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## Economic Commission for Europe

Committee on Sustainable Energy

Group of Experts on Energy Efficiency

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Item 7 of the provisional agenda

**Improving energy efficiency in buildings**

### **Report on enhancing national capacities to develop and implement energy efficiency standards for buildings in the United Nations Economic Commission for Europe region**

**Note by the secretariat**

#### *Summary*

During the period July 2020 to March 2022, the United Nations Economic Commission for Europe implemented the project “Enhancing National Capacities to Develop and Implement Energy Efficiency Standards for Buildings in the UNECE Region”.

The Group of Experts on Energy Efficiency at its eighth session (20-21 September 2021) requested ([ECE/ENERGY/GE.6/2021/2](#)) the results of project implementation be reported at the ninth session of the Group of Experts.

The present document was developed in response to this request. It contains results of evaluations from the training seminars and analysis of the impact of project activities on improving energy efficiency in buildings in the project’s beneficiary countries.



## I. Introduction

1. The project “Enhancing National Capacities to Develop and Implement Energy Efficiency Standards for Buildings in the UNECE Region” builds on previous activities of the United Nations Economic Commission for Europe (ECE) in the area of energy efficiency standards in buildings and aims to enhance the capacity of the ECE member States to develop and implement such standards.

2. The project duration was from July 2020 to March 2022. The project implemented all of the requested activities, namely:

(a) A study on gap analysis between the performance objectives set forth in the Framework Guidelines for Energy Efficiency Standards in Buildings (ECE/ENERGY/GE.6/2020/4) 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 has been conducted;<sup>1</sup>

(b) The findings and recommendations from this regional study were discussed at a workshop for stakeholders from the energy and housing sectors to validate the gap analysis on 9 April 2021;<sup>2</sup>

(c) Three national studies (covering Armenia, Kyrgyzstan and the Republic of Moldova) with a more detailed gap analysis have also been developed;<sup>3</sup>

(d) The country-specific recommendations from those studies were discussed at a workshop for stakeholders from the energy and housing sectors on 20 September 2021;<sup>4</sup>

(e) The project established a Collaborative Environment for Experts on Energy Efficiency in Buildings in the UNECE region and updated the network of experts from public and private sectors on energy efficiency in buildings;<sup>5</sup>

(f) In October and November 2021, national training seminars on high-performance energy efficiency standards in buildings were organized in Armenia and Kyrgyzstan.<sup>6</sup> A national training seminar for the Republic of Moldova was conducted on 20-21 January 2022;<sup>7</sup>

(g) Impact of project activities was evidenced by conducting an impact study on how project countries use and implement best practices and guidelines provided by ECE activities in their national or/and sub-national measures to address the issues of energy efficiency in buildings.<sup>8</sup>

## II. Trainings on high-performance energy efficiency standards in buildings in the selected project countries

3. One of the project activities was to conduct national training seminars on high-performance energy efficiency standards in buildings in selected ECE member States. The trainings were organized in Yerevan, Armenia on 25-26 October 2021; Bishkek, Kyrgyzstan on 29-30 November 2021; and Chisinau, Republic of Moldova on 20-21 January 2022.

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<sup>1</sup> See: [https://unece.org/sites/default/files/2021-06/Study\\_on\\_Gap\\_Analysis\\_07.06.2021.pdf](https://unece.org/sites/default/files/2021-06/Study_on_Gap_Analysis_07.06.2021.pdf)

<sup>2</sup> See: <https://unece.org/sustainable-energy/events/online-workshop-energy-efficiency-standards-buildings-and-their>

<sup>3</sup> See: <https://unece.org/sustainable-energy/regional-advisory-services/gap-analysis-and-national-studies>

<sup>4</sup> See: <https://unece.org/sustainable-energy/events/workshop-regional-and-national-studies-gap-analysis-between-performance>

<sup>5</sup> See: [https://sedwiki.unece.org/display/SED/EEEEB\\_db\\_Home](https://sedwiki.unece.org/display/SED/EEEEB_db_Home)

<sup>6</sup> See: <https://unece.org/sustainable-energy/regional-advisory-services/national-training-seminars-high-performance-energy>

<sup>7</sup> See: <https://unece.org/info/events/event/364307>

<sup>8</sup> See: <https://unece.org/sustainable-energy/regional-advisory-services/impact-study>

4. The objective of the trainings was to: (i) improve understanding of the energy management and monitoring, reporting, and verification (MRV) in the buildings sector; (ii) improve understanding of institutional, organizational, and legal aspects of energy management and MRV at the global and European Union level; (iii) consolidate capacities to organize municipal energy management as part of the national MRV system; (iv) provide knowledge to use existing or organize the development of an Energy Management Information System; (v) provide an understanding of the energy auditing process and confidence in using multicriteria analysis tools; and (vi) enhance capacities to use and understand the funding possibilities for energy efficiency measures in buildings.

5. The selection of training participants was based on the open invitation sent by governmental institutions and the United Nations Development Programme (UNDP) Country Offices of the three ECE member States. Based on the training evaluation,<sup>9</sup> in Armenia most of the participants were from public institutions; in Kyrgyzstan the majority were from private companies and universities; and in the Republic of Moldova they were primarily from public institutions and private companies. All together 180 participants followed the trainings conducted both online and in-person. Out of them, in Armenia, 46 participants followed the training. In Kyrgyzstan, there were 44 participants. In the Republic of Moldova, 90 participants followed the training.

6. Three training seminars were organized as a two-day event. At each training the presentations were distributed into six sessions. The first day sessions were focused more on energy audit procedures, energy management information systems and municipal energy management. The second day sessions were oriented towards institutional, organizational, and legal aspects of energy management and monitoring, reporting and verification of energy efficiency measures, and economic evaluation and funding possibilities of energy efficiency measures in buildings. The training seminar included classroom lectures (with in-person participation and online connection) and classroom calculation exercises using various tools.

7. The main outcome of the training seminar was achieved: the participants gained knowledge and expertise on high-performance energy efficiency standards in buildings. At the end of each training seminar the participants were asked to fill in the questionnaire to share their perspective on the delivered national training course. The trainees were asked to provide their evaluation of organisational issues, the quality of training, and self-assessment of their own understanding of topics covered by the training.

8. Organization of the training was evaluated as follows: 4.6 out of 5.0 in Armenia, 4.2 out of 5.0 in Kyrgyzstan, and 4.8 out of 5.0 in the Republic of Moldova. Venue of the training seminar, the number and duration of breaks, and the time schedule of lectures were scored in the countries as 4.7, 4.6, and 4.8 out of 5.0. The average score of the overall duration of the training seminar was 4.3 out of 5.0.

9. Participants also scored (on the scale from 1.0 to 5.0) each session with various scores as presented in the Table below. The overall average scores of all the sessions were 4.4 in Armenia, 4.0 in Kyrgyzstan, and 4.7 in the Republic of Moldova.

Table  
Quality of sessions as assessed by session participants

<i>Title of session</i>	<i>Armenia</i>	<i>Kyrgyzstan</i>	<i>Republic of Moldova</i>	<i>Average</i>
Introduction to energy management and monitoring, reporting and verification in the buildings sector	4.3	3.8	4.7	4.3
Institutional, organizational and legal aspects of energy management and monitoring, reporting and verification at the global and EU level	4.5	4.2	4.7	4.5

<sup>9</sup> More information is available in the Final Report on National Training Seminars: <https://unece.org/sites/default/files/2022-03/Final%20Report.pdf>

<i>Title of session</i>	<i>Armenia</i>	<i>Kyrgyzstan</i>	<i>Republic of Moldova</i>	<i>Average</i>
Municipal energy management as part of the national monitoring, reporting and verification system	4.2	4.0	4.7	4.3
Energy management information system and examples of energy management system tools	4.3	4.0	4.7	4.3
Energy audits procedure of buildings and multicriteria analysis	4.6	4.0	4.7	4.4
Best practices of funding possibilities for energy efficiency measures in buildings	4.2	4.1	4.8	4.4
Average	4.4	4.0	4.7	4.4

10. Similarly, the participants scored the overall satisfaction with the training seminar (4.3) as well as the ratio between theoretical and practical part of the training seminar (4.4). The set of questions related to participants' improvement of understanding of the energy efficiency topics presented during the training seminar, their enhanced capacities to perform specific tasks related to energy efficiency, and improved capacities to deliver presentations on any specific topic presented is scored as very good with average scores of 4.0, 3.8 and 3.9 for Armenia, Kyrgyzstan, and Republic of Moldova, respectively.

11. The participants of the training seminars indicated the need for more such events to be organized regularly reflecting more local issues related to various field of energy efficiency and energy management information systems implementation in the countries. Some mentioned the need of such trainings focused on industrial energy management and energy auditing of industrial facilities with practical examples on how to use metering devices. Many participants commented that they would like to have more intensive energy auditing trainings. Some participants suggested to include more videos and visualisations for future trainings and provide more examples and more information on tools that they could use in practice. Most of the participants were, in general, very satisfied and commented that the trainings were well-organized and that the information provided was well structured.

### **III. Impact study on how member States could better use and implement best practices and guidelines to improve energy efficiency in buildings**

12. The project was implemented with the goal of achieving significant change by improving the knowledge of policymakers and experts from ECE member States on energy efficiency standards, including on enforcement mechanisms and energy-efficient technologies in buildings. The impact study analysed the project's impact and how member States could better use and implement the best practices and guidelines developed by ECE in their national and/or sub-national measures to address the issues of energy efficiency in buildings.

13. The study investigated the project's impact on: (i) its gender perspective; (ii) overall relevance, including its design and its specific activities; (iii) the extent to which member States implemented the recommendations and best practices, accompanied by examples from respondents' countries; (iv) the extent to which the project provided guidance for implementation of recommendations; (v) the extent to which the project increased stakeholder capacity to implement the recommendations; (vi) the remaining challenges of member States to implement the recommendations; and, (vii) the extent to which countries implemented recommendations from the cross-country or regional perspective.

14. Both an online questionnaire and in-person interviews were conducted for the purposes of the impact study. The analysis of responses delivered valuable results regarding the relevance of the project, its impact, and suggestions for future projects.

15. The results of questionnaire revealed that project activities advocated for gender equality. On a scale from 1.0 (very low) to 5.0 (very high), the average score was 3.7, indicating that respondents perceived that gender equality was advocated. Furthermore, participation of women in workshops serves as a good indicator of support in achieving the gender equality. The online Workshop on Energy Efficiency Standards in Buildings and their Implementation in the UNECE region, held on 9 April 2021, included 68 participants, of which 24 were women (35 per cent). In the Workshop on Regional and National Studies on a Gap Analysis between the Performance Objectives of the Framework Guidelines for Energy Efficiency Standards in Buildings and Implementation of Current Building Energy Efficiency Standards, which was held on 20 September 2021, 162 experts participated, of which 34 were women (20 per cent). The Workshop on Best practices to Address the Issues of Energy Efficiency in Buildings and their Implementation in UNECE member States on 11 March 2022 was attended by 64 participants, of which 28 were women (43 per cent). These numbers show that participation of women in the workshops was lower than that of men. Taking into consideration that women are a minority in the energy sector, the numbers are not surprising. Together with the high average score on the survey question regarding gender equality, the figures are appropriate to conclude that the project performed well in terms of supporting the gender equality. Nevertheless, more efforts should be made to ensure equal opportunities for participation of men and women in the future activities.

16. The impact analysis has shown that the project was relevant to achieving its objective and has had a valuable impact on all its key aspects. The survey respondents indicated that their country implemented the recommendations and best practices from regional and national studies. The survey also revealed that, overall, respondents are moderately confident about the future implementation of recommendations and best practices. The respondents were quite confident that the implemented recommendations and best practices will sustain in the future.

17. The interviews have shown that member States regarded the recommendations and best practices developed by ECE as very helpful and that countries have undergone efforts to implement them. All countries recognize the importance of energy efficiency in buildings and the pressing need to implement the recommendations and best practices. In line with the results from the survey, the countries have indicated several measures that have been implemented at the national or local levels to improve energy efficiency standards in buildings.

18. The key focus of the interviews was to gain insights into how the recommendations provided guidance to countries on the topic of energy efficiency in buildings. Interviewees indicated that a key aspect of providing guidance was addressed in the regional study through the gap analysis, national studies, and national trainings. The latter presented the necessary steps that countries need to take in order to improve energy efficiency in buildings. They provided knowledge and expertise gained from countries that are more developed in the area of energy efficiency in buildings, helped other countries to bring that knowledge back to their national decision- and policy makers. Furthermore, the regional study's gap analysis was mentioned as an essential tool that showed a need to boost transition progress in the energy sector and communicated the urgency that energy efficiency should be a focus of national and local efforts. Sharing of best practices, including on data collection, monitoring and verification, energy audits, and implementation of specific measures has provided valuable guidance to the project stakeholders. Consequently, this provides a value added, especially in the long term. Sharing of knowledge and recommendations, together with the success factors, has proven to be a key activity of the project that provides guidance to member States.

19. The impact analysis looked at the materialized impact that the project had on member States. Since the project has been completed very recently, the specific observable benefits were expected to be limited. Nevertheless, respondents indicated several activities that have been undertaken in their country to use and implement the recommendations. Overall, the responses can be grouped into several main categories:

(a) The impact was on implementation of national laws and policies, meaning that countries either revised existing laws or adopted new laws on energy efficiency in buildings. Additionally, normative documents and national energy strategies were updated in the project countries. For example, Albania adopted several by-laws implementing the 2016 Law on

Energy Performance in Buildings, including the methods for calculating and setting minimum energy performance requirements and certification of buildings. Georgia is working to harmonize its national legislation with European Union (EU) Directives. Kyrgyzstan worked on the legal framework and started implementing practical steps to address the requirements set in the relevant laws. The Republic of Moldova started to update its energy efficiency laws based on the EU Directives;

(b) The impact was also on updating national norms and standards. Countries have updated several normative documents and revised national standards on energy efficiency in buildings. Specifically, the regional and national studies have focused the attention of decision-makers on the gaps in neighbouring countries, motivating them to update the standards to reflect the level of efficiency for both existing and new buildings in the countries. For example, Armenia developed energy efficiency standards based on adjustments to the EU standards, and those standards were fully adopted by January 2022. These standards will be mandatory for all entities engaged in planning and construction work;

(c) The project led to improved measurements. Following the project participation, countries improved their data collection and measurement efforts as well as measured building energy performance in accordance with International Organization for Standardization (ISO) standards. Armenia, for example, implemented ISO standards. Specifically, the ISO standards were translated into the local language and registered as national standards;

(d) The project countries increased the number of energy audits being conducted. More audits have been performed following the project implementation. For example, Kyrgyzstan certified 20 energy auditors to assess the energy efficiency in buildings and issue the certifications. Construction companies are now required to engage energy auditors to certify the newly constructed buildings. Even though a lot of progress has been made in all countries, it is still a long process, and national systems are slow to absorb the changes;

(e) The impact was seen on implementation of energy management information systems. Some experts indicated that their countries have implemented the energy management information systems;

(f) The project contributed to awareness-raising. The training seminars conducted in the selected countries increased awareness about the topic of energy efficiency in buildings. Further, through awareness-raising campaigns and marketing, the public was informed about the importance of energy efficiency. In the longer term, this translates into the increased investments in retrofits or higher standards for newly constructed buildings. Educating homeowners about the benefits of investing in energy efficient retrofits of existing buildings or the construction of new buildings according to the high-performance standards is crucial to saving energy in the long term.

20. The impact study showed that countries engaged in efforts to raise awareness about the importance of energy saving and energy efficiency in buildings. On one hand, they informed decision- and policy makers about the need to improve legislative framework and update the norms and standards frequently. On the other hand, they also promote the need to invest in energy efficiency in existing buildings through retrofits. For example, awareness-raising activities in Armenia are implemented through extensive campaigns on energy efficiency in buildings and through engaging influencers and other famous characters and opinion makers. Also, through movies and banners, Armenia engaged in active efforts to communicate the benefits of investing in energy efficiency in buildings, such as the percentage of energy saved and the adhering cost savings. In Kyrgyzstan, active sharing of knowledge and promotion of the importance of energy efficiency in buildings have been an outcome that can be attributed to the project.

21. The study also revealed that countries are engaged in implementing and updating the building codes. Yet, there is a room for improvement, especially since building codes are not updated frequently enough. In Armenia, for example, the energy measurements of building codes do not account for cooling or hot water. The process is also moving in the direction to include cooling and lighting into the building codes. Also, other countries, like North Macedonia and the Republic of Moldova indicated that work on building certification is ongoing but that the process is not yet finalized. Interviews voiced the fact that

improvement of energy efficiency in buildings is a long process and that continuous efforts are required for ensuring that efficiency gains are met.

22. The impact study looked at how exactly the project was helping the countries to implement recommendations and best practices. One aspect was that the project, through the workshops and trainings, provided benefits beyond the technical training of participants. The project offered a platform for communication among experts. The interviewees emphasized the benefit of having an opportunity to exchange information and engage in discussions among experts within the framework of the project, especially after the COVID-19 pandemic. Knowledgeable experts facilitated discussions on a detailed level during the project events.

23. Another objective of the impact study was to formulate recommendations for future projects and how member States could better implement recommendations and best practices. The analysis of the interviews indicated that stakeholders believe that projects should focus on awareness raising and provision of information to the general public to educate about the importance of energy efficiency in buildings. Additionally, more examples should be provided, such as best practices on project implementation, public-private partnerships, and practical examples on the implementation of measures and energy saving calculations. Another recommendation was that projects should provide detailed information on energy measurements in accordance with the ISO standards. Respondents suggested working on climate data for monthly and hourly calculations. The analysis has shown that respondents suggest both a regional focus and a country-specific focus of future projects. While the regional focus is good for learning about experiences and best practices, the countries are interested in recommendations that are specific to their national context and infrastructure.

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