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Ex-post evaluation of legislative framework for energy efficiency in buildings in Croatia within Better Regulation framework

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ABSTRACT

To ensure a trust-worthy governance, the European Union (EU) has established a Better Regulation (BR) framework, which was adopted and enforces in Croatia since beginning of 2024 within its legislative reforms and efforts to access the Organization for Economic Co-operation and Development (OECD). BR instruments include regulatory ex-ante impact assessments, ex-post evaluations, stakeholder consultations and strategic foresight. Ex-post evaluation is of particular interest, as until now it has not been implemented on regular basis and in this format in Croatia.

The ex-post evaluation of the Energy Efficiency (EE) Act's provisions related to renovation of public sector buildings has been performed. Apart from quantitative results and impacts (e.g. number and surface of renovated buildings, energy and emission savings) that are based on data collection on implemented projects, this kind of analysis may provide also qualitative evaluation of processes, providing better understanding of different stakeholders' viewpoints. The ex-post evaluation based on BR methodology is expected to provide the overall better understanding of legal provisions' implementation, consequences they have on policy measures design and on implementation rules applied. The evaluation results are used to formulate recommendations for improvement of legal framework, considering both past experiences and new requirements of revised directives on energy efficiency and energy performance of buildings.

The results of this analysis as well as pros and cons of BR methodological approach to ex-post evaluation are discussed in this paper.

Introduction

Better Regulation (BR) is the foundation and key determinant of the EU policymaking process. It has been established with the aim of improving governance[1]. Trust-worthy governance that designs, adopts and implements policies and legislation understandable to and supported by all stakeholders concerned, is vital tool for ensuring delivery of desired targets at both EU and Member States (MS) level. Policy makers must ensure that policies and legislation are evidence-based, goal-oriented and simple, understandable and easily implementable to those affected. The processes leading to adoption of policies and legislation shall be transparent and highly participatory, involving citizens, businesses and all other relevant stakeholders. For that purpose, the following BR instruments and tools have been developed (EIPA, 2024): regulatory ex-ante impact assessments, ex-post evaluations, stakeholder consultations and strategic foresight.

[1] More about EU's BR agenda is available here: https://commission.europa.eu/law/law-making-process/better-regulation_en

The Republic of Croatia has recently adopted the BR legislation: The Act on BR Policy Instruments[2] has been enforced since January 1st, 2024, and subsequently the Regulation on the Methodology and Procedure for the Implementation of BR Policy Instruments[3], has been in force since February 15th, 2024. While ex-ante impact assessment has been well integrated in the legislative processes when adopting new or amending existing legislation before adoption of BR framework, ex-post evaluation is rather new instrument for Croatian policy makers. Therefore, the capacity building project "Strengthening the application of ex-post evaluation in Croatia" has been initiated and implemented in cooperation with the Directorate-General for Structural Reform Support of the European Commission (EC).[4] The project aims to enhance the capacity of the Legislation Office of the Croatian Government (GLO) and the line ministries to implement appropriate methodological tools and processes of ex-post evaluation of laws. Further, it aims to expand the current limited experience and capacities of the GLO and selected ministries to improve the effectiveness of the domestic legal framework in policy areas identified by the Croatian Government and the EC as important for the country's economic growth and convergence with the rest of the EU. Moreover, the project is also important in the context of the reforms that need to be implemented as milestones defined in the National Recovery and Residence Plan (NRRP) and OECD accession efforts of the Republic of Croatia.

This paper is based on the part of this project that is dedicated to the provision of technical support for the implementation of ex-post evaluation of legislation for the decarbonisation of buildings and improving energy efficiency of buildings. It is structured in three main parts. Firstly, the background of the work is presented. It includes an overview of the existing legal (and policy) framework for EE in buildings in Croatia, the scoping of the ex-post analysis and initial hypotheses. Secondly, the methodology for ex-post evaluation, aligned with BR framework, is explained. Finally, the preliminary results of the ex-post evaluation are presented and discussed. The lessons learned and the next steps conclude this paper.

Background

An overview of the existing legal (and policy) framework for energy efficiency in buildings

The area of EE in buildings in the Republic of Croatia is regulated by the EE Act[5], the Construction Act[6], and by-laws that follow from these Acts. These laws and regulations in Croatia meet the requirements of the following EU directives: Directive (EU) 2018/2002 and 2012/27/EU on energy efficiency (EED); Directive (EU) 2018/844 and 2010/31/EU on energy performance of buildings (EPBD) and Regulation (EU) 2018/1999 governance of Energy union and climate activities. The main provisions of two main legal acts for EE are given in the following table, whereas only provisions that may be related to EE in buildings are given.

Table 1. Overview of Croatian legislation for EE in buildings

Energy Efficiency Act
Obligation of the Government of the Republic of Croatia to adopt the National Energy Efficiency Action Plan for a three-year period with measures to be implemented on the entire territory of the Republic of Croatia in accordance with the Integrated National Energy and Climate Plan (NECP), which defines alternative policy measures including measures to ensure annual energy renovation 3% of the total floor area of heated and/or cooled buildings owned and used by the central government.

[2] Official Gazette No. 155/23

[3] Official Gazette No. 19/24

[4] The project has been and commissioned by the German Federal Ministry for Economy and Climate Action, with co-financing from the European Union Technical Support Instrument for the period 01.09.2023 to 31.08.2025. and implemented by German Agency for International Cooperation (GIZ).

[5] Official Gazette No. 127/14, 116/18, 25/20, 32/21, 41/21 and 41/25

[6] Official Gazette No. 153/13, 20/17, 39/19, 125/19

Obligation of counties and large cities (> 35,000 inhabitants) to adopt (three-year) Action Plans and annual energy efficiency plans
The obligation of the public sector to manage energy systematically, which implies the appointment of a responsible person for energy management, regular monitoring of energy consumption, and entry of energy consumption data in the national EMIS database Energy Management Information System) – Ordinance on Systematic Energy Management in the Public Sector (Official Gazette No. 18/15, 06/16))
Obligation to record all EE activities and achieved savings in the national system for monitoring, measurement and verification of savings (SMiV) for the public sector, energy service providers and subsidizers - Ordinance on the system for monitoring, measurement and verification of energy savings (Official Gazette No. 71/15, 30/22)
The obligation of competent ministries and the National Coordination Body to establish and manage the EE information platform – National Energy Efficiency Portal: https://www.enu.hr/
Framework for energy services (energy performance contracting) for the public sector buildings bases on the programme adopted by the Government – Regulation on contracting and implementation of energy services in the public sector (Official Gazette No. 11/15)
Provisions for contracting energy services and energy renovation of apartment buildings and determining the adoption of the decision on energy renovation on the basis of the majority of votes of co-owners calculated by co-ownership shares of the building and the number of co-owners
Construction Act
Energy management and heat preservation as one of the fundamental building requirements – The Technical regulation on the rational use and heat retention of buildings (Official Gazette No. 128/15, 70/18, 73/18, 86/18, 102/20) stipulates the minimum energy performance for new buildings and buildings undergoing major reconstruction, the manner of determining the energy performance of the building, preparation of the study on the use of alternative energy systems, and requirements for nearly zero energy buildings.
Ordinance on simple and other buildings and works (Official Gazette No. 112/17, 34/18, 36/19, 98/19, 31/20, 74/22, 155/23), which defines the execution of works on the energy renovation of buildings and renewable energy sources (RES) systems in accordance with the main project, without a building permit
Obligation of the Government of the Republic of Croatia to adopt the Long-term renovation strategy of the National Building Stock of the Republic of Croatia until 2050 (LTRS) and update it every five years
The obligation of the Government to adopt energy renovation programs for buildings for the period from 2021 to 2030 at the proposal of the ministry responsible for construction
Obligation to regularly inspect heating and cooling or air conditioning systems in buildings and energy certification of buildings – Ordinance on energy audit of buildings and energy certification (Official Gazette No, 88/17, 90/20, 1/21 and 45/21), Ordinance on the control of energy certificates and reports on regular inspections of heating systems and cooling or air-conditioning systems in buildings (Official Gazette No. 73/15), Ordinance on persons authorised for energy certification, energy audits of buildings and regular inspections of heating systems and cooling or air-conditioning systems in buildings (Official Gazette No. 73/15, 133/15, 60/20 and 78/21)

The legislative framework in Croatia recognizes the importance of energy renovation of buildings and gives a basis to adopt strategic and policy documents that will provide implementing details. As shown in Table 1, the main strategic documents for EE and energy renovation are Integrated NECP and LTRS. Based on these documents, specific energy renovation programs for buildings are adopted. These programmes provide a detailed approach to stimulating the implementation of individual energy renovation projects through grants ensured from national and EU sources (European Regional Development Fund (ERDF), Recovery and Resilience Fund (RRF)). The specific programmes have been developed for family houses, multi-apartment buildings, public sector buildings, buildings with cultural heritage status and social housing buildings at special state care areas (MPGI, 2021, 2022).

Therefore, within Croatian legal and policy frameworks there is a strong foothold for energy renovation of buildings. Supported by public funding from EU sources, this creates enabling environment for implementation of EE projects that lead to measurable results in terms of energy and emissions savings.

Scoping the legislative framework for the ex-post evaluation

As shown in the previous section, the legal and policy framework for EE in buildings is very broad, hence the first step was to streamline the focus of the analysis to a more limited scope of the legislation. In that respect, the overlapping contents of two main legal acts were sought as well as the importance of the provisions for the overall achievement of the ultimate goal – decarbonisation of the building stock.

Both the EE Act and the Construction Act prescribe the adoption of the programme for energy renovation of public buildings. In building renovation efforts, the public sector has a prominent role – it needs to demonstrate leadership and through 'lead-by-example' actions demonstrate the benefits that result from improved EE. Given this role of the public sector, special attention in the scoping analysis of current national legislation is given exactly to this area, which is covered by the EE Act, in its section V. The main provisions define energy service, energy performance contract and the rules for energy performance contracting in the public sector. Croatian Real-estate Agency[7] (APN) has been given the task to conduct the public procurement procedure for energy services related to energy renovation of the public sector buildings on behalf of public entities that are the users of the state budget the Republic of Croatia, in accordance with the energy renovation program for public sector buildings. The procedure for contracting energy services for renovating public sector buildings – including the roles of the service provider and client, contract details, and budget monitoring – is defined by a regulation issued by the Government of the Republic of Croatia, based on a proposal from the Ministry of Physical Planning, Construction and State Assets (MPGI).

As these legal obligations have clear roles and responsibilities, they were selected to be the scope of the ex-post evaluation. The provisions of the EE Act identify two secondary documents - Regulation on contracting and implementation of energy services in the public sector[8] and Programme for energy renovation of public sector buildings – both of which were analysed within the ex-post evaluation. This is illustrated in Figure 1.

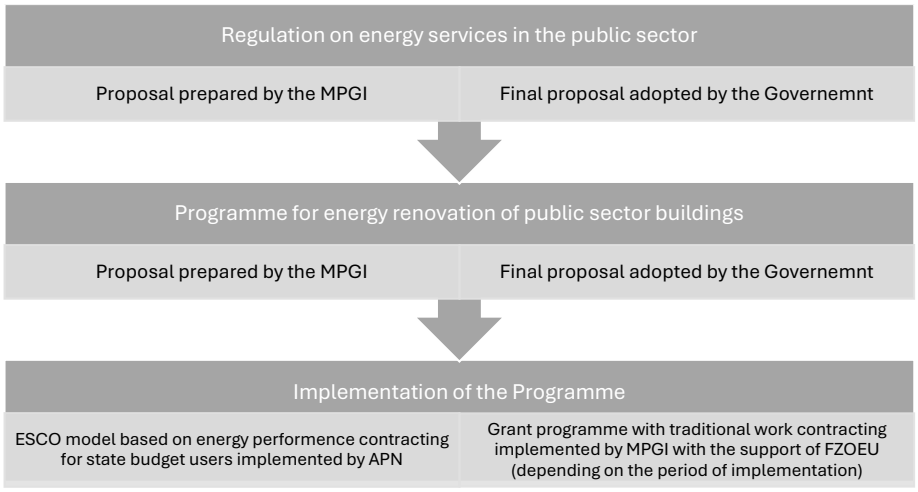

Figure 1. Scope of ex-post evaluation of EE Act provisions relating to energy renovation of public sector buildings

Initial hypotheses

The evaluated provisions of the EE Act focus on the energy renovation of public sector buildings through energy performance contracting, in accordance with the Regulation on contracting and implementation of energy services in the public sector and the Programme for energy renovation of public sector buildings.

[7] The Agency a state agency responsible for managing contracts related to the purchase, sale, rental, renovation, and energy efficiency of real estate, as well as implementing housing loan subsidies and reconstruction of homes damaged by earthquakes on behalf of the Republic of Croatia

[8] Official Gazette No. 11/15

The main feature of evaluated EE Act's provisions is that they are creating an enabling framework for the implementation of the energy services (ESCO) model in the public sector for energy renovation of buildings, with ensured institutional support (through clear obligations of APN) and financial support (through grant support defined in the Programme). While these provisions bring clear obligations to the MPGI and APN, they do not put the obligation on public sector entities to implement the ESCO model nor to renovate their buildings, i.e. public sector entities utilise these provisions on a voluntary basis. Similarly, these legal provisions did not oblige the companies supplying equipment and construction work for building energy renovations to adopt the ESCO model and offer energy services, instead of simply providing traditional work contracts. They needed to recognise the benefits of the ESCO model themselves in order to transition into energy service providers.

In that respect, it was preliminary identified that the ex-post evaluation might be focused on the following questions:

1. Have the MPGI and APN implemented their legal obligations in the optimal manner, i.e. have they complied timely and efficiently to attract the public sector entities to renovate their buildings and to attract companies to transform their business to the ESCO model?
    - For this purpose, an evaluation of the implementation process is suitable, looking at feasibility, economy and efficiency criteria.
2. What are the results of undertaken activities, in terms of savings achieved, ESCO market development, recognition of and interest in energy renovation and EE in general among public sector entities? Has the compliance with the EU policy requirements (EED and EPBD specifically) been ensured?
    - For this purpose, an evaluation of implementation results may be suitable model of ex-post evaluation, looking at relevance and compliance criteria.
3. Did these legal provisions contribute to long-term targets for the decarbonisation of national building stock? Would the impacts be the same if these provisions and related regulations and programmes were not in place?
    - Answering these questions requires evaluation of achieved impacts, for which control groups are needed, according to BR methodology.

A preliminary analysis was first conducted to develop hypotheses that would later be tested and confirmed or rejected during the ex-post evaluation process. It revealed that selected legal provisions have resulted in a significant number of renovated public sector buildings, either through the ESCO model or traditional work contracting model, both supported by grants from national or EU sources. The projects under the ESCO model are more comprehensive as they are based on the optimal selection of EE measures to enable the highest performance, but their number is lower. Preliminary analysis also revealed that Croatia has achieved 93% of targeted energy savings for public sector buildings in the period 2014 -2020 by implementing the Programme (MoE, 2022). Hence, its main purpose has been fulfilled. Targets for the period until 2030 are even higher and the requirements of new EU directives, EED and EPBD, call not only for continued effort in renovation but also further promotion of energy services, especially in the renovation of large public buildings.

In the previous period, there was an obligation to renovate annually 3% of central government buildings, which was derived from the EU directives and stated as a general target in the EE Act, without nominating the exact obligated parties. This obligation was fulfilled in the previous period, mainly through ESCO projects, and to a much lesser extent through projects financed by European Structural and Investment (ESI) grants. Namely, dominant users of the ESI grants were local level authorities and institutions, while engagement of central government institutions was much lower.

Based on this, the following two hypotheses, that will be confirmed or rejected through the comprehensive ex-post evaluation were set:

- Hypothesis no. 1 – Implementation of selected legal provisions was successful and contributed to long-term targets for achievement of energy efficient and decarbonised building stock; hence their implementation needs to be continued with updates directed to speeding up the processes and increasing the number of renovated buildings, and
- Hypothesis no.2 – Given the clear obligations defined by the EU directives, new legal provisions should be more specific in prescribing the obligation to the public sector entities to renovate their buildings (e.g. obligation for all worst performing buildings) and to implement an energy service model (e.g. large public buildings with a total useful area above 750 m^2).

Methodology

Evaluation models

To conduct an ex-post evaluation of the selected provisions of the EE Act focusing on energy renovation of public sector buildings, the methodological approach must integrate both quantitative and qualitative research methods to confirm or reject the set hypotheses. The methodology applied must strictly follow the approach given in the Regulation on the Methodology and Procedure for the Implementation of BR Policy Instruments and the dedicated Guidelines (GLO, 2024).

The methodology distinguishes their evaluation models: 1) evaluation of process; 2) evaluation of results/performance and 3) evaluation of impacts. The process evaluation determines the success of implementation and possible difficulties in implementing legislation. The evaluation of the achieved results determines whether the legislation has contributed to the achievement of the specific objective of the legislation and whether it has caused unintended consequences. The evaluation of the impact achieved determines to what extent the legislation has contributed to the achievement of the expected long-term situation in the administrative area.

Initial assessment of the current situation and achievements in the analysed scope of the legislation led to the selection of the most appropriate evaluation model. Starting point is always evaluation of the process, which provides the insight into whether the legislation is being implemented and to what extent, whether new subordinate legislation has been adopted and is in force, whether all actions from the legislation have been implemented and whether difficulties in implementation have been observed. When difficulties in implementing the legislation or delays in implementation are observed, it is necessary to identify and explain their causes. If the initial assessment shows that the legislation is not being implemented, or that delays or significant challenges exist, the evaluation process is concluded at that stage. In such cases, further implementation of other evaluation models is unnecessary, because the regulation has clearly failed to deliver the expected results. Only if if the legislation has been implemented to some extent can an evaluation of its results and impacts be meaningfully carried out.

The evaluation of results aims to establish a clear correlation between achieved results and implementation of legislation, while the evaluation of impacts determines how strong is this correlation in the long-term. This can be done using a control group to assess how much of the observed impact can be directly attributed to the legislation. However, applying a control group approach can be challenging in this context, as it may be difficult to find a group that was not affected by the legislation being evaluated.

Evaluation criteria and KPIs

The required criteria for each evaluation model are shown in Table 2. All the criteria presented were used in the evaluation.

Table 2. Overview of ex-post evolution models and evaluation criteria

Evaluation criteria	Description	Evaluation model in which criteria is obligatory		
compliance	Activities implemented as prescribed in legislation and activities that contributed to the implementation of legislation	process	results	
efficiency	Achieving results by using available capacities within set deadlines			
cost-effectiveness (effectiveness)	Availability and use of capacities for implementing legislation in a cost-effective manner			
coherence	Horizontal and vertical compliance with the legal system			
relevance	Achieved specific regulatory objectives and their contribution to strategic target			impacts
sustainability	The contribution of legislation to the sustainability of the achieved situation in the administrative area			
impact	Long-term goals in the administrative area that have been achieved through the implementation of legislation			

The next step in prescribed ex-post methodology is to prepare a detailed evaluation plan, containing evaluation questions, key performance indicators (KPI) and data sources to determine the values of KPIs.

Data sources for KPIs

For the purpose of this ex-post evaluation both quantitative and qualitative data are needed. For obtaining quantitative data, databases on implemented renovation projects and energy consumption in public sector buildings have been used. System for monitoring and verification of energy savings SMIV (MINGO, 2025) is managed by the Ministry of Economy (MINGO), however, the obligation to enter data into the system is prescribed for the public sector entities, energy service providers and subsidy providers. Energy Management Information System ISGE (APN, 2025) is used for monitoring energy and water consumption in public sector buildings. Hence, the data on realised energy and water consumption in the public sector are available from this system. This enables to monitor the actual effects in the public buildings after the renovation. Managed by APN, it is used by energy administrators from public sector institutions to track the energy consumption of buildings and systems under their direct control. Where remote reading is available, the ISGE database automatically collects the consumption information and enters it into the system. In other areas, the administrators input the monthly bills and/or reading of meter status and monitor how the consumption changes over time. And finally, MPGI administers another database, eObnova, in which the details of every post-2020 earthquake building renovation project are input. These details include the budget, costs, and scope of the renovation as well as the planned outcomes in terms of energy savings (MPGI, 2025). All these systems are official data sources managed and used by the competent authorities. They provide information on the renovated area of buildings, achieved energy and emission savings, total investment costs and the amount of public funding.

The structured or semi-structured meetings/interviews and online survey has been used to get qualitative data and information about the implementation process, from different stakeholders' points of view. To evaluate achieved impacts, the methodology prescribed the use of focus groups – one group comprising stakeholders implementing analysed legal provisions and second group (control) of those who have implemented the building renovation projects but outside the Programme. The first step would be to determine whether there are sufficient participants that may form a control group - a group that has implemented energy renovation of public buildings, but not under the provision of the EE Act and related Programme. For that purpose, an online survey has been prepared and sent to the public sector entities. The results of the online

survey were used to decide on the possibility to establish a control group for impact evaluation. The aim of focus groups would be to understand the reason behind the inclusion or avoidance of the available support models for energy renovation of public sector buildings. However, the survey results showed quite uniform standings of the public sector entities – renovation of public buildings hardly happens outside the Programme, due to lack of own funding and capacities. Therefore, the focus groups approach has not been implemented, as the control group could not be formed.

After the collection of data and information, the preliminary evaluation results were obtained (preliminary answers to evaluation questions with initial, planned and achieved values of KPIs). These results were then, according to the methodology, discussed in a consultation workshop with relevant stakeholders – public sector entities and market actors, i.e. ESCO or construction companies, included in processes of energy renovation of public buildings. Within the consultation process, the aim was to reveal the reasons why public sector entities and companies aware of the Programme chose not to apply, focusing on discouraging factors and decision-making context. Particular attention is paid to stakeholders' perceptions of the process's complexity, clarity, speed, efficiency, and overall awareness of the programme.

Evaluation plan

The evaluation plan builds upon the findings of the existing situation analysis, which provided a comprehensive overview of the legislation and the accompanied implementing regulation and programmes under review and presented preliminary findings and hypotheses. The evaluation plan outlines the evaluation design, primary criteria, pivotal questions, and specific data required for a thorough ex-post evaluation, along with a set of KPIs to measure the success of the outlined EE Act provisions. This is all presented in the intervention logic, as given in Table 3. Please note that Table 3 gives only shortened version of the intervention logic used to formulate evaluation plan and perform evaluation accordingly.

Table 3. Intervention logic matrix for formulating evaluation plan

Stage in the intervention logic		Key performance indicator (KPI)	Data source
Inputs (I)	I.1 Human resources	Number of employees (real vs. needed; % of staff needed)	Ministry, Agency, EE Fund (workload analysis)
	I.2 Financing for implementation	Allocated budget (EUR); Share in the total budget needed according to Programme (%)	Budgets of Ministry, Agency, EE Fund
	I.3 Financing for renovation	Used budget (EUR)	Budgets of Ministry, Agency, EE Fund; SMiV
Activities (A)	A.I Preparation of the Programme	Time between start of drafting to adoption (months); Number of included stakeholders	Ministry (internal records and assessment)
	A.II Implementing ESCO model	Number of workshops for mobilising interest, expressions of interest, feasibility studies, public procurements, concluded contracts, fulfilled contracts, terminated contracts	Agency (internal records and assessment)
	A.III Monitoring and evaluation	Number of projects recorded in SMiV and ISGE Issued penalties	SMiV, ISGE, Agency (internal records and assessment)
Outputs (OP)	OP.1 Public sector buildings renovated	Number of renovated buildings; Energy savings achieved (kWh/a; cumulative)	SMiV eObnova
	OP.2 Cost-effectives of renovation	(€/kWh) in ESCO model vs. traditional grant model	SMiV
Outcomes (OC)	OC.1 Awareness of the public sector	Number of energy service contracts not related to the Programme	Electronic system for public procurement (EOJN)
	OC.2 Development of ESCO market	Number of companies offering energy services/energy performance contracting	Electronic system for public procurement (EOJN)

Impacts (IM)	IM.1 Contribution to decarbonisation targets	Achieved vs. targeted renovation of public sector buildings (m^2; %)	SMiV LTRS
	IM.2 Contribution to energy savings targets	Achieved vs. targeted cumulative energy savings for public sector buildings (kWh; %)	SMiV, NECP NECP report 2025

Evaluation report and recommendations

Final step in the methodology is to prepare evaluation matrix and evaluating report (both in prescribed template) with recommendations. The final recommendation is selected between three options: 1) continued implementation of the regulation, 2) its amendment or 3) the termination of the regulation. The recommendation must be justified based on the findings of the evaluation process so that the recommendation is clear, implementable and, if possible, with the steps for implementing the recommendation.

The described methodology is illustrated in Figure 2.

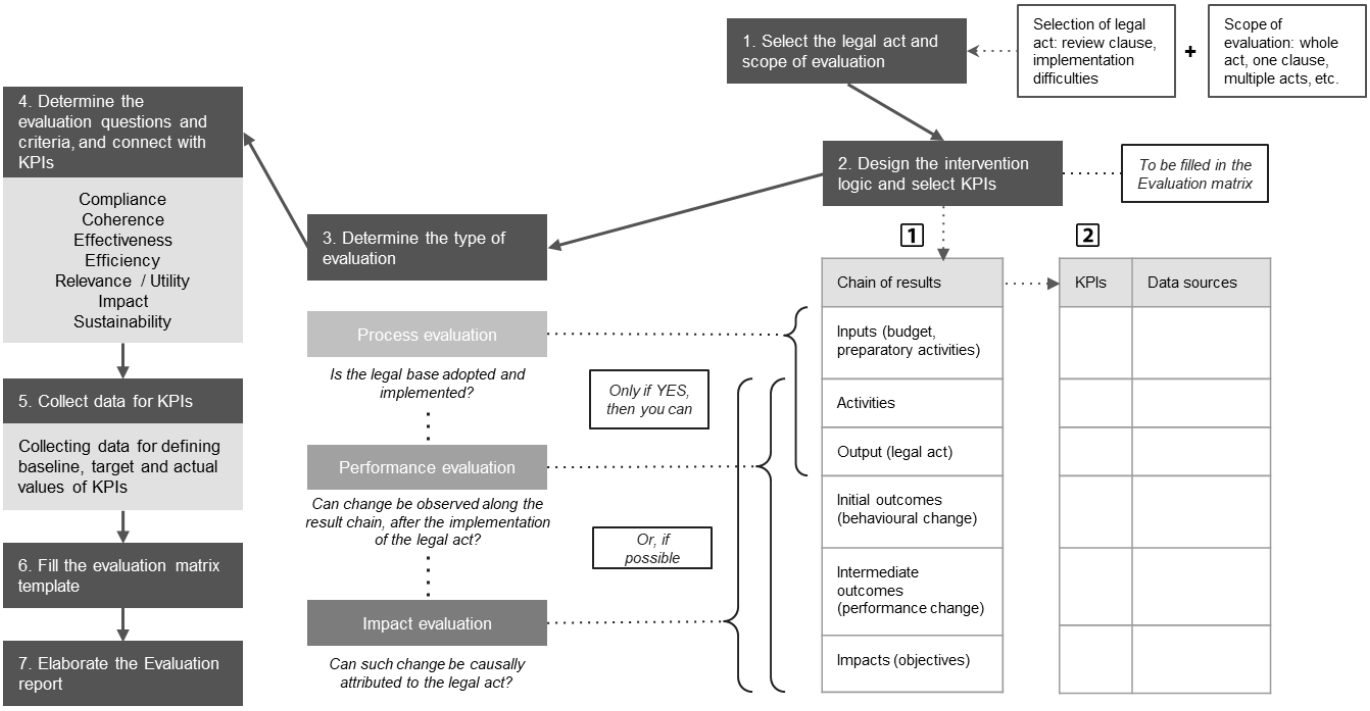

Figure 2. Methodology for ex-post evaluation (GIZ, 2023)

Results

Implementation of evaluation models

Considering the developed intervention logic, and in line with the analytical background, it was concluded that all three evaluation models may be applied. However, the process analysis has confirmed that the legal framework is well-implemented, with established procedures for program adoption, procurement, and contracting. Institutional capacities and funding availability are also assessed, but no major process-related obstacles have been identified. Lack of capacities in implementing institutions (Ministry, Agency) remains the issue, however budgets for external services were available, bridging this gap to satisfactory level. Hence, it was

decided not to further deep dive into the analysis of the processes, but to focus on performance evaluation, and if possible, impact evaluation.

Namely, the explicit goal of the analysed legal provisions was to facilitate energy renovation of public buildings, which will deliver energy and emission savings and potentially increase the use of renewable energy sources in public buildings. Therefore, the quantitative data on these results will be analysed (OP.1 in Intervention Logic Matrix). To evaluate the cost-effectiveness of this model, the costs of saved energy will be calculated and compared to the traditional model of contracting only renovation works (OP.2 in Intervention Logic Matrix). Finally, the implicit goal of the analysed legal provisions is to create a strong energy service market. This is a longer-term target and requires changes in market participants' operations. The evaluation will rest on data on procurement processes for energy services undertaken by public sector entities (OC.1 in Intervention Logic Matrix) as well as the identification of the number of energy service companies offering such services (OC.2 in Intervention Logic Matrix).

Impact evaluation faces challenges due to difficulties in forming control groups, as most public buildings undergo renovation through state-supported programs. Namely, an online survey has been conducted among the representatives of the public sector, revealing that only few local authorities have used own budgets for energy renovation of buildings (EIHP,2025). This situation disables the establishment of the counterfactual scenario analysis with control group mechanism. Therefore, the impact evaluation was limited.

Tackling processes, but focusing on performance (results) and impacts, the evaluation questions could be set for all seven evaluation criteria as listed in Table 2. Due to the limitations in the lengths of this paper, exact evaluation questions will not be presented, but the summary of questions under each evaluation criteria is given hereafter:

- Compliance – questions to assess the degree to which the legal obligations have been adhered to, encompassing inputs, resources, roles, and responsibilities from the state bodies involved, while also considering any challenges identified (relation to I and A in Intervention Logic Matrix).
- Efficiency – questions to assess the direct results of the implementation of analysed legal provisions in terms of renovated buildings and achieved energy and emission savings (relation to OP.1 in the Intervention Logic Matrix), the results will also be put in the relation with inputs, whereas capacity sufficiency for all necessary activities will be of particular interest.
- Cost-effectiveness – questions to assess the relation of the invested funds and achieved results in different models to reveal their cost-effectiveness (relation to OP.2 in Intervention Logic Matrix).
- Coherence – questions to assess the alignment with EU policy and legislation as well as with national strategies relevant for energy, EE, decarbonisation and buildings, but also with the programmes for the use of EU funds (relation to OC and IM in Intervention Logic Matrix).
- Relevance – questions to assess the original purpose of the analysed EE Act provisions (relation to OP and OC in Intervention Logic Matrix) and elaborate the need for continuation of their implementation, from both national and EU policy point of view.
- Sustainability – questions to assess (qualitatively) the probability that analysed legal provisions will ensure long-term benefits, in the context of 2050 decarbonisation targets.
- Impact – questions to assess the contribution of analysed legal provisions to the long-term targets set in LTRS and NECP (relation to IM in Intervention Logic Matrix) and wider benefits and other impacts that may occur in the long-term because of implementation of the analysed legal provisions (e.g. spill-over effect to other market segments, public budgets and expenditures effects, etc.)

Since the whole evaluation process is comprehensive and the selected focus is on performance evaluation, the evaluation results related to efficiency and cost-effectiveness criteria are given.

Efficiency and cost-effectiveness

To evaluate the efficiency criteria, the roles of MPGI and APN in implementing legal provisions for energy renovation of public buildings, focusing on programme adoption, contracting procedures, and institutional capacity were examined. While MPGI adopted the programmes on time and APN carried out a wide range of actions to support energy performance contracts, the evaluation found no strong link between institutional capacity and success rates. Shifting structures over the 10-year period made it difficult to assess capacities, and since tasks were largely completed as required, deeper analysis was deemed unnecessary.

The results evaluated are related to the implementation of the individual energy renovation projects under the Programme for energy renovation of public sector buildings. This Programme has had three phases: 2014–2015, 2016–2020, and the current phase extending to 2030. In period 2014 – 2020, the Programme was implemented through ESCO model (with grant support from national EE Fund) and traditional works model with grants from EU sources (ERDF) for deep renovation. Additionally, grants from national EE Fund for individual EE measures were available. In the most recent period, the Programme is funded by RRF. The achieved annual energy saving is shown in Figure 3. In period 2014-2020, the majority of new annual savings comes from ESCO projects or projects co-financed from ERDF. The later were still implemented throughout 2021. In new period, support was dominantly provided for RES measures from national EE Fund. In 2023, some of the major post-earthquake renovation projects were finalised, using the funding from RRF.

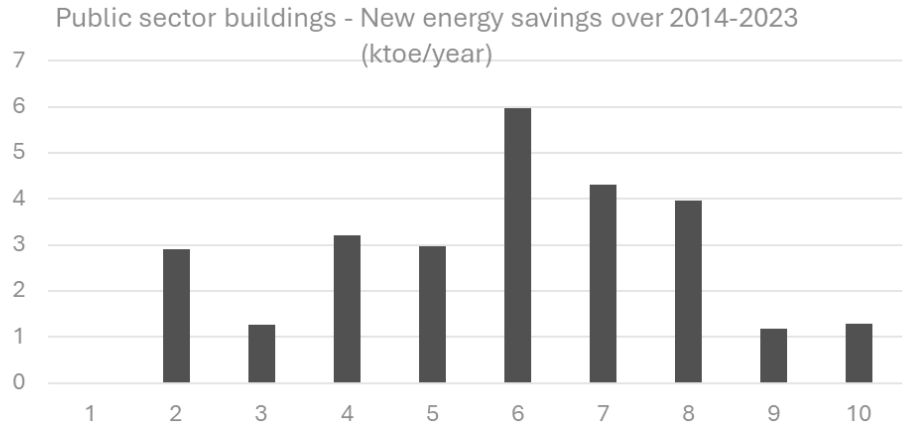

Figure 3. New annual energy savings achieved within the Programme in period 2014-2023 (ENSMOV, 2025)

The cumulative target for the period 2014-2020 was set to 66.2 ktoe (MoE, 2022), while the achieved cumulative savings amount to 61.8 ktoe. Therefore, the 93% of the planned target was achieved. 36% of cumulative savings come from projects implemented by the ESCO model, 30% from deep renovation projects with grants from ERDF, and 34% from projects co-financed by the EE Fund for individual measures. It is also interesting to note that there were only 69 buildings renovated at 12 locations with ESCO model and the savings from this relatively small number of projects are comparable to savings achieved in about 800 energy renovation projects funded by ERDF.

In the period 2014-2020, approx. 40 million € was ensured from the national sources, i.e. EE Fund, to grant support for public sector entities implementing energy renovation based on ESCO model. These renovation projects have brought 256 GWh savings over their lifetime. The cost-effectiveness ratio of the policy measure would therefore be 15.63 eurocents/kWh saved considering lifetime savings. Since grants amounted to 40% of investment, the cost-effectiveness ratio from beneficiaries' viewpoint would thus be 23.44 eurocents per kWh saved over the action lifetime. In the same period, 194 million € was used from ERDF in form of grants, with achieved cumulative savings of 719 GWh resulting in cost-effectiveness ratio of the policy measure 26.98 eurocents/kWh saved considering lifetime savings and from beneficiaries' viewpoint 44.97 eurocents per kWh saved over the action lifetime, as grant rates were higher.

For period 2021-2023, the distinction must be made between RES-based projects supported by the EE Fund and complex post-earthquake renovation projects. For the former, the cost-effectiveness of policy measure is 1.84 eurocents/kWh saved considering lifetime savings. This high cost-effectiveness is the result of much lower investment costs needed to upgrade the building systems than to deeply renovate the buildings, which always includes intensive construction works on the building envelope as well as long lifetimes of these actions. Taking into account the grant rate of 40%, the cost-effectiveness from beneficiaries' viewpoint is 2.76 eurocents per kWh saved over the action lifetime. However, prioritization of this measure should align with the energy efficiency first principle, meaning these measures should only be applied to energy-efficient buildings with low energy demand (higher energy classes). For the post-earthquake renovation projects, determination of the cost-effectiveness in the same manner would be seriously misleading due to huge investment costs that are only in small part related to energy renovation.

Other evaluation aspects

The overall ex-post evaluation exercise includes other KPIs, as explained in the methodology and evaluation plan, but due to length limitations, they are not presented in detail in this paper. One of the important parts of the evaluation process was stakeholders' consultation, to reveal their viewpoints about the legal provisions and their implementation in practice. This process revealed that the public sector is heavily relying on grant support from the state and is seeking more and higher grants and simpler administrative procedures for obtaining these grants. Local authorities in general prefer investment grants to ESCO model, while ESCO is more suitable for large, energy intensive central government buildings (e.g. hospitals). The impacts of the Regulation and Programme on the energy service market are still limited. There are several companies offering such services for energy renovation of buildings. However, there are significantly more companies offering energy performance contracting in public lighting, showing that legal provisions on energy performance contracting in the public sector did cause market transformation, at least in this segment.

The complete ex-post evaluation results are given in the final evaluation report and prescribed evaluation form, in line with BR regulation requirements.

Conclusion and recommendations

The ex-post evaluation of policy under the BR methodology provides several key benefits:

1. Assessing policy effectiveness – it evaluates whether the policy has achieved its intended objectives, such as energy savings, financial efficiency, or market development.
2. Evidence-based decision-making – it provides quantitative and qualitative data to inform future policy improvements, ensuring decisions are based on actual outcomes rather than assumptions.
3. Cost-effectiveness – by analysing costs versus benefits, it helps determine if resources were used optimally and whether alternative approaches could deliver better results.
4. Identifying weaknesses and bottlenecks – it highlights administrative, financial, or operational barriers that may have hindered policy implementation (especially from different stakeholders' points of view), allowing for targeted improvements.
5. Stakeholder engagement and transparency – it involves consultations with affected parties, ensuring policies remain aligned with their needs and fostering greater stakeholder support.
6. Alignment with EU and international standards – it ensures compliance with evolving EU directives and OECD best practices, supporting regulatory harmonization.
7. Guiding future policy reforms – findings from ex-post evaluations provide recommendations for refining existing legislation or designing new, more effective policy instruments.

The ex-post evaluation presented in this paper confirmed initial hypotheses established. It brings the recommendations to maintain and strengthen the legal provision related to the energy renovation of public buildings and promotion of the energy services for that purpose. The main challenge is to ensure that at least 3% of the total floor area of buildings that are owned by public bodies are renovated each year and transformed into at least nearly zero energy buildings or zero-emission buildings. This will be hard to achieve with the current practice of providing only the 'carrot'. Implementing models defined in the programmes for energy renovation of the public sector proved to be successful, but they are based on voluntary actions of public sector entities. Clear legal obligations for public sector entities, based on criteria that are stated in EU directives, could be the solution.

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