SPECIAL REPORT 20/2026 **EN**

Improving the energy efficiency of private homes with the RRF

Broad financial support, but weaknesses in the foundations

CURIA RATIONUM
EUROPEAN COURT OF AUDITORS

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Main messages

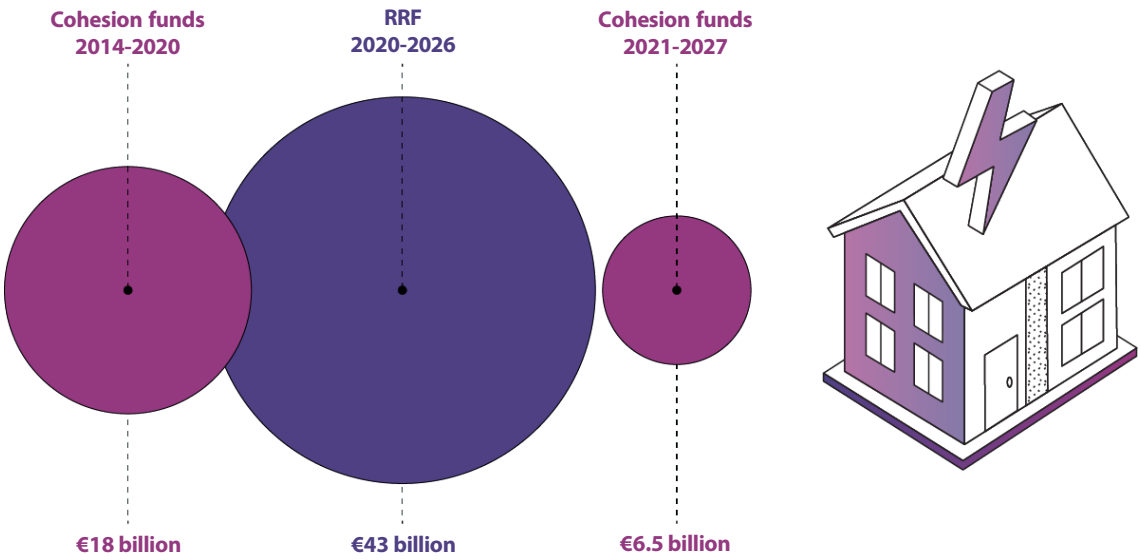
Why this area is important

01 Residential buildings accounted for 26 % of energy consumption in the EU in 2023[1], and reducing this figure is key to the EU's pursuit of its energy targets. The EU and its member states have been taking action for many years to improve the energy efficiency of the building stock. EU financing used to be mainly provided through the cohesion policy funds. Since 2021, the Recovery and Resilience Facility (RRF) – which requires a significant proportion of funding (37 %) to be dedicated to climate and energy targets – offered member states the opportunity to boost residential energy efficiency improvements. Furthermore, the Commission has included in its proposal for the 2028-2034 EU budget the option to continue financing renovations.

02 According to the data available as at January 2026, the member states planned to spend €43 billion in RRF funding directly on energy efficiency measures for renovating residential buildings. This corresponds to about 8 % of the total available RRF funds and 17 % of the contribution to the climate and energy targets. ***Figure 1*** presents further comparison with the EU budget for energy efficiency under the cohesion funds.

[1] Energy statistics – an overview, Figure 10, Eurostat (May 2025).

Figure 1 | EU funding for the energy efficiency of residential buildings



Source: ECA, based on cohesion data and the Commission's database for the RRF (FENIX).

03 This audit examined whether the RRF measures (both investments and reforms) contributed to the energy efficiency of residential buildings in an effective and cost-effective way. In particular, we looked at whether key features of the RRF set-up and the design of RRF energy efficiency measures were adequate to address renovation needs. We also looked at whether the RRF energy-saving measures' progress, results and cost-effectiveness were adequately monitored.

04 We expect this report to be of interest to the public, as all the member states have launched renovation schemes, impacting residents. The report provides input for improving future EU-funded energy efficiency measures in residential buildings, through better targeting of the measures. It also aims to enhance the way energy savings resulting from these measures are calculated and reported. For more background information, and details on the audit scope and approach, see ***Annex I***.

What we found and recommend

05 Overall, we conclude that while the RRF provided broad support for improving the energy efficiency of residential buildings, weaknesses in the set-up and implementation of the renovation measures limit the extent to which they deliver actual and cost-effective energy savings. We found that the RRF mostly financed medium-depth renovations. Reforms were not clearly defined and their effect on investments and energy savings has not been demonstrated. There were delays in implementation, and cost-effectiveness and the actual results of renovation measures were not adequately analysed and monitored.

06 Before the launch of RRF, the Commission had already stressed the importance of achieving a highly efficient building stock, including through deep renovations (i.e. with more than 60 % savings). However, the RRF Regulation made no reference to deep renovations, and the measures selected by the member states did not directly target such renovations to meet the EU energy objectives. If not planned in a coherent way as a first step towards higher energy efficiency, light or medium renovations risk creating lock-in effects (paragraphs ***17***-***24***).

07 We found that the four member states selected for this audit (Belgium, Italy, Cyprus and Lithuania) applied eligibility criteria when selecting specific renovation projects for the RRF measures, although with some limitations. They also did not conduct a comparative assessment of the renovation projects submitted. All eligible renovation projects were financed without a comparative quality assessment, potentially limiting their focus on types of works that would produce high nominal energy savings (paragraphs ***25***-***26***).

08 In assessing the RRF reforms, we found that both the RRF Regulation and the Commission's guidance lacked clear definitions of what constitutes a reform, leading to inconsistencies across the RRF national recovery and resilience plans (NRRPs). Moreover, due to the absence of suitable indicators, it is difficult to measure the RRF reforms' effects on energy efficiency investments and thus on energy savings (paragraphs ***27***-***31***).

09 Our analysis of the measures' progress highlighted the fact that, across EU member states, most RRF measures relating to energy efficiency in the residential sector lacked result-oriented targets in terms of energy to be saved. The member states followed the Commission's guidance, basing targets on output indicators. This limits the possibility to assess the RRF measures' results in terms of energy efficiency and evaluate performance (paragraphs ***32***-***35***).

Recommendation 1

Improve the targeting of renovation measures

When assessing the measures for the renovation of residential buildings proposed for financing under the next MFF, the Commission should check the extent to which the member states:

(a) include deep renovations;

(b) set a clear target for each appropriate individual measure in terms of the energy savings to be achieved, to track performance across measures and member states and facilitate aggregation. The target should be well substantiated and be coherent with the design of the measure, the funding provided and the initial baseline situation and needs.

Target implementation date: 2027

10 In addition, we observed that there was high demand for measures that are simple to implement or associated with a high level of support, and that such measures progress quickly. More complex measures, such as those entailing roof and wall insulation, faced implementation delays or low demand, and led to revisions to the NRRPs. We noted that, despite revisions, some RRF measures risk not being completed within the RRF deadlines, which can affect the results achieved (paragraphs ***36***-***40***).

11 The Commission encourages member states to use energy performance certificates as the main tool for calculating energy savings achieved for all EU-supported programmes, including the RRF. These certificates help identify the improvements in renovated buildings. However, the information on energy savings contained in the energy performance certificates is not reliable, comparable or detailed enough for it to be used for the meaningful monitoring of results. In particular, there is a gap between estimated consumption (as calculated through the energy performance certificates) and actual consumption, as the latter is also driven by human behaviour. Not taking this gap into account leads to significant differences between estimated and actual savings (paragraphs ***41***-***47***).

12 In terms of reliability, we found that the checks carried out by the national or regional authorities on energy performance certificates identified a significant level of anomalies. Our analysis of the certificates and alternative methodologies applied in the selected member states showed additional weaknesses, such as incorrect estimates of energy consumption, affecting the savings reported (paragraphs ***48***-***55***).

13 We also found that the information on energy savings reported by the Commission under common indicator 1 covers all RRF measures, including those concerning public buildings or enterprises. However, the data is sent by the member states in an aggregated format that does not allow for a specific assessment of renovation progress in residential buildings. The Commission does not clearly indicate that the information on savings is based on theoretical calculations which do not sufficiently reflect actual savings. Furthermore, the Commission carries out plausibility checks, but does not check the figures in more detail, limiting the possibility of carrying out adequate performance monitoring (paragraphs ***56***-***61***).

14 Finally, our analysis of the costs of supporting renovation projects under the RRF showed high variability in the cost per unit of energy saved in the selected member states, which was not further analysed by the Commission. Overall, the cost-effectiveness of building renovation measures is not tracked. In particular, we consider that the Italian *Superbonus* measure, which was financed using both Italian and RRF funds, and which covered up to 110 % of costs incurred by recipients, was not in line with the principles of sound financial management, and did not represent a cost-effective use of EU funds. While the RRF was intended to be a "performance-based instrument", there is no requirement to track cost-effectiveness in the Regulation (paragraphs ***62***-***69***). In our recent special report 14/2026 on RRF traceability and transparency, we pointed to weaknesses in the collection of data on actual costs and recommended that such information be used to assess and achieve efficient use of EU funds.

Recommendation 2

Transparently report on savings and evaluate the RRF measures to improve the energy efficiency of residential buildings

In order to better assess the results of the RRF energy efficiency measures for residential buildings, the Commission should:

(a) disclose further information on the methodology used for common indicator 1, and explain how it affects the reliability of savings reported by member states;

Target implementation date: end 2026

(b) evaluate the results and cost-effectiveness of the measures for the energy efficiency of residential buildings to draw lessons for future programmes, in particular regarding the appropriate level of public support for renovation measures.

Target implementation date: end 2028, in the context of the Commission's *ex post* evaluation of the RRF

Recommendation 3

Improve performance tracking of energy savings

For the next MFF, in order to improve the performance tracking of energy savings, the Commission should:

(a) improve the methodology for reliably reporting on the energy saved by renovation measures, including by taking into account the difference between the estimated and actual energy savings;

(b) collect reliable information for each relevant measure on the results achieved and amounts paid (EU, member-state and private financing).

Target implementation date: December 2027

02

A closer look at our observations

RRF energy efficiency measures are hampered by set-up shortcomings

15 The RRF Regulation allows member states to design measures that contribute to improving efficiency in residential buildings as part of their national recovery and resilience plans (NRRPs). We examined the key features of the RRF set-up and how the RRF energy efficiency measures for residential buildings were designed, with a focus on the 28 measures designed in the four member states we selected, consisting of 18 investments and 10 reforms (***Annex II***).

16 We expected:

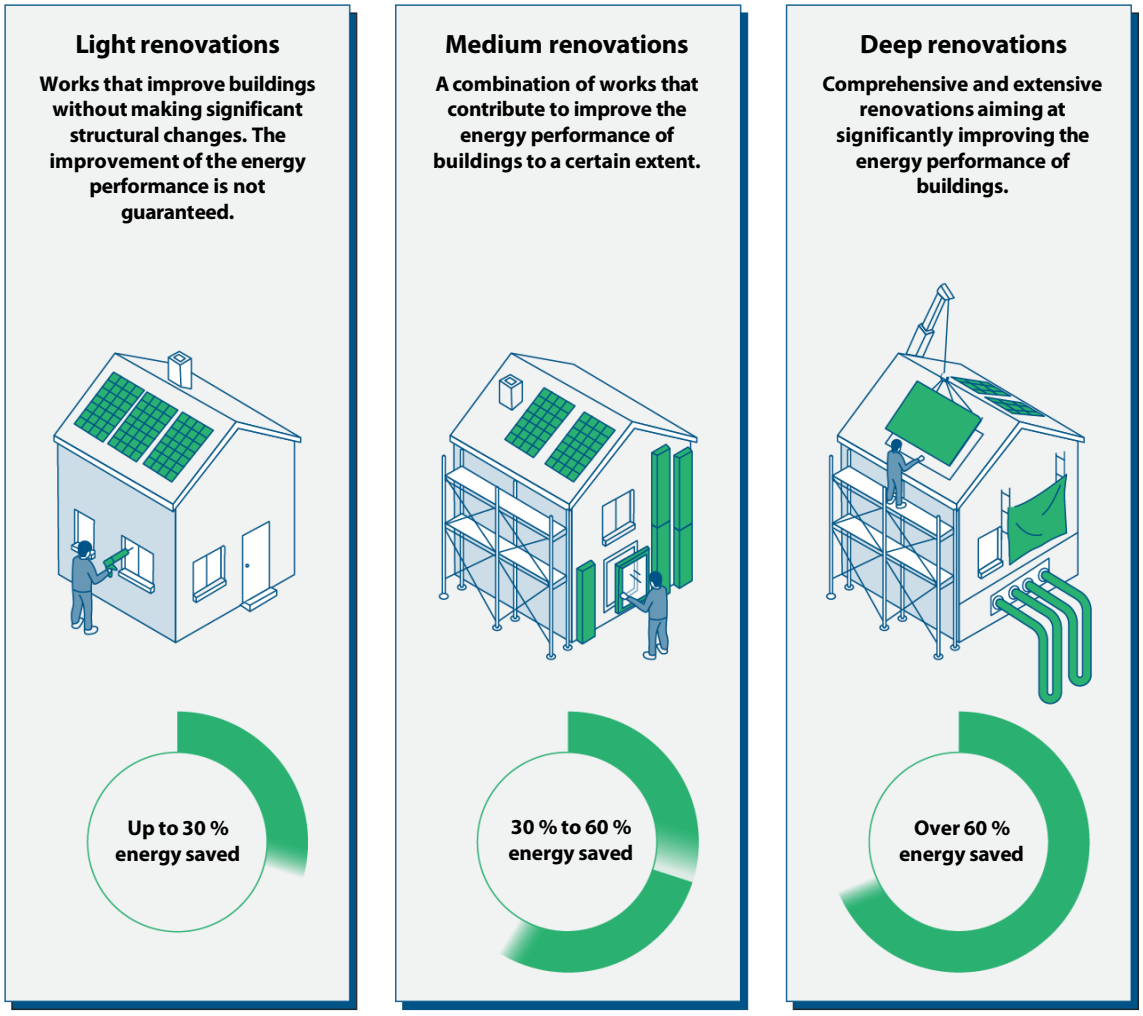
- measures to adequately target the renovation needs of the building stock;
- reforms to increase or complement investments in energy efficiency.

RRF renovation measures do not directly target deep renovations

17 In order to be relevant, RRF measures for residential buildings included in the NRRPs should respond to the specific needs of the building stock in each member state in line with the EU's energy efficiency policy objectives. We checked relevance by examining the RRF Regulation, the EU policy framework for energy efficiency and the NRRPs, and analysing the reasons for the member states' choices of RRF measures and underlying projects.

18 The 2018 Directive on the energy performance of buildings – a key element of the EU energy efficiency policy framework (***Annex I***) – required member states to establish a national long-term renovation strategy by March 2020 to make their residential building stock highly energy efficient and decarbonised by 2050. To achieve this objective, the Directive explicitly refers to an increase in "deep renovations", a term the Commission defined in its Recommendation (EU) 2019/786 (***Figure 2***). Building on this, in October 2020, the Commission presented its Renovation Wave strategy to boost building renovations and foster deep renovations. The Commission highlighted that the annual deep renovation rate in the EU was only 0.2 % on average[2].

Figure 2 | Different types of renovations



Source: ECA, based on Commission Recommendation (EU) 2019/786. These are the applicable definitions for energy efficiency measures.

[2] COM(2020) 662 - A Renovation Wave for Europe; European Commission, Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU.

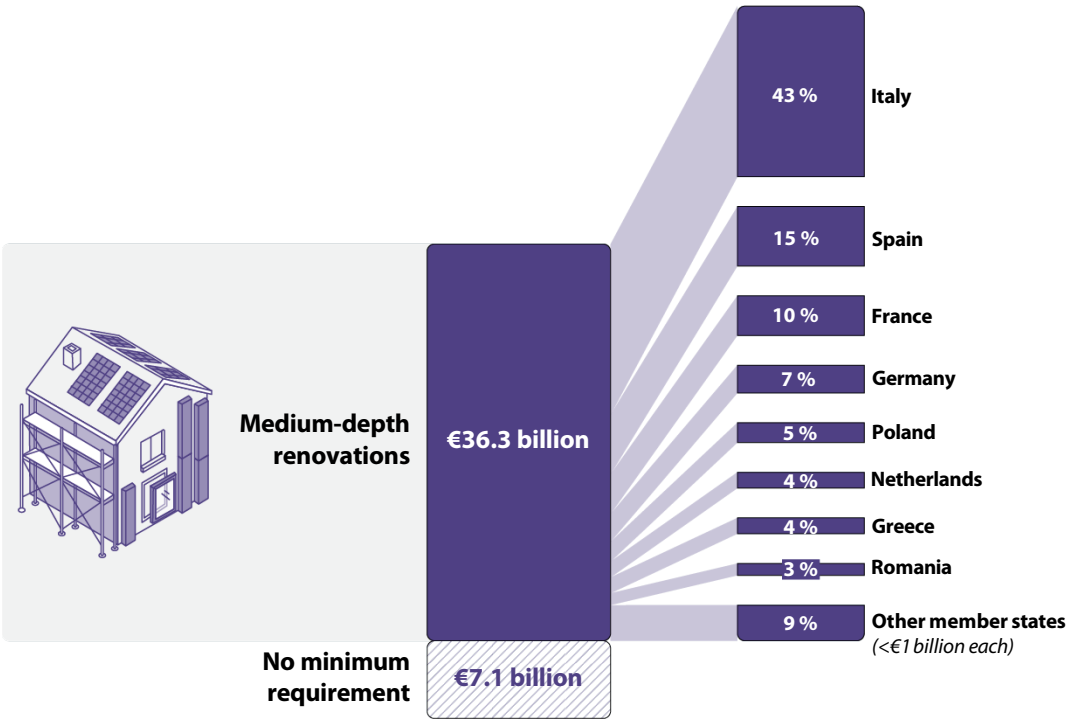
19 These national long-term renovation strategies, together with any additional needs assessments carried out by member states before the RRF was launched, could have served as a basis for defining cost-effective deep renovation measures addressing the specific needs of the national building stock, including the need to foster deep renovations. However, the RRF Regulation did not specifically require RRF measures to be based on a specific evaluation or needs assessment.

20 The RRF Regulation sets a general requirement for consistency with EU objectives and national strategic documents, including the National Energy and Climate Plans (NECPs). The Commission guidance asked member states to indicate in their NRRPs how specific measures set out in these plans could be fast-tracked with the help of the NRRPs. However, neither this guidance nor the RRF Regulation specified how the Commission should check this.

21 The Commission's assessment looked at whether the proposed measures chosen by member states were consistent with the existing framework. When the selected member states decided which measures for the energy efficiency of residential buildings they would include in the NRRPs, their decisions were not based on a specific evaluation or needs assessment, but generally referred to the national long-term renovation strategies. Based on discussions with the member states' authorities, we note that the selection of RRF measures was influenced by the relatively short timeframe available for preparing the NRRPs and the need to choose measures that could be implemented within the RRF timeframe (i.e. by August 2026).

22 Furthermore, the RRF Regulation made no reference to deep renovations. We found that only one of the 27 member states (Romania) had associated a measure with a target explicitly referring to deep renovations. Most RRF energy efficiency measures in residential buildings required support to target at least a medium-depth renovation level on average, and medium-depth renovations represented 83 % of the measures' estimated costs. For the remaining 17 % of RRF estimated costs for energy efficiency measures in residential buildings, no minimum energy savings were required (***Figure 3***). For example, measures targeting private buildings in Belgium did not require any minimum energy savings.

Figure 3 | RRF allocations to residential buildings, based on requirements, with breakdown by member state



Source: ECA, based on the RRF data provided by the Commission – latest update January 2026.

23 Moreover, as explained in our 2024 special report 14/2024 on RRF Green transition, the Commission specified that to be considered medium-depth under the RRF Regulation, renovation measures should aim to reach[3] at least "30 % primary energy savings on average", which corresponds to the lowest possible threshold for this category (***Figure 2***). Furthermore, the requirement applied to the measure as a whole rather than to each project. Out of the four member states selected, Italy applied a stricter rule as it required all RRF projects to reach a minimum threshold of 40 % for energy savings. Whether these thresholds are reached also depends on the reliability of the estimation of the savings achieved, which we examine in the second part of the report (paragraphs ***32***-***69***).

24 While none of the selected member states included deep renovations in their targets (paragraph ***22***), we noted that Cyprus selected some deep renovation projects under a specific measure (representing 20 % of the funds allocated to renovations). In the other three member states, we found that RRF measures were not aimed at promoting deep renovations. Financing renovations that do not substantially increase the building's energy

[3] Annex VI to the RRF Regulation.

performance risks creating a lock-in effect (***Box 1***). Several research papers[4] have warned that focusing on moderate measures without holistic planning can lead to lock-in effects, where renovation decisions constrain future options or lead to investments that are suboptimal for long-term decarbonisation goals.

Box 1

Lock-in effect of renovation works

A lock-in effect may occur when medium renovations prevent deeper energy renovations due to additional costs, the need to recover the initial investment or technical reasons. Examples could include:

- uncoordinated insulation works (additional layers cannot always be applied)[5];
- use of materials incompatible with future solutions;
- installation of heating/hot water systems without considering future insulation works (can result in over-dimensioning) or vice versa;
- complete renovations (observed in the selected member states) that only achieve a medium energy rating (when further improvements would require deconstruction), without planning a staged deep renovation.

Source: ECA, based on studies and the projects assessed.

25 When deciding on specific renovation projects for the RRF measures, the selected member states approved projects based on eligibility criteria and financed all eligible projects as long as funding was available. ***Figure 4*** presents examples of eligibility criteria used by the member states selected for this audit. The eligibility criteria in the selected member states were often not very selective and did not require financing to be targeted towards buildings with a low energy rating or households with a greater financial need for support. Nor did these member states use selection criteria to rank applications. In case of Cyprus, this choice was a deliberate simplification decision to increase the number of projects,

[4] BPIE, Deep Renovation: Shifting from exception to standard practice in EU policy briefing; Gepts B., Where is the potential for deep (energy) renovations?, Barbosa G. and Almeida M., Strategies for implementing and scaling Renovation Passports.

[5] Barbosa G., Building renovation passports for affordable and digital deep renovation; L'Énergie en Wallonie, Guide de la rénovation énergétique et durable des logements en Wallonie, Chapter 5, Sections 2.3 and 2.7.

within the time constraints of the RRF. The use of such criteria could have led to more result-oriented project selection, thus maximising the expected energy savings.

Figure 4 | Examples where RRF project selection was based solely on eligibility criteria

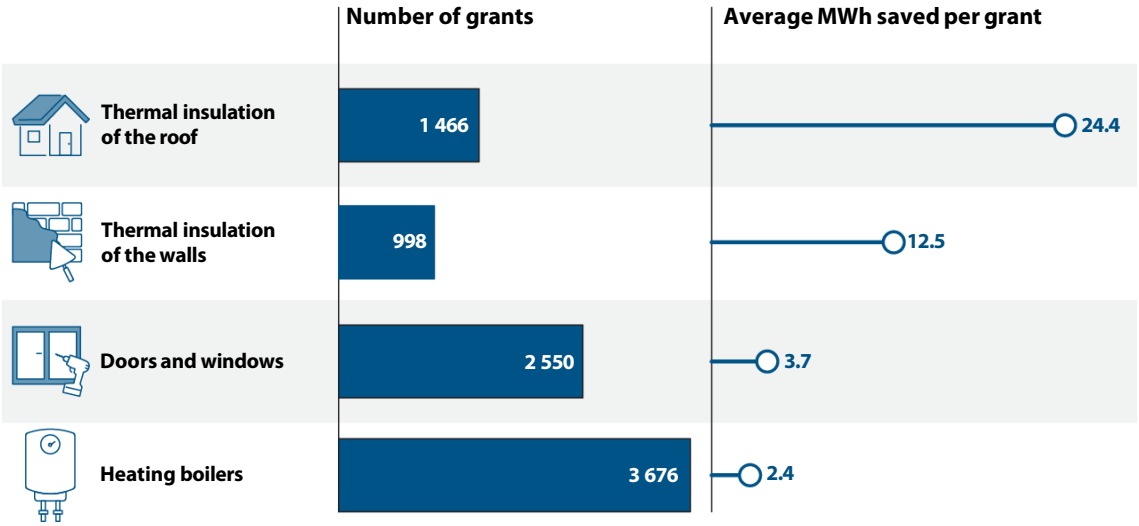
Note: * = Lithuania Long-term Renovation Strategy 2021, Tables 3 and 4; ** = Cyprus 2020 Long-term Building Renovation Strategy (LTRS), p. 13.

Source: ECA.

26 Since project selection in the selected member states did not include a comparative quality assessment of the projects submitted, there is a risk that the renovations funded might focus on types of works that produce lower nominal energy savings. ***Figure 5*** shows that in Belgium (Brussels-Capital Region), projects focused on medium or light renovations (such as replacing heating boilers or windows). Consequently, in the selected member states, the

RRF generally supported renovation schemes targeting a broader range of households and buildings to renovate more in less time. Prioritising medium or light renovations diverted member states' focus away from securing long-term energy savings through deep renovations; it also risks creating lock-in effects in the future.

Figure 5 | Number of grants and average MWh energy savings (2023), Brussels-Capital Region, by type of works



Note: These figures do not include only RRF-funded projects.

Source: Annual statistical report, RENOLUTION 2023 RBC.

Reforms were not clearly defined, and their effect on investments and energy savings has not been demonstrated

27 According to the RRF Regulation, RRF reforms and investments should constitute a coherent package[6] and bring about structural changes[7] in the relevant administrations or policies[8]. We identified 10 reforms in our selected member states, and analysed their link with the RRF investments and their potential to enable or support future renovations.

28 In our 2025 special report 10/2025 on RRF labour market reforms, we noted that the RRF Regulation refers to investments and reforms without defining them or clearly distinguishing between them. We also noted that what constitutes a reform remained

[6] Recital 32 of the RRF Regulation.

[7] SWD(2021) 12 – Guidance to member states – Recovery and Resilience plans.

[8] Annex V to the RRF Regulation.

subjective to some extent, even after Commission guidance[9]. In the NRRPs we reviewed, this lack of a clear definition resulted in different applications by the member states of the concept of reform. Nor did the Commission ensure a consistent approach across the NRRPs. For example, Belgium labelled revisions of its subsidy schemes and funding for related projects as "reforms", while Italy labelled similar changes to its renovation scheme as "investments". The degree of subjectivity in classifying measures confirms the previous ECA finding.

29 We found three measures labelled as reforms that were in fact mainly investments, two in Belgium and one in Lithuania. These concerned considerable project expenditure and did not involve significant changes to the renovation schemes. When the measure in Lithuania was replicated under the REPowerEU chapter, it was deemed an investment. We consider that having investment measures called "reforms" diminishes their potential to tackle existing obstacles and enable investments.

30 Furthermore, we found other reforms that could enable investments. However, there was no – or insufficient – data available to demonstrate their effects on investments within the RRF or beyond (see examples in ***Box 2***).

Box 2

Examples of assessment of the potential effects of reforms on energy efficiency investments

Belgium, Italy, Cyprus, Lithuania: reforms to set up one-stop-shops to close the information gap faced by citizens – which can act as a barrier to renovations – could enable future investments in energy efficiency, but their impact has not yet been demonstrated.

Lithuania: the NRRP included a reform incentivising a new wood-panel method of renovation by amending construction regulations, launching demonstration projects and developing the local industry. However, it lacked feasibility studies and analyses of the potential scale of use and possible bottlenecks for its adoption.

31 In our review on the lessons to be learned from the weaknesses of the RRF, we noted that the extent to which the result or impact of the RRF reforms can be assessed is limited by the absence of suitable indicators. We consider that it is therefore difficult to demonstrate that RRF energy efficiency reforms deliver greater savings than investments alone.

[9] SWD(2021) 12.

There were delays in implementation and weaknesses in monitoring energy savings

32 Planned renovation measures need to be implemented in a timely manner and according to the NRRPs if they are to progress towards their objectives. Robust tracking tools should be in place to assess, monitor and report on the performance of the energy efficiency measures. We therefore looked at the implementation of the RRF measures, and we expected:

- measures to deliver on result-oriented targets within the set deadlines, due to the performance-based nature of the RRF;
- member states to collect, and the Commission to report, reliable information on the actual energy saved;
- the Commission and member states to track progress in the implementation of the measures, including the cost-effectiveness of the measures financed.

Complex renovation investment measures faced implementation delays and required revision

33 The RRF was intended to be a "performance-based instrument", based on the achievements of results measured against set milestones and targets. We examined the extent to which the RRF Regulation and related guidance supported the inclusion of result-oriented targets in the NRRPs. We then assessed whether the result-oriented targets were associated with the NRRP measures in the selected member states. As all measures need to be completed by 31 August 2026[10], we analysed whether the different types of renovation measures in our selected member states were progressing as planned, whether any were lagging behind and whether revisions of the measures increased the feasibility of achieving them within the RRF deadlines.

34 While the RRF Regulation specifies that each measure should be associated with milestones, targets and indicators to monitor progress in implementation, it does not explicitly require targets to be result-oriented. The Commission's guidance for member states specifies that milestones and targets should be based on input indicators or, preferably, output indicators.

[10] Article 18(4)(i) of the RRF Regulation.

35 We found that quantitative targets for the audited measures included in the NRRPs mostly focused on outputs (e.g. number of renovations or renovated area), rather than results (reduction in energy consumption). This limits the possibility for the Commission to assess the results of the measures and evaluate the performance of the RRF in the field of energy efficiency. In previous reports, we concluded that RRF targets measured implementation progress rather than performance. Out of 111 renovation measures across all EU member states, we only found three cases where result-oriented targets were applied. One of these examples is the main Italian scheme for renovations of private buildings. ***Figure 6*** summarises the types of targets associated with renovation measures in the selected member states.

Figure 6 | Targets in the selected member states

	Indicator description	Belgium	Italy	Cyprus	Lithuania
OUTPUT	**Number of residential units**	✓		✓	
	Renovated area		✓		✓
	Signature of legal agreements *(financial instrument)*		✓		
	Completion of preparatory works *(wood panels)*				✓
RESULT	**Number of MWh saved**		✓		

Source: ECA, based on the Council Implementing Decisions (CID).

36 In the selected member states, we noted that some RRF measures were in high demand, as they are easier to implement. This is the case, for example, of the simpler renovation measure in Cyprus ('Promoting individual energy efficiency measures' – see ***Annex III***), which mainly finances the installation of photovoltaic (PV) panels. As shown in ***Box 3***, installing PV panels is an investment with a short payback time. Similarly, measures that do not require a minimum level of savings are progressing fast, such as a measure supporting renovations of private buildings in Belgium.

Box 3

Example of short payback period for RRF-supported PV panel installation in Cyprus

Beneficiaries of the simpler renovation measures (paragraph ***36***) in Cyprus can participate in the national "net metering" scheme, which is not covered by the RRF measure. It enables beneficiaries to keep the energy produced by PV panels for future use, storing it virtually. This translates into immediate financial benefits for the beneficiary, as they can quickly recover the installation costs, through reduced energy bills. The Cypriot authorities estimate the payback period to be between 3.5 and 5 years.

We acknowledge that the increased penetration of renewable energy from PV panels in the Cypriot electricity mix is a positive development. However, during our on-the-spot checks, some beneficiaries confirmed that the energy credits available following the installation of PV panels enabled them to maintain or even increase their energy consumption.

37 The Italian *Superbonus* renovation programme, financed using both Italian and RRF funds, supported up to 110 % of the costs incurred by recipients. We consider that this level of support is not in line with the principles of sound financial management, and that it negatively affects the cost-effectiveness of the measure (***Box 5***). This measure was taken up by half a million beneficiaries, meaning that Italy has enough completed projects to reach its final target.

38 Furthermore, we found that the Commission considered most of the milestones and targets associated with the 10 reforms selected for this audit to have been fulfilled at the time of our audit, i.e. during the RRF implementation period. We analysed the creation of one-stop shops supported by the RRF in the selected member states. Although the purpose of the measures was to ensure that these services were operational, the platforms were not entirely ready to provide tailored advice to citizens interested in energy efficiency renovations. We found a need for additional features to be deployed.

39 While the RRF's short timeframe (paragraph ***21***) incentivises simpler renovations, it has proven less suitable for deep renovations and complex investments. In this regard, we found that more complex RRF measures were delayed (12 out of 18 investments are delayed – see ***Annex III***). For example, a measure in Italy aimed at reducing energy consumption by at least 30 kilo tonnes of oil equivalent (Ktoe) per year through district heating was behind schedule: at the time of the audit only six out of 34 projects had

received prefinancing or a partial payment (corresponding to 5 % of the allocated RRF amounts for this measure), and none had been completed.

40 To tackle slow implementation and reduced demand, some energy efficiency measures were revised in the selected member states, with amended targets and estimated costs. The targets were revised downwards in 13 out of 22 measures, while for six additional measures there was no associated target, only milestones (***Annex III***). The amendments were allowed under the RRF Regulation[11], subject to the Commission's assessment of whether the proposed changes were justified, whether the revised NRRP continued to meet the Regulation's requirements, and whether the revised milestones and targets remained clear and realistic. Despite these revisions, some RRF measures risk not being completed within the RRF deadlines, which could affect the results achieved. ***Box 4*** presents additional details of our assessment.

Box 4

Examples of revisions of measures that do not entirely reflect the measures' actual progress at the time of the audit

Cyprus: The target for the complex renovation measure in Cyprus supporting interventions including roof and wall insulation was reduced in November 2025, as the Cypriot authorities reported unexpected circumstances that triggered delays in implementation. The target decreased from 1 100 renovations to 800, reducing the amount concerned from €30 million to €22 million.

At the same time, in November 2025, i.e. half-way through the measure's implementation period, the Cypriot authorities informed us that 263 projects had been completed while 1 465 projects had been signed and were due for completion by June 2026. This calls into question the need for the revision.

The latest revision did not take full account of actual progress

Belgium: As at June 2025, none of the projects for the social housing measure in Wallonia had started. In October 2025, the target for this measure was revised. The allocation was reduced from €30 million to €12.5 million, and the target number of social housing units to be equipped with PV panels was decreased from 3 600 to 1 532.

The revised target remains at risk of not being achieved

[11] Article 21 of the RRF Regulation.

Lithuania: The NRRP revision resulted in a 40 % reduction of the renovation measure's target, while the estimated RRF costs were increased by 32 %. Our analysis of the progress indicates that only about 77 % of the revised target may be achieved by the end of the RRF due to delays in the selected projects.

The revised target remains at risk of not being achieved

Information on energy savings was not reliable, comparable, or detailed enough for it to be used for the meaningful monitoring of results

41 Energy efficiency measures under the RRF are expected to contribute to the EU's high-level energy efficiency target, which is based on actual reductions in energy consumption. Based on this, we expect these measures to deliver results in the form of measurable energy savings. We also expect member states to track achievements regarding buildings renovated using RRF funding.

Information on energy savings as calculated by member states hinders comparability and affects reliability

42 The aim of the RRF interventions is to improve buildings' energy performance, generating energy savings and other benefits. To assess these improvements, member states collect data that is usually based on energy performance certificates (EPCs). EPCs were set up primarily to inform building owners, buyers and tenants about the energy performance of buildings (typically on an A–G scale from most to least efficient).

43 In the context of the RRF renovation measures, the Commission encouraged member states to use EPCs for calculating the energy savings achieved for all EU supported programmes, including the RRF. One common approach compares the energy consumption indicated in the EPCs drawn up before and after renovations (*ex ante* and *ex post*) and reports the difference as energy saved. This methodology was applied by Italy and Lithuania. Cyprus also applied it (only for more complex renovations). Belgium chose alternative methodologies (***Figure 7***, paragraphs ***50***-***52***).

Figure 7 | Annual savings by the selected member states

	Measure	Annual savings *(million kWh)*	Methodology used
Belgium	Renovation of social housing Brussels-Capital region	11.5	Standard values and assumptions
	Renovation of social housing Flanders	44.3	Standard values and assumptions
	Renovation of social housing Wallonia	14.1	Standard values and assumptions
	Renovation of social housing German-speaking community	1.0	Standard values and assumptions
Italy	*Superbonus*	1 412.2	EPC *ex ante* and EPC *ex post* (with adjustments)
Cyprus	Promoting individual energy efficiency measures	419.0	Standard values and assumptions
	Promoting extensive energy upgrading of housing stock	49.8	EPC *ex ante* and EPC *ex post**
Lithuania	Support for renovation of buildings	67.7	EPC *ex ante* and EPC *ex post*

Note: * = value is currently estimated.

Source: ECA, based on the information provided by the member states.

44 EPCs were originally designed as an asset-rating tool. In this role, they are suitable for identifying improvements made to a building, reflecting typical use under standard conditions. However, they were not specifically designed to reliably calculate actual energy savings achieved by a publicly funded measure.

45 Under the framework established by the EPBD, EPCs rely on buildings data and theoretical assumptions to estimate energy consumption. This can differ from actual consumption, which is influenced by human behaviour. This "performance gap" (***Figure 8***) is not accounted for in the values reported by member states on energy saved, which leads to significant differences between estimated and actual savings.

Figure 8 | The performance gap in the selected member states

Belgium

Technical analyses* of the performance gap were conducted in both Flanders and Wallonia. The results show how the gap between actual and estimated consumption steadily increases from "close-to-parity" for the most energy-efficient buildings, to estimated consumption up to 400 % or more above actual consumption for the worst-performing buildings. This means that the gap particularly affects the calculations of energy savings for buildings with the greatest expected savings.

Cyprus

The authorities did not carry out an official study, but a study of Cyprus' methodology** for calculating the energy performance of buildings confirmed that the estimated final energy consumption for a selected number of buildings was two to three times higher than the final energy consumption measured. Another study***, which aimed to evaluate the energy performance of a typical residential unit in Cyprus found that the actual energy consumption was 377 % higher than estimated.

Italy

The authorities did not carry out an official study, but another study**** quantified the theoretical deviation between estimated and actual consumption and found up to 80 % higher estimated values for buildings with poor energy performance. The study found that the gap increased as energy needs rose, for example during more severe weather conditions. In high-performing buildings the effect can be the opposite: actual consumption can be up to 30 % higher than estimated, as users' behaviour adjusts following the improvements in energy efficiency.

Lithuania

The authorities did not carry out an official study, but an academic review***** shows that estimated consumption for the best-rated buildings can be 18 % to 77 % higher than the actual figures. The study confirms the findings from the other countries that very high-rated buildings tend to consume more energy than predicted.

Note: The above studies were carried out on a sample of renovations, regardless of funding source.
* = Wallonia: Annex e) of the 2020 Long-term renovation strategy; Flanders: Onderzoek naar de kostenoptimale niveaus bij renovatie van residentiële gebouwen, 5.11.1.3 Geschat energieverbruik.
** = Cyprus building energy performance methodology: A comparison of the calculated and measured energy consumption results
*** = A Comparative Study on Discrepancies in Residential Building Energy Performance Certification in a Mediterranean Context
**** = Energy performance gap of the Italian residential building stock: Parametric energy simulations for theoretical deviation assessment from standard conditions
***** = Energy Performance Gap Analysis in Energy Efficient Residential Buildings in Lithuania

Source: ECA, based on the quoted studies.

46 In addition, EPCs do not collect the same type of information across member states. For example, elements such as hot water, ventilation, air conditioning, etc. are not always included[12]. EPCs were never intended to be used for comparing buildings across member states. Because different countries capture different elements, the data on energy consumption and energy savings derived from EPCs, even when expressed in kWh/year, is not directly comparable across countries. For example, in the EU, the upper limit of energy consumption for A-rated buildings may range between a negative value and almost 300 kWh/m^2/year, while the lower limit for G-rated buildings may range between 200 and 1 005 kWh/m^2/year. Even within the same member state, variations can be significant, potentially hampering comparison. In Lithuania, we found that E-rated buildings consumed between 311 and 600 kWh/m²/year before renovations took place. Consumption in F-rated buildings varied from 263 to 1 124 kWh/m²/year.

47 Furthermore, the 2018 Directive on the energy performance of buildings allowed member states to base EPCs on either calculated or metered energy consumption. While our selected member states base their method on calculated energy consumption, other member states use metered energy consumption. This further hinders the comparability of the reported savings.

48 Additionally, national or regional authorities in the selected member states checked a selection of EPCs – not related specifically to RRF projects – and reported a significant level of anomalies. While we acknowledge these efforts, errors in the *ex ante* EPCs can prevent the actions needed to improve a building's energy efficiency from being correctly identified, and can make the reported figures they contain unreliable for calculating the resulting energy savings. Similarly, errors in the *ex post* EPCs may lead to under- or over-estimation of buildings' energy consumption (see examples below).

- The latest report[13] on the risk-based checks carried out by the Italian authorities indicated that almost half of the EPCs checked contained incorrect or anomalous values (e.g. values outside the acceptable range).

- In Belgium-Flanders, in 2023, the checks carried out resulted in fines for one in eight EPCs sampled, according to the information provided by the regional authorities. The authorities explained to us that this high rate was partly due to the fact that inspections were targeted to focus on cases under serious suspicion of error, for example based on complaints from the public.

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[12] Progress on the implementation of Energy Performance Certificates in EU, JRC, 2023.

[13] ENEA, Rapporto annuale sulla certificazione energetica degli edifici, 2025.

- In Lithuania, according to the information provided by the national authorities, 1 518 of the 16 592 certificates submitted in 2024 were rejected by the authorities (9 %). The main errors included mistakes in calculating areas and the incorrect assessment of certain buildings' characteristics.

49 When we carried out our own analysis of the EPCs for the 19 selected projects, we found additional weaknesses which limit the relevance of EPCs for estimating actual energy savings (see examples below).

— All EPCs treated buildings as permanent residences. Therefore, yearly savings were calculated as if the buildings were fully occupied, which could lead to the overestimation of energy savings. For example, one project (out of five) in Italy concerned a non-permanent residence.

— When new living areas were added (which was the case in two of the selected projects that we visited on the spot, one in Belgium, one in Italy), the energy savings were calculated on the basis that these spaces were previously present, but uninsulated; however, as we reported in our special report 14/2024 on the RRF contribution to the green transition, such new areas do not generate savings but in fact represent additional energy consumption.

— In four of the five EPCs related to projects in Italy, we found various reliability issues (misclassifications of buildings, incorrect area, missing appliances).

50 In addition to EPCs, the Commission allows alternative methods of calculating energy savings resulting from the RRF measures, and Belgium and Cyprus used standard values in their calculations to establish the savings for most of their financed renovations. We identified several aspects that call into question the reliability of the figures produced by these alternative methods, which are presented below. This is the case even though the methodologies used by Belgium and Cyprus were approved by the Commission.

51 For example, under the RRF-funded measure for private and social residences in Belgium-Flanders, each heat pump installed is credited with 8 065 kWh/year of savings per residential unit, regardless of the buildings' size and characteristics. Insulated roofs are credited with 7 000 kWh/year, while insulated floors, walls and windows each account for 2 000 kWh/year of savings. When interventions are combined, these savings are added together, without any weighting for interaction effects.

52 For more extensive renovation projects under the RRF-funded Flemish measures, the method multiplies the average area by the theoretical average energy consumption per square metre before renovation, and compares the result with the average energy consumption after renovation for a standard apartment or house. This method bases its

calculations on the characteristics of average buildings, rather than the specific buildings in need of renovation.

53 Cyprus applied a similar method, approved by the Commission, using averages of standard buildings to estimate a threshold corresponding to a 30 % energy saving. It then calculated the energy savings based on the actual characteristics of each renovation supported by the measure, using either the installed PV-panel capacity (in kWh), or the added insulation thickness, roof area (m^2) and roof thermal performance. Using this approach, Cyprus reported that, overall, the energy savings met the minimum threshold. However, we consider that the worst-performing buildings require, in absolute values, higher savings to reach the minimum threshold of 30 %. Therefore, we recalculated the threshold, using data from actual buildings in need of renovation in Cyprus. Our results indicate that the value of savings reported by Cyprus would not have met the minimum threshold of a 30 % energy saving.

54 Finally, we found that savings declared from PV panels in Cyprus are reported as primary energy saved, even though part of this production is not consumed by the resident but exported to the grid. Although this is in line with the provisions of the EPBD, in such cases, the reported energy savings do not correspond to the building's actual energy consumption.

55 Regardless of the methodology used, we found significant issues with the reliability and comparability of the information on actual energy savings reported by member states.

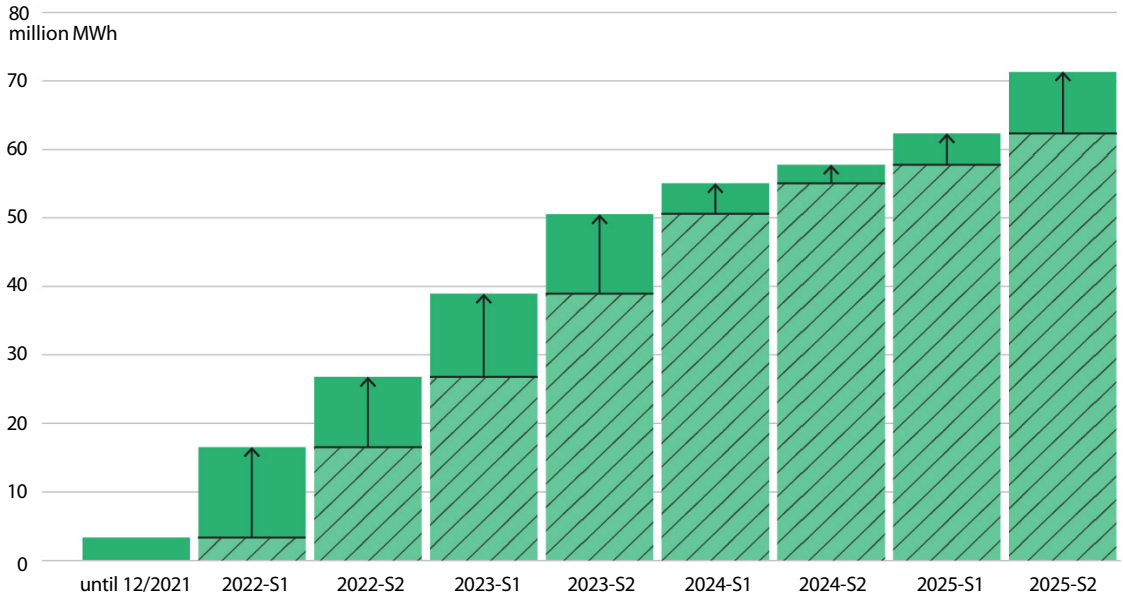
Aggregated reporting on energy savings limits the meaningful monitoring and assessment of results

56 Both methodologies described above allow member states to report energy savings to the Commission under common indicator 1 "savings in annual primary energy consumption". This indicator, however, is meant to show cumulative efforts under the NRRPs, and as such it includes all energy savings, with no breakdown by type of energy efficiency measure (e.g. residential building renovation). We examined the savings reported under this indicator, which are published on the RRF Scoreboard. At the end of 2025, cumulative reported savings for all member states since February 2020 totalled 71 278 397 MWh/year.

57 The total reported savings figure is a cumulative value that does not refer solely to the results achieved by energy efficiency measures for residential buildings, but covers all RRF measures, including those concerning public buildings or enterprises. In practice, we could not verify the reported contribution from the individual RRF measures as the Commission did not have this data. The Commission pointed out that the RRF's common indicators were designed to monitor and evaluate the RRF as a whole. Consequently, the RRF

Scoreboard lacks information at the level of individual measures, as it only shows the cumulative values for all member states (*Figure 9*). The reporting of savings cumulatively, together with the absence of a target for energy saved under common indicator 1, means that the Commission cannot use this type of information for the effective monitoring of results, or to address issues promptly at measure level.

Figure 9 | Reported energy savings for the entire EU



Note: This graph shows the savings in annual primary energy consumption in MWh per year. The numbers are added cumulatively, and its values can only increase over time.

Source: RRF Scoreboard, data as at December 2025.

58 At member-state level, data is expressed in the RRF Scoreboard as a percentage of the total primary energy consumption in 2019. This suggests that reported values correspond to actual savings, while – as set out in paragraphs *41*-*54* – the estimates from the residential building sector are theoretical and not fully reliable. Furthermore, the member states did not set a baseline, as the RRF Regulation did not include this requirement. Nor did the member states set final targets that would allow us to measure actual progress.

59 Based on the information included in the RRF Scoreboard, we found that by the end of the second half of 2025, RRF-funded measures had made only small contributions to energy savings in the audited member states: 3.125 % in Cyprus, 0.273 % in Belgium, 0.275 % in Italy and 0.139 % in Lithuania (which started reporting savings in 2025). While the figure seems higher for Cyprus, 88 % of the savings reported result from the installation of PV panels. As a source of renewable energy, PV panels reduce climate impact through lower carbon emissions and are accounted for as savings under the EPBD; however, in practice, they do not reduce a building's actual energy consumption (paragraph *54*).

60 The savings in annual energy consumption reported by member states are counted for the full year, even if the savings only materialise in the course of that year. Furthermore, as we previously reported in our special report 26/2023 on the RRF performance monitoring framework, while the Commission carries out plausibility checks, such as checking that the reported values do not exceed a member state's total energy consumption, it does not check the figures in more detail. The Commission stressed that responsibility for the quality of data on the common indicators lies solely with the member states. In addition, the figures are not broken down by measure; instead, only aggregated data is reported. It is also not possible to verify that the savings reported are exclusively linked to RRF funds, or to check the total funding linked to the reported savings.

61 The information from the RRF Scoreboard is used in communications issued by the Commission such as "NextGenerationEU – The road to 2026", which reports 33.4 TWh/year of RRF-related energy savings. The Commission communication does not clarify that savings reported under common indicator 1 are based on theoretical calculations (paragraph ***45***). Combined with the various reliability issues found in this audit, we consider that the figures do not sufficiently reflect actual savings. All these weaknesses limit the usefulness of the reported information in adequately monitoring performance in order to assess effectiveness and efficiency.

The cost-effectiveness of building renovation measures is not tracked

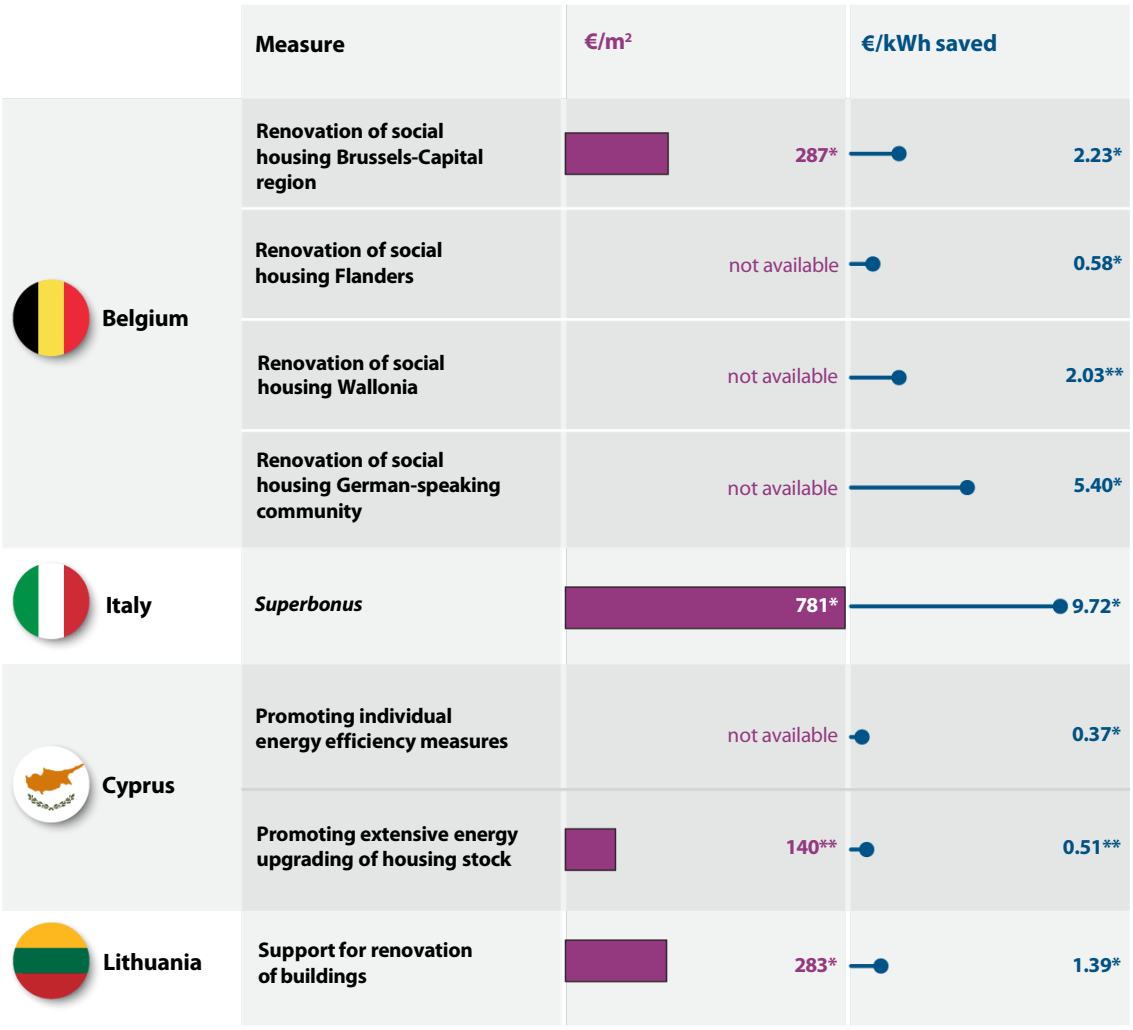
62 The member states provided cost estimates for each measure in their NRRPs, representing the expected costs needed to meet the set targets. We assessed the extent to which member states and the Commission kept track of cost-effectiveness during the implementation of the measures. We performed our own cost effectiveness calculation on the selected measures aiming to deliver at least 30 % savings.

63 As previously mentioned, member states were not required to set results targets for each measure. Consequently, the audited measures did not focus on results, i.e. the value of energy savings (paragraph ***34***). This makes it more difficult to assess, either during implementation or *ex post*, whether energy efficiency measures delivered energy savings in a cost-effective way. Neither the Commission nor the selected member states tracked the cost-effectiveness of the measures implemented, as this is not required by the RRF Regulation. Such an analysis would have been useful for monitoring the performance of the measures, identifying variations in cost-effectiveness between them, and enabling both the Commission and member states to take corrective action where necessary during implementation. It would also have provided useful evidence for the Commission's final *ex post* evaluation report, planned for 2028.

64 *Figure 10* shows the results of our cost-effectiveness calculations, based on the data on renovation measures received from the selected member states at the time of the audit. In the case of Belgium, the measures for private buildings are not shown, as they are not required to achieve the 30 % minimum threshold for energy savings. For the calculations of the actual cost per square metre and the unit cost of saving 1 kWh, we used, the total cost of the projects incurred by the recipients, wherever possible. In the remaining cases, when total investment costs were not provided, we used the grant amount allocated by the member state to the projects and covered by the RRF.

65 While this analysis covers different types of intervention, building stock and policy choice made by the member states, it shows substantial variations and illustrates the importance of tracking cost-effectiveness. We note, for example, that Lithuania's decision to only renovate blocks of flats led to a relatively low cost (€/kWh). The figures show higher cost-effectiveness compared to Belgium and Italy. While the figure for Cyprus indicates better cost-effectiveness, this is due to the installation of PV panels, a relatively cheap investment.

Figure 10 | Our analysis of the cost-effectiveness of the audited measures



Note: * = data based on the total cost of the projects incurred by the recipients; ** = data based on the grant amount allocated by the member state to the projects and covered by the RRF.

Source: ECA, based on the data provided by the selected member states.

66 Based on the information above, we found that, while the level of achieved savings per dwelling in Italy was quite high, this came at a very high cost. Our analysis shows that the *Superbonus* was not a cost-effective measure (see example in ***Box 5***).

Box 5

Example of a measure that was not cost-effective: the *Superbonus* in Italy

The Italian renovation measure is by far the most expensive and least cost-effective measure targeting the energy efficiency of residential buildings, as it requires nearly €10 to save 1 kWh (***Figure 10***).

The measure met with high demand (over half a million renovations were carried out thanks to the scheme) and the estimated costs surged to €123 billion (as at November 2025). Ultimately, the estimated RRF contribution (€13.95 billion) will only cover half of the target set for this measure (about 18 million m^2 instead of 36 million m^2) and about 10.5 % of the nationally approved tax credits for renovations. Based on this data, additional funds will have to be made available from the national budget.

Several articles have since analysed its side effects, including high inflation[14], a substantial national budgetary impact[15], and low cost-effectiveness.

The cost-optimal model prepared by Italy in 2020[16] indicated that with a €9 billion investment, 24.7 million m^2 would be renovated and 330 Ktoe of energy saved, resulting in a cost of €2.58 per kWh saved. The current cost per kWh of the RRF measure is almost four times higher. Additionally, as reported by the Italian Supreme Audit Institution[17], quoting a report from the Italian Central Bank[18]: over a quarter (27 %) of the nationally approved *Superbonus* projects could have been carried out in the absence of public financing (the "deadweight" effect), and it was possible to recoup a high proportion of the renovation costs.

67 We also compared initial cost estimates with the latest figures provided by the national authorities. For example, in Cyprus the estimated cost of the simpler renovation measure (see paragraph ***36***) was adjusted upwards in an NRRP revision in line with implementation progress. The measure had been allocated €74 million, and implementation progress indicated that €71 million (96 %) would be needed to reach the target. This is a good example of keeping the estimated RRF costs aligned with implementation.

68 On the other hand, according to our recalculations based on the figures provided by the national authorities, at the current rate Cyprus would need €24 million to reach the target established for the deep renovation measure. This corresponds to 81 % of the allocated envelope, indicating that costs were overestimated. In Belgium, social housing in Flanders and in the German-speaking community is also expected to require a lower amount of funding than initially estimated, indicating that the costs were overestimated. The

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[14] CEPR, The impact of the Superbonus on Italian construction costs, 9 February 2025.

[15] Fitch Ratings, Italy's 'Superbonus' Spending Puts Its Debt Ratio on an Upward Trajectory, 23 April 2024.

[16] Ministero della transizione ecologica, 2020 long-term building renovation strategy.

[17] Corte dei Conti Italiana, Relazione sullo stato di attuazione del Piano Nazionale di Ripresa e Resilienza (PNRR), December 2024.

[18] Banca d'Italia, Incentives for dwelling renovations: evidence from a large fiscal programme, 2024.

measures will use about 86 % and 36 % of the envelope, respectively; however, as at April 2026, no revision of the NRRPs is planned.

69 Similarly, in paragraph 39 of our special report 14/2026 on RRF traceability and transparency, we reported on cases of measures where the estimated RRF costs had exceeded the actual costs. We concluded that, if this trend continued, there was a risk that the overall RRF allocation to some member states might exceed the actual costs. The same audit also identified that some ongoing measures were experiencing cost overruns.

This report was adopted by Chamber I, headed by Ms Joëlle Elvinger, Member of the Court of Auditors, in Luxembourg at its meeting of 17 June 2026.

For the Court of Auditors

Tony Murphy
President

Annexes

Annex I – About the audit

Energy efficiency as a key objective of the EU

01 Improving energy efficiency is one of the key objectives of the Energy Union Strategy. The targets set by EU legislation have become more ambitious over time. In 2012 the Energy Efficiency Directive incorporated the target of 20 % energy efficiency by 2020. In our recent special report 18/2023 on EU climate and energy targets, we noted that the achievement of this target was due not only to the EU's climate action, but also to the economic effects of the COVID-19 pandemic.

02 The 2018 revision of the Energy Efficiency Directive set an EU energy efficiency target of at least 32.5 % by 2030. In 2023, the European Parliament and the Council adopted the Revised Energy Efficiency Directive, which included the goal of reducing EU final energy consumption by 11.7 % by 2030 compared to projected energy use for that year. When expressed using the older 2007 EU Reference Scenario, this target corresponds to a reduction of 40.5 % in primary energy consumption.

The residential building sector and the EU's climate and energy targets

03 The building sector is key for achieving Europe's climate and energy targets. Two thirds of the energy used for heating and cooling still come from fossil fuels and almost 75 % of buildings in the EU are still energy-inefficient[1]. Improving the energy balance of existing buildings through renovations is therefore a major axis of public intervention.

04 In order to specifically tackle the energy efficiency of buildings, the EU has established a legislative framework that includes the Energy Performance of Buildings Directive (EPBD)[2],

[1] Recitals 14 and 24 of Directive (EU) 2024/1275 on the energy performance of buildings.

[2] Ibid.

which was revised in 2024. It aims to increase the rate of renovation in the EU, particularly for the worst-performing buildings. It includes a binding target for member states to decrease the average primary energy use of their entire residential building stock by 16 % by 2030 (compared to 2020). Member states should include this target and how to achieve it in their national building renovation plans, which, by the end of 2026, should replace the long-term renovation strategies established in the 2010 Directive[3]. Finally, Commission Recommendation (EU) 2019/786 on building renovations defined the different levels of renovations (light, medium and deep). At EU level, the objective is also to make the entire building stock highly energy-efficient and decarbonised by 2050.

The Recovery and Resilience Facility

05 In February 2021, Regulation (EU) 2021/241 establishing the Recovery and Resilience Facility (RRF) entered into force, in response to the COVID-19 pandemic[4]. The RRF also aimed to help member states better prepare for the challenges and opportunities arising from the green and digital transitions. As at January 2026, it had mobilised €577 billion in grants and loans to support reforms and investments in the EU member states. In May 2022, the European Union adopted the REPowerEU Plan to reduce reliance on Russian fossil fuels, adding €21 billion in grants to the RRF. As a result, member states either topped up their existing RRF energy efficiency measures or added new measures. As at January 2026, the estimated cost of measures to promote energy efficiency in residential buildings was about €43 billion, around 8 % of the amount mobilised under the RRF (investments represent 99 % of the costs).

Roles and responsibilities

06 The Commission manages the RRF directly. The Reform and Investment Task Force (SG REFORM), and the Directorate-General for Economic and Financial Affairs (DG ECFIN) are the main parties responsible. The Commission is responsible for assessing the national recovery and resilience plans (NRRPs) and approving member states' payment requests along with the Council[5]. The Commission is also responsible for monitoring the implementation of the RRF and for reporting the progress made towards its objectives, for example by using common indicators[6]. The Commission's Directorate-General for Energy

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[3] Directive 2010/31/EU on the energy performance of buildings.

[4] RRF Regulation.

[5] Ibid., article 20.

[6] Commission Delegated Regulation (EU) 2021/2106 setting out the common indicators.

(DG ENER) develops, implements, and coordinates policies related to energy – including energy efficiency.

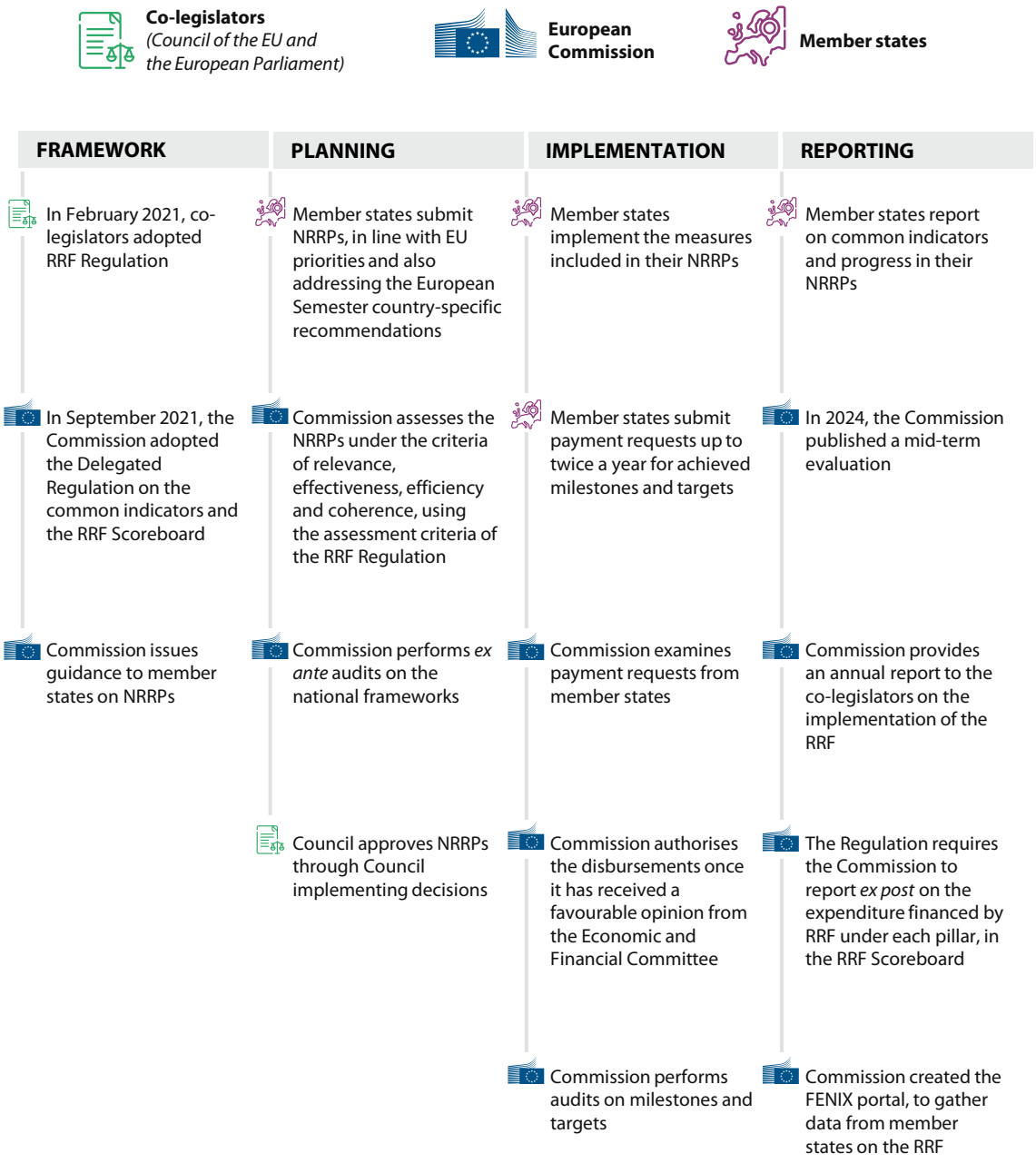
07 The member states each submit an NRRP, which includes a series of measures comprising investments and reforms. Member states must indicate the estimated costs for each measure in order to justify the amount of RRF grants or loans requested[7]. For some measures, usually reforms, member states have not estimated costs. Under the RRF Regulation, member states may make a reasoned request to amend their plans[8], where justified by objective circumstances. In this case, they must show that the existing milestones and targets are no longer fully or partially achievable. Amendments may involve changes to the estimated costs of existing measures, the replacement of previously approved measures, or changes to previously approved milestones and targets.

08 The Commission assesses whether member states have duly fulfilled the milestones and targets for the reforms and investments associated with the payment request. If it is satisfied that this is the case, the Commission disburses the RRF funds to the member states. ***Figure 1*** shows the various roles and responsibilities.

[7] Annex V, point 3, of Regulation (EU) 2021/241.

[8] Ibid., article 21.

Figure 1 | Roles and responsibilities within the RRF



Source: ECA, based on applicable legislation and supporting documents.

Audit scope and approach

09 The aim of our audit was to assess whether the RRF measures (i.e. investments and reforms) contributed to the energy efficiency of residential buildings. The audit covered the period from February 2020 (starting date of RRF implementation) to December 2025. Our analysis concentrated on possible shortcomings stemming from the RRF Regulation and guidance affecting how the measures were set up; whether measures were

progressing according to plan, or were appropriately revised; whether they were delivering results in terms of energy savings and how these results were monitored.

10 *Figure 2* shows how we obtained evidence for our observations. Our audit methodology complies with the international standards on auditing issued by the International Organization of Supreme Audit Institutions (INTOSAI).

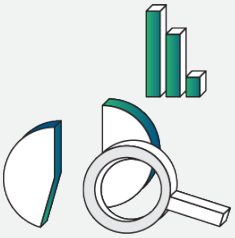
Figure 2 | Audit work carried out

We reviewed

- Commission work and documentation from Commission directorates-general (DG ECFIN, SG REFORM, DG ENER)
- Studies and reports in the area of energy efficiency in residential buildings

We analysed

- The NRRPs of the selected member states
- Key data on the costs and targets for all EU measures to support energy efficiency renovations of residential buildings
- The Commission's assessment of the NRRPs, and their revisions
- A sample of 27 renovation projects in the selected member states, which were visited on the spot
- The energy savings reported by the member states and the Commission

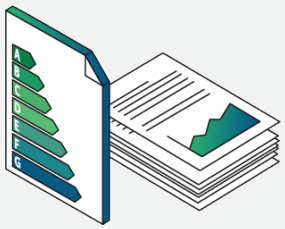


We interviewed

- Representatives from the Commission services (DG ECFIN, SG REFORM, DG ENER)
- Representatives from four member states (Belgium, Italy, Cyprus and Lithuania), selected due to the relevance of their energy efficiency measures

We consulted

- Scientists and experts in the field of energy performance certificates and the energy efficiency of residential buildings



Source: ECA.

Annex II – List of audited measures

Investments

Investment code	Investment name	Energy efficiency requirement
BE-C[C11]-I[I-101.S4]	Renovation of social housing Flanders	30 %
BE-C[C11]-I[I-102.S5]	Renovation of social housing Brussels-Capital	30 %
BE-C[C11]-I[I-103.S6]	Renovation of social housing German-speaking community	30 %
BE-C[C71]-I[I-701]	Renovation of private housing Brussels-Capital (REPowerEU) - low income	none
BE-C[C71]-I[I-702]	Renovation of private housing Flanders (REPowerEU)	none
BE-C[C71]-I[I-703]	Renovation of private housing German-speaking community (REPowerEU)	none
BE-C[C71]-I[I-704]	Renovation of social housing Wallonia	none
BE-C[C71]-I[I-726]	Renovation of private housing Wallonia	none
IT-C[M2C3]-I[I2.1]	Superbonus	30 %
IT-C[M2C3]-I[I3.1]	Promotion of efficient district heating	not applicable
IT-C[M7]-I[I17]	Financial instrument for energy renovations of public and social housing	30 %
CY-C[C2.1]-I[I2]	Promoting individual energy efficiency measures	30 %
CY-C[C2.1]-I[I7]	Smart Meters	none
CY-C[C3.4]-I[I6]	Renovations in the Nicosia Inner City	none
CY-C[C6.1]-I[I1]	Promoting individual energy efficiency measures (REPowerEU)	30 %
CY-C[C6.1]-I[I3]	Promoting extensive energy upgrading of housing stock	30 %
LT-C[C8]-I[H-1-1.H-1-1-1-a]	Renovating demonstration buildings with wood panels	30 %
LT-C[C8]-I[H-1-1-.H-1-1-2-]	Renovation of buildings - block of flats (REPowerEU)	30 %

Reforms

Measure code	Measure name	Energy efficiency requirement
BE-C[C11]-R[R-101.S1]	Renovation of private housing Flanders (incl. One stop shop and the revision of the energy label scheme)	none
BE-C[C11]-R[R-102.S2]	Renovation of private housing Brussels-Capital	none
BE-C[C11]-R[R-103.S3]	Renovation of private housing German-speaking community	none
BE-C[C71]-R[R-701]	Revision of the code on air, climate and energy	not applicable
IT-C[M2C3]-R[R1.1]	Simplification of procedures for energy efficiency interventions	not applicable
CY-C[C2.1]-R[R3]	Digital One-Stop Shops	not applicable
LT-C[C2]-R[B-1-3-.B-1-3-1-a-]	Update of building renovation framework	not applicable
LT-C[C2]-R[B-1-3-.B-1-3-2-]	One stop shop	30 %
LT-C[C2]-R[B-1-3-.B-1-3-3-]	Wood panels for the renovation of buildings	not applicable
LT-C[C2]-R[B-1-3-.B-1-3-4-]	Renovation of buildings - block of flats	30 %

Source: ECA, based on the NRRPs.

Annex III – ECA assessment on the feasibility of the measures

Country	Measure	Revision of the target	ECA assessment of feasibility
Belgium	Renovation of social housing Flanders	-35 %	**delayed**
	Renovation of social housing Brussels-Capital	-23 %	**on track**
	Renovation of social housing German-speaking community	-87 %	**delayed**
	Renovation of private housing Brussels-Capital (REPowerEU) - low income	20 %	**on track**
	Renovation of private housing Flanders (REPowerEU)	**No target associated to the measure***	**not available**
	Renovation of private housing German-speaking community (REPowerEU)	-5 %	**risk of delays**
	Renovation of social housing Wallonia	-57 %	**delayed**
	Renovation of private housing Wallonia	No change	**risks of delays**
	Renovation of private housing Flanders (incl. One stop shop	3 %	**on track**

	and the revision of the energy label scheme)		
	Renovation of private housing Brussels-Capital (incl. One stop shop)	-10 %	**on track**
	Renovation of private housing German-speaking community	-100 % (measure cancelled)	**cancelled**
	Revision of the code on air, climate and energy	**No target associated to the measure***	**completed**
Italy	Superbonus	12 %	**on track**
	Promotion of efficient district heating	50 %	**delayed**
	Financial instrument for energy renovations of public and social housing	0 %	**delayed**
	Simplification of procedures for energy efficiency interventions	**No target associated to the measure***	**completed**
Cyprus	Promoting individual energy efficiency measures	14 %	**on track**
	Smart Meters	-50 %	**delayed**
	Renovations in the Nicosia Inner City	-45 %	**delayed**

	Promoting individual energy efficiency measures (REPowerEU)	52 %	**on track**
	Promoting extensive energy upgrading of housing stock	-27 %	**risks of delays**
	Digital One-Stop Shops	**No target associated to the measure***	**completed**
Lithuania	Renovating demonstration buildings with wood panels	-25 %	**delayed**
	Renovation of buildings - block of flats (REPowerEU)	13 %	**risks of delays**
	Update of building renovation framework	**No target associated to the measure***	**delayed**
	One stop shop	**No target associated to the measure***	**delayed**
	Wood panels for the renovation of buildings	-64 %	**delayed**
	Renovation of buildings - block of flats	-32 %	**delayed**

Note: * = the measure had only milestones associated to it.

Source: ECA, based on the information provided by the member states.

Abbreviations

Abbreviation	Definition/Explanation
EPC	Energy performance certificate
GWh	Gigawatt hour
Ktoe	Kilo tonnes of oil equivalent
KWh	Kilowatt-hour
MFF	Multiannual financial framework
MWh	Megawatt hour
NECP	National energy and climate plan
NRRP	National recovery and resilience plan
PV	Photovoltaic
RRF	Recovery and Resilience Facility

Glossary

Term	Definition/Explanation
Building stock	All buildings in a given geographical area.
Climate target	EU objective to reduce greenhouse gas emissions.
Common indicator	Measure of progress made in the implementation of the member states' recovery and resilience plans and, hence, towards the achievement of the RRF objectives.
Council Implementing Decision	Document by which, based on an assessment from the Commission, the Council approves a member state's recovery and resilience plan.
Decarbonisation	Transition to an economic system with reduced emissions of carbon dioxide and other greenhouse gases.
Deep renovation	Building improvement work that results in very significant energy savings (typically more than 60 %).
Eligibility	Suitability of measures to be considered for RRF funding, based on conditions that include compliance with the eligibility period and the principles of additionality, "do no significant harm", and non-substitution of recurring national budgetary expenditure.
Energy efficiency	Ratio between the output of a system or appliance and the energy consumed, expressed as a percentage.
Energy performance certificate	Document that provides information on how much energy is needed for a building or building unit, including elements such as energy for heating, cooling, ventilation, hot water and lighting.
Energy rating	Standardised indicator showing the energy efficiency of a building.
Energy target	EU objective to increase the proportion of renewables in the energy mix as well as to reducing final energy consumption
Final energy consumption	Total energy consumed by end users, such as households, industry and agriculture, excluding that which is used by the energy sector itself.
Investment	Expenditure on an activity, project or other action within the scope of the RRF Regulation that is expected to bring beneficial results to society, the economy or the environment.
Lock-in effect	Situation where, for technical or financial reasons, once a decision is taken it is impossible to move to a better alternative at a later date.
Milestone	Qualitative measure of a member state's progress towards completing a reform or investment in its recovery and resilience plan.
National long-term renovation strategy	Document drawn up by an EU member state, setting out how it intends, by 2050, to decarbonise its national building stock and make it highly energy-efficient.

Needs assessment	Systematic evaluation to identify requirements, determine priorities and allocate resources effectively
NextGenerationEU	Funding package to help EU member states recover from the economic and social impact of the COVID-19 pandemic.
Payback period	Time needed for an investment to repay its initial cost by generating savings or revenue.
Performance gap	Difference between estimated/theoretical and actual energy consumption.
Primary energy consumption	Total energy demand, including consumption by the energy sector itself, losses during the transformation and distribution of energy, and final energy consumption, but excluding the use of energy carriers for non-energy purposes (e.g. petroleum for producing plastics).
Recovery and Resilience Facility	The EU's financial support mechanism to mitigate the economic and social impact of the COVID-19 pandemic, stimulate recovery and meet the challenges of a greener and more digital future.
Recovery and resilience plan	Document setting out a member state's intended reforms and investments under the Recovery and Resilience Facility.
Reform	In the context of the RRF, a change resulting in significant, lasting improvement in the functioning of a market, a policy, or institutional or administrative structures, or in significant progress towards policy objectives such as growth and jobs, resilience and the green and digital transitions.
REPowerEU	EU initiative to end dependence on fossil fuels, diversify energy supplies and accelerate the clean energy transition.
RRF Scoreboard	Commission website showing how the implementation of member states' recovery and resilience plans is progressing.
Target	Quantitative measure of a member state's progress towards completing a specific reform or an investment in its recovery and resilience plan.

Replies of the Commission

https://www.eca.europa.eu/en/publications/SR-2026-20

Timeline

https://www.eca.europa.eu/en/publications/SR-2026-20

Audit team

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber I – Sustainable use of natural resources, headed by ECA Member Joëlle Elvinger. The audit was led by ECA Member Nikolaos Milionis, supported by Kristian Sniter, Head of Private Office, Aris Konstantinidis and Katarzyna Radecka-Moroz, Private Office Attachés; Florence Fornaroli, Principal Manager; Antonella Stasia, Head of Task; Dirk Neumeister, Lucia Rosca and Asimina Petri, Auditors. Alexandra-Elena Mazilu provided graphical support.

From left to right: Florence Fornaroli, Antonella Stasia, Asimina Petri, Kristian Sniter, Nikolaos Milionis, Dirk Neumeister, Aris Konstantinidis and Alexandra-Elena Mazilu.

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European Court of Auditors, special report 20/2026 “Improving the energy efficiency of private homes with the RRF – Broad financial support, but weaknesses in the foundations”, Publications Office of the European Union, 2026.

A quarter of energy consumption in the EU comes from residential buildings. The Recovery and Resilience Facility has allocated €43 billion to improving the energy efficiency of these buildings and reducing energy consumption. Our work identified shortcomings in the set-up of the measures, which did not directly target deep renovations. We also found delays in implementation and weaknesses in monitoring the measures' performance. Information on energy savings was not reliable, comparable or detailed enough and the cost-effectiveness of building renovations was not tracked. Our recommendations aim to improve the targeting of renovation measures, the reliability of reported energy savings and the evaluation of the measures' results and cost-effectiveness.

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