պայծառ)	բաց արտադրություն	30-40, 50-100, 100-200	0.025-0.030

Source: “Improving Energy Efficiency in Buildings” UNDP-GEF Project

Are they effectively implemented?



Are they effectively implemented?

What types of energy efficiency standards in buildings exist in your country?
Provide some examples.
Are they effectively implemented?

Energy Efficiency in New Constructions

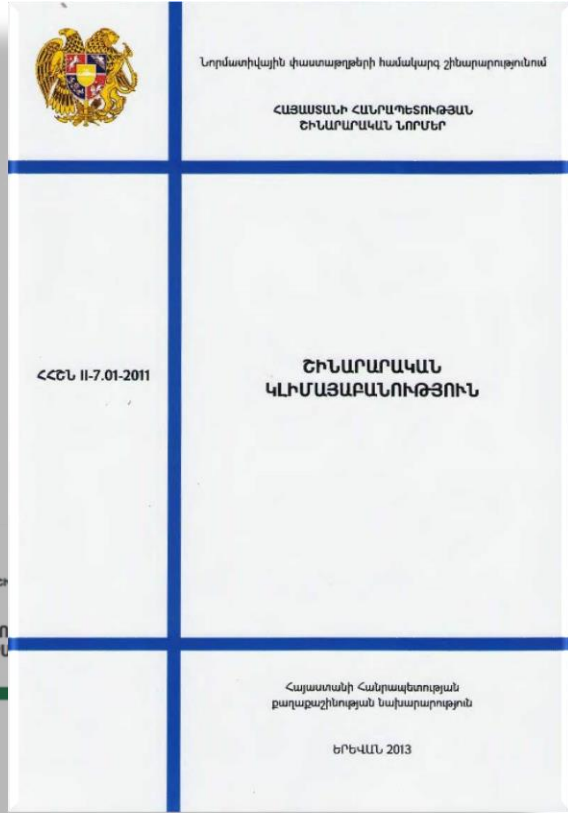
Legislative and Regulatory Framework

- Energy efficiency related laws and decrees revision and amendment in accordance with EU and Eurasian Economic Community directives and technical regulations
- National and international standards development and adaption for Armenia, methodologies and handbooks on energy efficiency

Use on new technologies and construction materials

Enforcement of regulations

Building certification and issuance of energy passports



What types of energy efficiency standards in buildings exist in your country?

Provide some examples.

Are they effectively implemented?

Energy Efficiency in New Constructions

Կանաչ Ճարտարապետություն

Էներգաարդյունավետություն և վերականգնվող էներգիա

Green Architecture

Energy Efficiency & Renewable Energy



The textbook is developed and published in the framework of “Improving Energy Efficiency in Buildings” UNDP-GEF project.

web-site: www.nature-ic.am
www.am.undp.org

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Artak Hambarian



What types of energy efficiency standards in buildings exist in your country?
Provide some examples.
Are they effectively implemented?

The requirements of the above-mentioned documents are not fully implemented. They are mainly implemented in newly constructed buildings, as well as in reconstructed and renovated public buildings.

The existing shortcomings are especially for multi-apartment buildings with the greatest potential for energy efficiency.



2. What are the main challenges to the enforcement of these standards?

Imperfection of control levers over execution of legislative and normative-technical requirements in the stages of building design, construction and maintenance.

Lack of reliable statistics (quantitative, qualitative) on energy supply in buildings

Lack of targeted financial support fund for the implementation of energy efficiency measures in existing buildings

The lack of approved and financially supported programs for thermal protection of buildings

Insolvency of building owners in conditions of the measures costs for energy efficiency

Insufficient level of awareness and capabilities of stakeholders

Absence of defined energy characteristics

Absence of energy passport

3. How can the Joint Task Force support you in your effort to improve and enforce energy efficiency standards in buildings?

Replenishment of the normative-technical field, through the localization of international standards and its implementation and control effective mechanism investment opportunity

Definition of energy characteristics of buildings according to the purpose of buildings

Development of buildings passportization guideline

Development of information system model based on the data obtained as a result of passportization

Defining design requirements in accordance with eco-design principles
Representation of international best practice of buildings in almost zero energy consumption.

