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How Does the Recovery and Resilience Facility Compare to the Cohesion Policy Funds: The Case of Renewable Energy

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Abstract

This paper provides the first systematic, cross-country empirical comparison of the Recovery and Resilience Facility (RRF) and Cohesion Policy funds (CPF) in the domain of renewable energy deployment. Covering 14 EU Member States, the analysis combines quantitative cross-country evidence on financing volumes, technology mixes, implementation speed, and reported capacity achievements. The findings show that the RRF represents a major amplification of EU renewable energy financing, with planned allocations exceeding Cohesion Policy expenditure by a factor of five to ten. At the same time, claims of superior performance-based delivery require qualification: green transition financial progress lags the general RRF disbursement rate, milestone fulfilment for renewable energy falls short of planned indicative rates in most countries, and reported operational capacity figures raise concerns about plausibility. The analysis reveals no meaningful correlation between milestone and target fulfilment and progress with renewable energy country-specific recommendations, suggesting that administrative compliance with milestones does not immediately translate into structural reform outcomes. These findings carry direct implications for the design of the post-2027 EU financial framework, particularly regarding the performance indicators, the introduction of attribution protocols for reform-linked achievements, and the preservation of complementarity between performance-based and non-performance-based approaches.

Keywords: Recovery and Resilience Facility; Cohesion Policy; renewable energy; performance-based funding

1. Introduction

Two EU instruments dominate the public financing of renewable energy across Member States: the multiannual Cohesion Policy funds (CPF), principally the European Regional Development Fund and the Cohesion Fund (Regulation (EU) 2021/1060) ([European Union, 2021c](#)), and the one-off Recovery and Resilience Facility (RRF), established after the COVID-19 crisis (Regulation (EU) 2021/241). Both instruments operate within the European Green Deal architecture ([Häbel & Hakala, 2021](#); [Miłek et al., 2022](#)) and serve overlapping climate and energy security objectives, but they follow fundamentally different logics, timelines, and governance arrangements. The CPF disburses against incurred costs over multiannual programmes; the RRF makes payments conditional on achieving predefined milestones and targets over a fixed 2020–2026 horizon. We exploit these differences to assess and compare what the RRF and the CPF have planned and delivered for renewable energy



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across 14 EU Member States, and to evaluate whether the RRF's performance-based logic yields measurably faster or more effective outcomes than the CPF's cost-based model.

The RRF has been hailed as novel and ambitious, both as a fiscal instrument and as a lever for accelerating progress toward EU climate commitments, including renewable energy targets (Bocquillon et al., 2023), and the financial stakes are substantial. As of January 2026, the RRF envelope of EUR 577 billion includes more than EUR 37 billion for renewable energy, while the CPF 2021–2027 envelope of EUR 367 billion contains around EUR 8 billion for the same sector (Recovery and Resilience Scoreboard; Cohesion Open Data Platform). Together, the two instruments are set to mobilise more than EUR 40 billion for renewable energy between 2020 and 2029, an unprecedented level of public support at the EU level.

The existing literature on the RRF is dominated by macroeconomic simulations and governance analysis. Macroeconomic studies estimate the Facility's aggregate growth and spillover effects (Bańkowski et al., 2022, 2024; Freier et al., 2022; Pfeiffer et al., 2023; Domínguez-Díaz et al., 2025), and public procurement effects on firm-level new lending (Ortiz et al., 2025). Governance studies debate whether the RRF marks a genuine institutional break with the EU's traditional cost-based financing or a reconfiguration of existing patterns (Sandulli, 2022; Fasone & Lupo, 2024; Miró et al., 2024; Fabbri, 2025). Far less work examines what the Facility has delivered on the ground, particularly in comparison with the CPF. The few comparative studies available so far concentrate on design and governance differences rather than implementation outcomes (European Court of Auditors, 2023; Zeitlin et al., 2023; Darvas & Welslau, 2023; European Committee of the Regions, 2023; Schwab, 2024; Feld & Hassib, 2024), and the RRF mid-term evaluation (EC, 2023b) explicitly noted that it was too early to compare the two instruments' effectiveness. As Zeitlin et al. (2025) observe, almost no academic work has yet investigated the implementation and monitoring phases or examined the practical operation and impact of the RRF's performance-based approach.

This empirical gap is observed at a crucial moment. In the last year of the RRF's implementation and five years into the 2021–2027 multiannual financial framework (MFF), it is worth exploring if any lessons can be learned from the RRF's and CPF's implementation so far. The Commission's proposal for the post-2027 MFF (COM/2025/570 final), currently under discussion, leans heavily on the RRF model: it foresees results-based funding across most of the EU budget and a streamlined indicator set replacing the current 5000 indicators with around 900 output and result indicators, designed in line with European Court of Auditors recommendations. Whether the RRF's performance-based logic delivers what its proponents claim is therefore not only an academic question, but a live policy decision.

We make three contributions to this academic and policy discussion. First, we provide the first systematic, cross-country empirical comparison of RRF and CPF support for renewable energy across 14 Member States, drawing on the latest available datasets. Second, the contribution is not only empirical, but also methodological, because we provide a comparability framework and expose inconsistencies in reported operational capacity and milestone fulfilment that have not been examined in the existing literature, showing where attribution claims are methodologically fragile. Third, the paper's contribution is policy-oriented, as we derive policy implications for the design of the 2028–2034 programming period, in which the RRF's performance-based logic is proposed as a model for most of the EU budget (European Union, 2025a).

The paper proceeds as follows. Section 2 provides a conceptual framework based on the literature on EU regional policy, green conditionality, and evaluation practice and outlines the legal and governance differences between the CPF and the RRF. Section 3 describes the dataset, indicators, and overall methodology. Section 4 presents quantitative

comparisons of funding volumes, technology mixes, implementation speed, and reported capacity achievements. Sections 5 and 6 place the study results in perspective (Discussion), synthesise the conclusions, and offer recommendations for the next programming cycle.

2. Conceptual Framework and Research Questions

The RRF has two distinct features: a performance-based approach, where payments to Member States depend on the achievement of predefined milestones and targets (MTs); and an emphasis on structural reforms alongside investments to ensure the mechanism's sustainability and long-term impact (EC et al., 2025). Unlike the RRF, the CPF is typically defined as a cost-based instrument, i.e., it is primarily based on the reimbursement of incurred costs—the Commission pays the amount requested by the Member State, provided it is below the EU contribution approved for the respective priority under the programme and meets all eligibility conditions (European Court of Auditors, 2023). To an extent, the CPF shares some performance-based features: the requirement to fulfil specific prerequisites ('ex ante conditionalities' in the 2014–2020 period and 'enabling conditions' in 2021–2027); a mandatory performance reserve, which could be released for successful priority axes; and performance-based funding models, which linked EU financial support directly to predefined outputs or results. However, the European Court of Auditors (2021) found that their use was limited and only partially successful.

Whether RRF governance is truly more performance-based than the CPF remains an open question (Zeitlin et al., 2023). Previous studies (e.g., European Court of Auditors, 2022; Darvas & Welslau, 2023; Corti & Ruiz de la Ossa, 2023) found that NRRPs vary widely across countries, including in milestones and targets, which prevented the Commission from making a proper comparison to assess their level of ambition. The European Court of Auditors (2023) also concluded that the extent to which RRF financing is more performance-based than Cohesion Policy funds remains to be seen, and indicated that the RRF might allow faster disbursement of funds than the CPF. A study for the European Committee of the Regions (2023) notes that the RRF and Cohesion Policy are not aligned on what is considered a result or an output between the two policies, while for the RRF, there are considerable ambiguities about how to prove a result has been achieved.

Despite these unresolved questions, the RRF model is increasingly framed as a template for CPF reform (Zeitlin et al., 2023). The argument is normatively powerful: Bucci et al. (2026) characterise the Facility as a fundamental break from a structural funds logic that has historically rewarded absorption rather than outcome achievement, and Fabbrini (2025) labels the inherited Cohesion Policy "receipts-based". But this case rests largely on design comparisons rather than implementation evidence.

Our study also connects to a broader and fast-growing literature on green finance and the financing of the renewable energy transition. A substantial strand of this work examines the macro-level relationship between green finance and environmental outcomes, increasingly using advanced quantitative and machine learning techniques, often in emerging-economy or multilateral settings (Akhtar et al., 2022; Feld & Hassib, 2024; Rasoulinezhad & Taghizadeh-Hesary, 2022; Naveed et al., 2026). This literature consistently finds that the volume and design of green finance shape renewable energy deployment and emission outcomes, but it largely treats green finance as an aggregate and concentrates on private or blended capital flows and their environmental effects. Our contribution is complementary but distinct: rather than estimating the aggregate effect of green finance on emissions, we examine two specific public financing instruments at the level of their design, disbursement logic, and measured implementation within the EU's institutional architecture.

We examine whether the RRF's performance logic actually delivers faster or more effective renewable energy outcomes than the CPF for two reasons. First, renewable energy

is central to the European Green Deal and to the EU's post-2022 energy security agenda, making it a substantively important domain in its own right. Second, it is a sector where the RRF has been actively framed as a success story. The Commission (EC, 2025b) reports that the Facility had supported 110,655 MW of additional installed renewable energy capacity by 2025, a figure equivalent to Italy's entire electricity production capacity. A European Parliament study cites a comparable 107,000 MW (Binder et al., 2025), and Bricongne et al. (2025) document a measurable RRF effect on Italian solar deployment. The mid-term RRF evaluation (EC, 2023b) reported a much lower figure (as of December 2022) for the installation of an additional capacity of renewable energy (1 thousand MW in just four MSs), but also mentioned that it corresponds to 27% of what had so far been implemented in the 2014–2020 period under Cohesion Policy across all MSs.

The size and rapid evolution of these reported figures invite scrutiny. We take the favourable a priori case for the RRF as our starting point, asking the following two research questions:

- What differences exist in the financial scale between the instruments, and does the RRF's performance-based approach achieve faster financial absorption speed?
- What is the scale and speed of achievements of the instruments in terms of renewable energy deployment, and to what extent can they be attributed to them?

3. Scope, Methodology, and Data Sources

Systematic comparative analysis across policy areas of the RRF represents a promising avenue for further research (Bocquillon et al., 2023). The RRF's mid-term evaluation (EC, 2023b) concluded that Cohesion Policy is the EU investment tool that lends itself best to comparison with the RRF, but did not present a comprehensive comparison due to severe limitations in approach, indicator comparability, and measurement methods. This paper acknowledges these limitations but addresses them through a rigorous methodological approach and transparent caveats.

3.1. Scope and Unit of Analysis

The empirical focus is on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF) as investment funds financing renewable energy capacity under Cohesion Policy, and on the Recovery and Resilience Facility (RRF) under NextGenerationEU. The study covers 14 Member States (Belgium, Czechia, Germany, Greece, Spain, Italy, Lithuania, Luxembourg, Latvia, Malta, Poland, Portugal, Romania, and Slovakia), selected to capture variation in country size, geography, RRF size (from Italy and Spain to Luxembourg and Malta), and the relative scale of RRF support for the green transition (ranging from 38% in Lithuania to 80% in Luxembourg). All selected countries have access to RRF financing for renewable energy, and a historical reliance on Cohesion Policy funding for renewable energy. This sample compares favourably to earlier studies: Zeitlin et al. (2025) covered eight countries and Bokhorst and Corti (2023) five.

The analysis is conducted primarily at the national level, reflecting the RRF's reporting structure. Where relevant, programme and project information (for CPF) and milestone/target documentation (for RRF) are used to interpret cross-national patterns. Time coverage reflects each instrument's lifecycle: for Cohesion Policy, realised expenditure and project outputs for 2014–2020, and planned allocations plus early implementation signals for 2021–2027; for the RRF, planned commitments and implementation progress over 2020–2026.

3.2. Key Indicators and Progress Metrics

The main indicator is additional renewable energy production capacity (MW), distinguishing where possible between production capacity (linked to supported projects or measures) and operational capacity (connected to the grid and ready to produce). For the RRF, operational capacity is captured by common indicator 2, “additional operational capacity installed for renewable energy production.”¹ Two important caveats apply. First, the common indicators were an afterthought—Regulation (EU) 2021/241 required the Commission to adopt a delegated act establishing them (Commission Delegated Regulation (EU) 2021/2106) (European Union, 2021a, 2021b), which prevented rigorous linking to individual NRRPs. Second, at the country level, the Scoreboard reports this indicator as a stock measure relative to a 2019 baseline, which is why we use Eurostat baseline capacity figures to harmonise values into MW for cross-country comparability.

Following Bricongne et al. (2025), we consider both financial absorption and actual renewable energy achievements. The quantitative analysis compares CPF and RRF support for renewables along four dimensions: (i) scale of financial support, based on allocations and realised expenditure; (ii) technology mix, distinguishing between solar, wind, biomass, and other renewables; (iii) implementation speed, using comparable proxies for financial progress (or the so-called absorption rates, as explored by Gambina & Mazzola, 2025) and output delivery; and (iv) renewable deployment outcomes, centred on additional renewable energy production capacity.

There is a comparability challenge across the two financing instruments and across the programming periods, both from a financial and from an indicator point of view. For financials, to compare the different allocations and spending rates, we use the following nomenclature for the categories of intervention: CPF 2014–2020—renewable energy codes 009–012²; CPF 2021–2027—renewable energy codes 047–052³; and RRF 2020–2026—renewable energy codes 028–032⁴. For the current period (CPF 2021–2027 and RRF), except for the numbering, the codes are identical. Compared with 2014–2020, where “Other renewable energy” explicitly bundled renewable energy integration (incl. storage, power-to-gas and renewable hydrogen infrastructure) and smart grids appeared as a separate energy distribution code, the 2021–2027 nomenclature is more granular on generation and shifts integration/system aspects into a dedicated “Smart Energy Systems (including smart grids) and related storage” intervention field rather than embedding them under “other renewables.” Thus, the data on financial allocations for 2014–2020 are slightly overestimated because they include renewable energy integration, but not by much, as this budget item is lower than the allocations for solar energy and biomass. Finally, some large RRF financing may reflect loan-financed investment capacity in addition to grants, which does not exist under the CPF.

Comparing implementation speed across the two instruments is constrained by their different disbursement logics. For the RRF, the Member States are the beneficiaries to whom the financing is disbursed, while the CPF considers the financing to the project beneficiaries. Thus, for the RRF, the paper generally uses disbursed vs. allocated, while for the CPF, spent vs. planned and decided vs. planned metrics are applied. A further empirical challenge is that the RRF does not provide harmonised country- or project-level data linking realised expenditure to specific renewable energy measures. We partially address this by constructing an indicative implementation proxy using the general green transition rate⁵.

$$\text{Implementation rate} = (\text{Green disbursed} / \text{Total disbursed}) \times (1 / \text{Green share commitment}) \times (\text{Total disbursed} / \text{Total allocated}) \quad (1)$$

Similar to the financial data, there are several ways to compare the achievements of the CPF and RRF, but none allow a straightforward one-to-one comparison. The two main

indicators could be additional renewable energy production capacity and additional operational capacity installed for renewable energy with RRF support, which goes a step further by specifically measuring if the additional capacity is connected to the grid, if applicable, and fully ready to produce or already producing energy (EC, 2024a). For reasons of data availability and credibility, discussed further in the Results section (Section 4), we focus on additional renewable energy production capacity.

To make the comparison transparent, Table 1 summarises the key structural differences between the two instruments along the dimensions on which they are compared, together with the metrics used for each. These differences underpin the caveats applied throughout the analysis and explain why no single one-to-one comparison is possible.

Table 1. Indicator comparability matrix between the CPF and the RRF.

Dimension	RRF	CPF	Comment on Comparability
Time horizon and reporting obligation time lags	Single 2020–2026 window; commitments end Aug 2026, disbursement by Dec 2026. Under the RRF reporting framework, Member States may have completed reforms or investments in practice, but these are only reflected in EU-level disbursement data once they are included in a payment request and positively assessed by the Commission.	Several programming periods (e.g., 2014–2020 and 2021–2027); spending effectively to 2029 for the current programming period. Member States periodically transmit financial and indicator data, meaning that reported absorption may lag behind project implementation and does not necessarily capture the full pipeline of selected or ongoing operations.	Due to the different timelines and reporting frameworks, a comprehensive RRF/CPF comparison of achievements would only be possible after both instruments are completed, but this would be too late to provide meaningful policy insights. In this paper, we rely on the most up-to-date available data for each instrument. The two CPF programming periods are compared at the same point in their lifecycle ($n + 4$; see the Appendix A Tables A1–A4), so that elapsed time since launch, rather than calendar year, drives the comparison. We acknowledge that the comparison has limits: from a chronological perspective, the RRF is more advanced in its implementation, whereas the CPF still has further years of implementation ahead. We are explicit about these limits throughout the paper and treat the resulting comparisons as indicative rather than exact.
Financial metric used	Disbursed (the amount paid by the Commission to a Member State under the RRF) vs. allocated (amount approved for a Member State’s endorsed Recovery and Resilience Plan); green transition proxy for renewables (Equation (1)).	Decided ⁶ (financial resources allocated to selected projects) vs. planned (total budget allocated); spent (expenditure reported by the selected projects) vs. planned (and vs. decided).	Considering the different financial indicators used by the funding mechanisms, we pair “disbursed vs. allocated” (RRF) with “spent/decided vs. planned” (CPF) and, as the RRF provides no harmonised measure-level financial data, approximate renewable spending with a green transition proxy (Equation (1)). As above, the comparison is indicative rather than one-to-one.
Capacity indicators	Additional production capacity (MT descriptions) and common indicator 2 operational capacity (stock vs. 2019 baseline).	Additional renewable energy production capacity (MW) from supported projects.	Both funding mechanisms report additional renewable energy production capacity in MW, which is why this is the key indicator used for assessing physical progress. The RRF’s common indicator 2 on operational capacity is a stock measure against a 2019 baseline and was set by a later delegated act, so it is not rigorously linked to individual NRRPs; Eurostat baselines are used to harmonise values into MW. Yet, due to these methodological challenges, operational capacity is treated as a secondary indicator only. Further comments on this are provided in Sections 3.2 and 4.2.1.

Finally, reflecting another structural difference between the instruments—the RRF’s reform pillar—we measure the progress with country-specific recommendations (CSRs), particularly in the RES sector. Previous evaluation studies (EC, 2023b; EC et al., 2025) have also explored this aspect using the CSR progress, but here we apply an approach with weighting and benchmarking. To measure implementation progress, each CSR assessment was assigned an ordinal weight (No Progress = 0, Limited Progress = 1, Some Progress = 2, Substantial Progress = 3, Full Implementation = 4), with unassessed recommendations excluded. A normalised score was then computed for each country and an aggregate EU level as

$$S = (1/N) \sum w_i, \quad (2)$$

where w_i is the weight assigned to the i -th recommendation and N is the total number of assessed recommendations, yielding a comparable score on a 0–4 scale. Scores were calculated for the 2022 and 2025 assessment cycles, and the normalised delta

$$\Delta S = S_{2025} - S_{2022} \quad (3)$$

was used to capture the direction and magnitude of change in implementation progress over the period. In addition to this general approach, a more targeted way to analyse CSR progress was to examine individual CSRs’ progress over the years. To do that, we have focused on the implementation trajectory of 222 renewable energy-related CSRs across EU Member States, selected from the broader pool spanning all policy areas, based on the following criteria: (i) a thematic link to renewable energy sources and (ii) availability of at least two European Semester assessment cycles (2022–2025), enabling a first-to-last comparison⁷.

3.3. Data Sources

The analysis draws on five main data sources: (1) the Recovery and Resilience Scoreboard for RRF financial progress, milestone and target fulfilment, and common indicator 2 on renewable energy; (2) the 2026 release of the RRF Sectoral Database for a structured breakdown of planned RRF renewable energy support⁸; (3) the Cohesion Open Data Portal for ERDF/CF allocations and renewable energy-relevant intervention fields (also used by Tijanić & Kersan-Škabić, 2025); (4) the country-specific recommendations (CSR) database⁹ for recording and monitoring progress with CSR implementation; and (5) Eurostat for baseline and trend indicators on renewable energy capacity.

4. Results

This section presents a comparative analysis of the Recovery and Resilience Facility and Cohesion Policy funds, focusing on their financing volumes, technology mixes, implementation speed, and achievements in renewable energy deployment across selected EU Member States.

4.1. Renewable Energy Financing

4.1.1. Volume

There has been a pronounced shift in the scale of EU support for renewable energy from traditional Cohesion Policy instruments to the Recovery and Resilience Facility. In most countries, planned RRF allocations for renewable energy exceed past Cohesion Policy expenditure by one or more orders of magnitude, and in several cases by several orders. This effect is particularly strong in countries such as Greece and Italy, resulting in very high RRF-to-CPF ratios. Even when compared to planned CPF allocations for 2021–2027, RRF funding remains substantially larger in most countries, underscoring the exceptional, one-off character of RRF support. At the same time, there is considerable cross-country

heterogeneity: while RRF financing dominates in large Member States such as Germany, Spain and Italy, in a small number of cases (e.g., Slovakia and Malta), planned Cohesion Policy support remains comparable to, or larger than, RRF allocations (see Appendix A, Table A3). Overall, the evidence points to the RRF as a major amplification of EU financial support for renewable energy, with a $10.3\times$ increase in planned financing and a $13\times$ increase in spending compared to the 2014–2020 period, and a $5.6\times$ boost in planned financing compared to the CPF 2021–2027.

Exploring the distribution of funding per technology (see Table 2), at the EU aggregate level, solar dominates renewable energy financing across all three instruments, but the RRF is notably more skewed toward a “fast-deployment” electricity mix: it combines a very large solar share (58.2%) with a much higher wind share (19.4%) than Cohesion Policy (11.6% under CPF 2021–2027 and just 1.4% in CPF 2014–2020), while allocating comparatively little to biomass (6.3%) and only a moderate share to “other” renewables (16.1%). By contrast, Cohesion Policy is more structurally diversified: CPF 2014–2020 shows a sizeable biomass component (18.1%), whereas CPF 2021–2027 shifts toward a broader mix with a much larger “other” category (29.7%) alongside solar (49.4%), suggesting a stronger role for territorially specific technologies and system-adjacent investments than under the RRF. At the country level (see Appendix A, Table A1), the RRF approach often appears as near-single-technology concentration (Spain, Luxembourg and Malta are mostly solar), but there are exceptions that underline national pipelines, such as Poland’s RRF portfolio being overwhelmingly wind (92.9%) and Portugal’s being dominated by “other” renewables (85.9%). All in all, Cohesion Policy allocations tend to look less “all-in” and can preserve legacy specialisations (e.g., higher biomass/other shares in parts of Central/Eastern and Northern Europe), while the RRF more frequently concentrates funding into quickly deployable project types.

Table 2. Financing for renewable energy—per country, per type of RES, per funding¹⁰.

	Fund	Wind	Solar	Biomass	Other
EU	RRF	19.4%	58.2%	6.3%	16.1%
	CPF21-27	11.6%	49.4%	9.3%	29.7%
	CPF14-20	1.4%	64.8%	18.1%	15.8%

Source: CPF 2014–2020—Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020-Categorisation/ESIF-2014-2020-categorisation-ERDF-ESF-CF-planned-/3kx-ekfq/about_data, as of 2023, accessed on 13 April 2026)—distribution of spent amounts, CPF 2021–2027—Cohesion data (as of January 2026)—distribution of planned amounts, RRF—Sector database (https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/rrf-sectoral-database_en, accessed on 13 April 2026)—distribution of planned amounts.

4.1.2. Financial Implementation Speed

For the selected countries, as of January 2026, the general RRF rate of disbursement of grants and loans is 69%, while for the CPF, the decided vs. planned rate was 58% and the spent vs. decided rate was 13%, i.e., the RRF has been faster in terms of overall financial progress (see Figure 1). However, considering the different logics and stage of implementation of the funding instruments (as discussed in Section 3), these results can only be deemed indicative. Furthermore, as concerns the renewable energy investments, the picture is more nuanced. As mentioned, due to the lack of more precise data, the general green transition financial implementation rate for the RRF is approx. 38%¹¹, which is lower than the CPF21–27 rate for renewable energy for decided vs. planned, but higher than the CPF21–27 rate for spent vs. planned. The green transition absorption rate for the RRF is much lower than the general absorption rate, whereas for the CPF, it does not appear to be the case, suggesting delays in the RRF financial implementation rate¹².

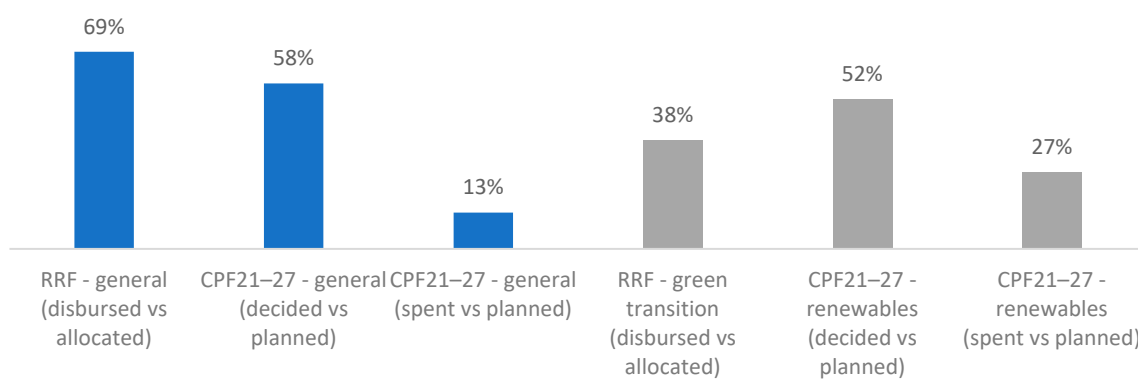


Figure 1. Financial implementation—RRF and CPF2021–2027 in the sampled countries (in percentages). Source: RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/, as of January 2026, accessed on 13 April 2026) and Cohesion data (https://cohesiondata.ec.europa.eu/2021-2027/2021-2027-Finances-Detailed-Planned-vs-Implemented/3git-md5z/about_data, as of January 2026, accessed on 13 April 2026).

4.2. Renewable Energy Deployment Achievements

4.2.1. Renewable Energy Production Capacity—Volume

The comparison of target values for renewable energy production capacity (see Table 3; full country-level detail in Appendix A, Table A4) shows that the RRF in the selected 14 countries has targets three times higher than CPF21–27 and more than four times higher than CPF14–20, when both investments and reforms are considered. The target values for the RRF are based on the descriptions of milestones and targets provided by the Member States, rather than on a more comprehensive dataset such as the Cohesion data. These descriptions are incomplete, which is why the target values for the RRF are probably undervalued.

As concerns the achieved values, however, despite its earlier stage of implementation, as of January 2026, the CPF21–27 has achieved higher values than those reported under the RRF for investments—962 MW vs. 294.7 MW. In terms of target achievement, the CPF21–27 has already reached 11% of its target values for RES production capacity, while for the RRF, this percentage is only 3%. Taking into account the achievement values through reforms would not be methodologically sound, because the CPF effectively does not have reforms as an instrument in the toolbox, but moreover, the values reported by Greece, Spain, and Poland represent the increases in the overall RES production capacity in the three countries, which inflates the RRF figures. While the RRF reforms have certainly contributed to these achievements, they cannot be fully attributed to them. On one hand, the RRF reforms show the high potential of reforms as a tool for increasing the RES capacity—while only seven countries of the selected sample have them, their target values are higher than the investment values for the 12 countries that envisage them under the RRF. On the other hand, attribution represents a serious methodological challenge when assessing the concrete effects of these reforms.

The operational capacity values are also presented in the table, but they are not reported by all CPF countries, which makes the comparison difficult. The more important reason for not using the reported additional operational capacity is that the RRF-reported values are unrealistic, particularly for Italy and Greece, which drive the overall value upwards. Italy and Greece reported, as of January 2026, respectively 73.7% and 95.2% additional operational capacity installed for renewable energy production expressed as a percentage of the total electricity production capacities for renewables per Member State in 2019 (see Appendix A, Table A2). For comparison, the overall growth in electricity production capacity from renewables and waste in Italy and Greece between 2019 and 2023 was 19% and 56%, respectively, which makes the reported values improbable. In addition, the values for the RES operational capacity (in GW) supported by the RRF have

varied significantly through the years: 1.061 MW reported in 2023 (EC, 2023a), 101.3 GW reported in 2024 (EC, 2024b), 110.7 GW in 2025 (EC, 2025b), and down to 62.4 GW in 2026 (as reported in January 2026 on the RRF Scoreboard).

Table 3. CPF and RRF: Additional renewable energy production/operational capacity—EU aggregate for the selected 14 countries (in MW), as of January 2026.

Indicator	Value
Production capacity—CPF 2014–2020	
Target	6331
Decided	7703
Implemented	3807
Production capacity—CPF 2021–2027	
Target	8822
Decided	6435
Implemented	962
Production capacity—RRF 2020–2026	
Planned investments	11,166.3
Planned reforms	16,063.2
Fulfilled investments	294.7
Fulfilled reforms	26,264.6
Operational capacity—CPF 2021–2027	
Target	3046
Decided	1695
Implemented	248
Operational capacity—RRF 2020–2026	
Fulfilled (investments and reforms)	58,773.4

Source: for the CPF14–20—Open Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020/ESIF-2014-2020-Achievement-Details-timeseries/aesb-873i/about_data, 2014–2020 achievement details, accessed on 13 April 2026), for the CPF21–27—Open Cohesion data (https://cohesiondata.ec.europa.eu/2021-2027-Indicators/2021-2027-Achievement-Details-multi-funds-timeseri/xi3a-zddk/about_data, 2021–2027 achievement details, accessed on 13 April 2026), for the RRF (planned and fulfilled investments/reforms—MT dataset (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/milestones_and_targets.html, accessed on 13 April 2026) and RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/common_indicators.html, accessed on 13 April 2026)).

As flagged in Section 3, several distinct measurement problems compound these figures and warrant explicit treatment. First, the indicators conflate different capacity concepts: planned capacity (derived from MT descriptions), installed capacity (physically in place), and operational capacity (connected to the grid and producing). Second, the baseline is unstable: common indicator 2 is reported as a stock relative to a 2019 reference, so the values depend on the baseline chosen and are sensitive to subsequent revisions. Third, several Member States appear to report cumulative national renewable capacity rather than the increment attributable to RRF-supported measures; where reforms carry capacity targets, this conflates economy-wide market growth with Facility-induced additionality and inflates reported achievement. Fourth, because the RRF and the CPF can co-finance overlapping investments and the RRF indicators are not linked to individual measures, there is a latent risk of double-counting capacity across the two instruments. Taken together, these problems imply that the headline RRF operational capacity figures should be read as upper-bound, weakly attributed estimates rather than as validated measures of net additional deployment.

4.2.2. Renewable Energy Production Capacity—Speed

Almost all Member States, with the exception of Czechia and Greece, have a fulfilment rate of the RRF milestones and targets (MTs) related to renewable energy and networks, which is lower than the general fulfilment rate (see Figure 2), which is consistent with the findings on the slower green transition financial rate as compared to the general financial rate. On average, the general MT fulfilment rate for the RRF is 53%, while in the renewable energy and networks sector, it is 42%, as of January 2026. The last bar in the chart presents the planned indicative annual rate of implementation¹³, which on average had a higher planned rate of fulfilment of renewable energy (i.e., the indicator does not include networks) MTs by the end of 2025, when compared to the current general and renewable energy and networks rates of fulfilment. Countries like Belgium, Czechia, Italy, and Poland achieved faster rates than planned, but they are exceptions. These patterns, combined with the RRF's remaining period of implementation, point to delays in the deployment of renewable energy capacity supported by the RRF.

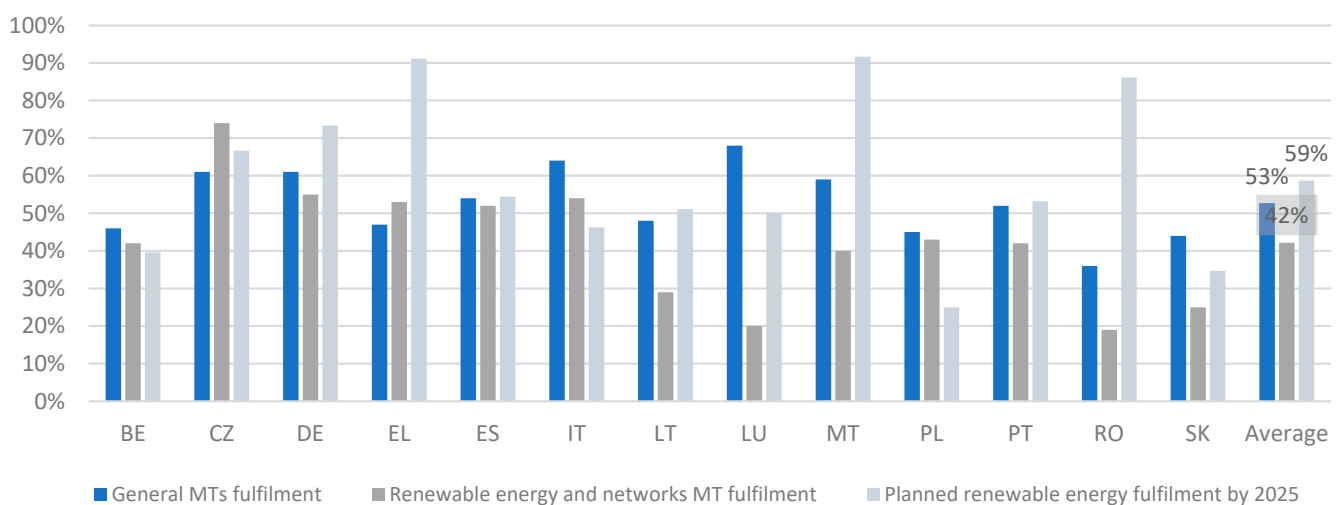


Figure 2. RRF—milestones and targets (MTs) fulfilment rate (percentages). Source: own elaboration, based on RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/milestones_and_targets.html), as of January 2026, accessed on 13 April 2026).

The RRF's renewable energy fulfilment rate of 42–44% (see Table 4) falls between the CPF21–27 rate of decided vs. target (73%) and the implemented vs. target (11%). However, when comparing the RRF with the CPF speed of implementation, it should be considered that the percentages presented in Table 4 show the achievement values for production RES capacity for the CPF, while for the RRF, it is the percentage of fulfilment of renewable energy and networks MTs. Thus, they are different indicators, and any conclusions comparing both financing mechanisms should be treated with caution. Furthermore, the different implementation periods of the two instruments (as described in Section 3) should also be taken into account.

The CPF comparison across programming periods shows that the implemented vs. target rates are very similar, but the rate of decided vs. target has been faster in the current programming period. Countries like Germany, Greece, Malta, and Portugal have notably lower CPF implementation rates than the RRF and CPF14–20, but this is not the case across all Member States. On the contrary, countries like Lithuania, Poland, and Slovakia have higher CPF21–27 rates of decided vs. target than both the CPF14–20 and RRF fulfilment rates.

Table 4. Implementation speed—CPF and RRF.

	CPF21–27 2025 (n + 4)		CPF14–20 2018 (n + 4)		RRF 2025 (n + 5)¹⁴	RRF 2025 (n + 5)¹⁵
	% decided from the target	% implemented from the target	% decided from the target	% implemented from the target	% fulfilment of MTs	% fulfilment of MTs
BE	64%	17%	617%	0%	42%	25%
CZ	61%	22%	7%	1%	74%	64%
DE	4%	0%	287%	103%	55%	44%
EL	7%	0%	21%	0%	53%	55%
ES	10%	0%	6%	5%	52%	39%
IT	33%	13%	21%	12%	54%	58%
LT	96%	38%	66%	2%	29%	29%
LU	25%	0%	20%	0%	20%	50%
LV	89%	0%	45%	13%	-	-
MT	0%	0%	22%	20%	40%	55%
PL	143%	11%	128%	16%	43%	49%
PT	0%	0%	46%	0%	42%	55%
RO	18%	0%	0%	0%	19%	25%
SK	72%	13%	28%	23%	25%	24%
Total/ Average	73% (total)	11% (total)	56% (total)	12% (total)	42% (average)	44% (average)

Source: own elaboration, based on: for the CPF14–20—Open Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020/ESIF-2014-2020-Achievement-Details-timeseries/aesb-873i/about_data, 2014–2020 dataset, accessed on 13 April 2026), for the CPF21–27—Open Cohesion data (https://cohesiondata.ec.europa.eu/2021-2027-Indicators/2021-2027-Achievement-Details-multi-funds-timeseri/xi3a-zddk/about_data, 2021–2027 dataset, accessed on 13 April 2026), and for the RRF (planned and fulfilled investments/reforms—RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/common_indicators.html), as of January 2026, accessed on 13 April 2026).

4.2.3. Renewable Energy Reforms—Progress with Country-Specific Recommendations (CSRs)

Analysing the progress with CSRs in the renewable energy sector shows that between 2022 and 2025, no renewable energy CSR has reached full implementation, yet there is a clear positive trend in the “substantial progress” category, which more than doubled from 5% in 2022 to 11% in 2025 (see Figure 3). Virtually no renewable CSRs are assessed as having made no progress, though around a quarter consistently remain at the limited progress level (22–32%), with the bulk concentrated in the “some progress” category (~65% in 2024–2025). The overall weighted progress score in the RES CSR category is a four percentage point improvement. By contrast, the broader pool of all CSRs shows a more even distribution across categories, with full implementation steadily rising from 3% to 7% and a stable share of around 12–13% achieving substantial progress—roughly on par with where renewable CSRs arrived only in 2025. The weighted progress for all CSRs is three times higher than the RES progress—12 percentage points—which shows that the progress with RES CSRs is delayed when compared to the overall progress.

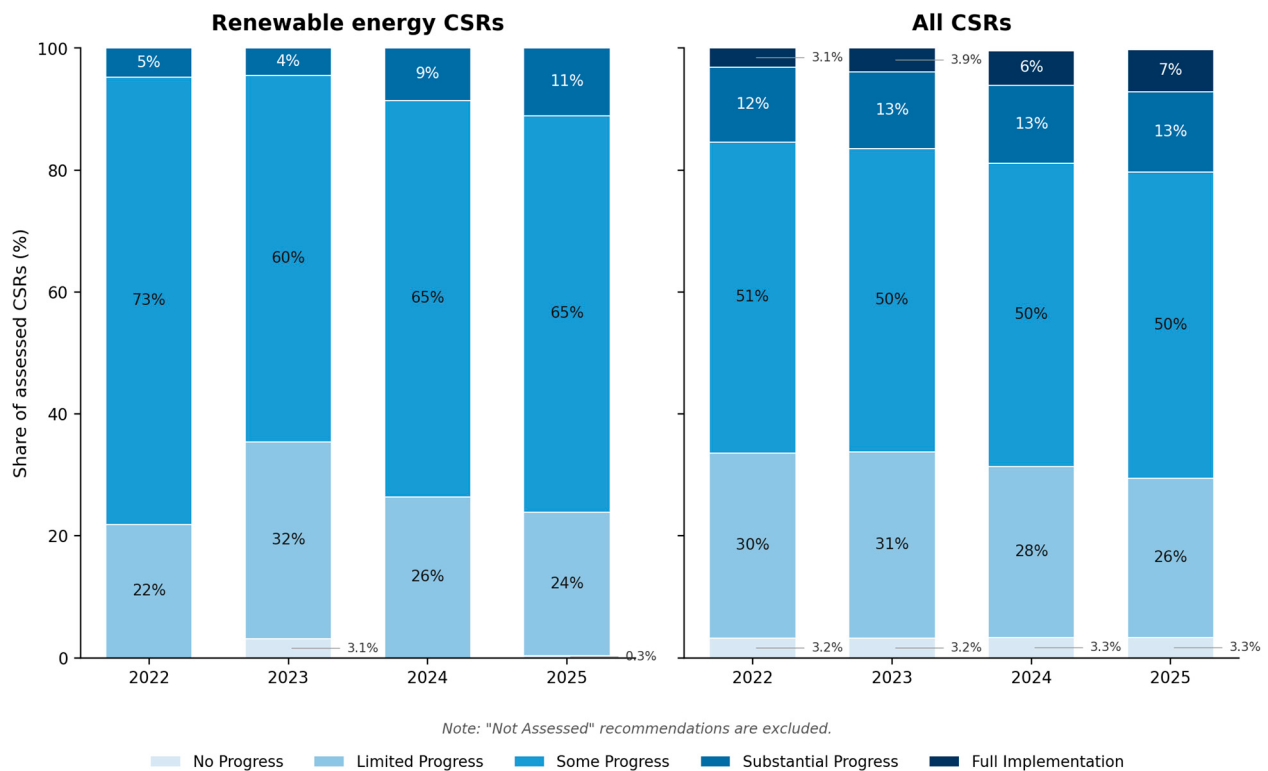


Figure 3. Progress with RES CSRs (left) and all CSRs (right)¹⁶—EU level. Source: own elaboration, based on the CSR database (https://ec.europa.eu/economy_finance/country-specific-recommendations-database/), as of January 2026, accessed on 13 April 2026).

A more focused analysis of individual CSR trajectories shows that between the 2022 (May) Semester cycle and the 2025 (June) Semester cycle, 18% of CSRs (total $n = 222$) in EU-27 improved their status. While this represents progress, for 77% of the CSRs in the renewable energy sector, there was no change in CSR status, and 5% deteriorated. For comparison, the individual RES CSRs are performing worse than the total ($n = 1289$) rate of assessed individual CSR progress, which had 26% improvement and 68% of CSRs with no change.

Finally, for the countries in the sample, exploring the link between MT fulfilment and financing and the CSR progress in the RES sector shows no correlation ($r = -0.1$). As shown in Figure 4, strong fulfilment of the MTs does not automatically translate into CSR improvement. For Germany, this seems to be the case, but not for Italy and Spain. The bubble chart also suggests that CSR improvement is not meaningfully linked to either the overall RES RRF financing volumes or the amount of financing absorbed. The correlation between overall RES RRF financing and CSR improvement is weakly negative (-0.32), and the correlation between the absorption rates and CSR improvement is essentially zero (0.02), indicating that countries that received and spent more RRF financing did not systematically improve their CSR compliance in the RES sector. This is visually striking when looking at Spain and Italy, the two largest bubbles with the darkest shading (each allocated ~EUR 9.6 bn, with ~EUR 3.5–3.7 bn absorbed), yet Spain shows a negative CSR change (-0.1), and Italy shows no change at all. The strong correlation between MT fulfilment and absorption rates (0.91) is unsurprising, since countries that complete more milestones naturally draw down more funds in line with the performance-based logic of the RRF.

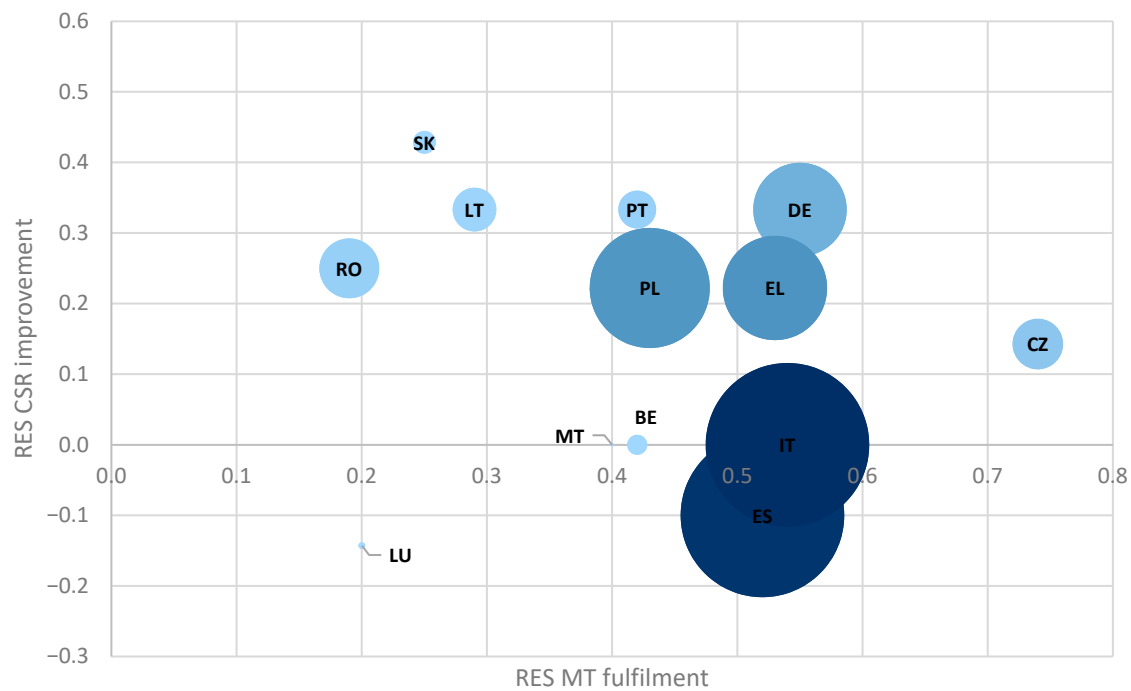


Figure 4. Link between MT fulfilment and CSR improvement in the RES sector, per country (bubble size = allocated RRF financing for RES; colour intensity = approximated absorbed financing). Source: own elaboration, based on the CSR database (https://ec.europa.eu/economy_finance/country-specific-recommendations-database/, accessed on 13 April 2026), MT dataset (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/milestones_and_targets.html, accessed on 13 April 2026), and RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/common_indicators.html, all as of January 2026, accessed on 13 April 2026). Anthropic’s Claude Opus 4.8 add-in for Excel was used for the drafting of the figure. The authors processed the data and provided the analysis. The LLM was only used for the visualisation.

5. Discussion

Our findings refine three claims that recur in the literature on the RRF: that the Facility represents a fundamental scale shift in EU support for renewables; that its performance-based logic produces faster delivery than cost-based instruments; and that its monitoring framework is sufficiently robust to support cross-country comparison.

The financing volumes scale shift is real but temporary. Planned RRF allocations for renewable energy exceed past CPF expenditure by an order of magnitude on average, and by two orders of magnitude in Greece and Italy. Even compared with the larger CPF 2021–2027 envelope, RRF allocations are roughly 5.6 times higher in aggregate. This confirms the framing of the RRF as an exceptional, one-off mobilisation in the renewable energy domain, in line with characterisations of the Facility as a fiscal instrument of unprecedented scale (Bocquillon et al., 2023; Bańkowski et al., 2024). Yet because RRF financing terminates in 2026 while the CPF will continue to disburse through 2029, the Facility represents an amplification of, rather than a substitute for, multiannual territorial support. Earlier studies of EU funding for renewables have documented the role of the CPF as a sustained catalyst (Chodkowska-Miszczuk et al., 2016; Carfora et al., 2017; Musiał et al., 2021); our results suggest the RRF should be read as a complement to this longer-running architecture rather than a successor to it.

The case for performance-based funding rests on the claim that conditionality on milestone delivery accelerates implementation. Bucci et al. (2026) provide supporting evidence in Italian public works generally, finding that the National Recovery and Resilience Plans (NRRPs) framework reduced delays by 12%. We do not observe this acceleration

in renewable energy specifically. Milestone fulfilment rates for “renewable energy and networks” lag the general RRF fulfilment rate in almost all sample countries and typically fall below the indicative annual rates Member States set themselves. On absolute capacity delivered through investments alone, the CPF 2021–2027 has produced higher values than the RRF (962 MW vs. 295 MW), despite its earlier stage of implementation. The [European Court of Auditors \(2024\)](#) has separately documented general absorption delays under the RRF; our evidence shows these are particularly acute in renewables, where sector-specific bottlenecks, permitting, grid connection, and supply chain are binding regardless of the disbursement logic.

Our analysis also exposes serious concerns about the reliability of reported achievements. The reported values for additional operational capacity installed (common indicator 2) have fluctuated significantly across reporting years, and the country-reported figures for Italy and Greece appear implausible when cross-checked against Eurostat capacity trends. This echoes the concerns raised by [Corti and Ruiz de la Ossa \(2023\)](#), who highlighted the current limits of milestones and targets as being “sometimes overly aggregated or too vague,” and by [Barbieri et al. \(2023\)](#), who found that Italy’s RRP monitoring platform (ReGIS) did not provide consistent and timely information to assess implementation progress. As noted by [Zeitlin et al. \(2023\)](#), the vast majority of RRF indicators measure inputs and outputs rather than results, and [Darvas and Welslau \(2023\)](#) have argued that result indicators should have a more prominent role in any performance-based EU budgeting framework. Similarly, [Tijanić and Kersan-Škabić \(2025\)](#) identified the lack of comprehensive and harmonised metrics for tracking the green transition under Cohesion Policy, further reinforcing the need for improved monitoring frameworks across both instruments.

Finally, our findings on reforms merit particular attention. The attempts to link EU funding to the establishment of a stable regulatory framework for RES predate the RRF considerably ([European Court of Auditors, 2014](#)), and the Commission ([EC, 2017](#)) reported that Cohesion Policy’s ex ante conditionalities already contributed to the transposition of the EU acquis in the energy and renewable energy sectors. Previous studies note that RRFs integrate CSRs and have contributed to their progress, including in the clean energy sector ([EC, 2023b](#); [EC et al., 2025](#)), and while our analysis also finds some evidence of progress with RES-related CSRs, the attempt to link CSR improvement with milestone and target fulfilment yielded no statistically meaningful correlation. The effects of reforms are also inherently difficult to quantify ([EC, 2023b](#)), and meaningful assessment likely requires in-depth case studies rather than cross-country correlations.

Several limitations qualify our findings. First, our study covers 14 Member States, which, while representing substantial variation in size, geography, and RRF allocation, does not encompass the full EU-27; findings may not generalise to excluded countries with different institutional or energy contexts. Second, the comparison between instruments is constrained by fundamental differences in their reporting architectures: the RRF tracks milestone and target fulfilment at the national level, while the CPF reports project-level selection, expenditure, and output data. The green transition proxy indicator used to approximate the RRF’s renewable energy financial implementation rate is a transparent but indirect measure of the progress with RES deployment. Third, the RRF’s common indicators, including the one on renewable energy capacity, lack rigorous linkage to individual NRRPs, limiting their analytical value for cross-country comparison. Finally, our design does not address several questions that future work could productively examine: implementation challenges specific to renewable energy projects under the RRF ([Dinca et al., 2023](#)); the relationship between investments and renewable energy potential across territories ([Kazak et al., 2020](#)); the profile of applicants for EU support ([Florkowski & Rakowska, 2022](#)); and spillover effects mediated by administrative capacity ([Carfora et al., 2017](#)).

6. Conclusions and Policy Implications

This paper provides the first systematic, cross-country empirical comparison of the RRF and Cohesion Policy in a specific investment domain—renewable energy—at a point when both instruments have generated implementation data. By drawing on quantitative cross-country evidence and confronting officially reported achievements with external plausibility checks, it moves the debate beyond governance and design comparisons toward an evidence-based assessment of what these instruments have delivered.

The RRF represents a major but temporary amplification of EU renewable energy financing, rather than a structural replacement of Cohesion Policy. Planned RRF allocations for renewables exceed past Cohesion Policy expenditure by large margins in most sample countries, though in a few cases (e.g., Slovakia and Malta), CPF allocations remain comparable or larger. Combined, they represent an unprecedented level of support for the renewable energy sector at EU level. The RRF's renewable energy portfolio is heavily skewed toward fast-deployable, mature technologies, solar (58%) and wind (19%), with several countries having near-single-technology concentration. By contrast, Cohesion Policy retains a more structurally diversified profile, preserving support for biomass, geothermal, and other territorially specific technologies.

Claims about the RRF's superior performance-based delivery require qualification. While overall RRF disbursement appears faster than Cohesion Policy financial progress, the comparison is constrained by fundamentally different measurement logics. When focusing on renewables, we find signs of slower-than-expected RRF implementation: green transition financial progress is systematically slower than the general disbursement rate, and milestone/target fulfilment for “renewable energy and networks” lags behind the overall rates in most countries. In most sample countries, actual milestone fulfilment rates for renewable energy fell below the planned indicative rates set by Member States, pointing to systematic over-optimism in RRF planning for renewables rather than to mere implementation delays. Moreover, we identify serious fragility in reported renewable capacity achievements under the RRF, where some country-reported values appear inconsistent with external capacity trends and the aggregate EU figure shifts substantially across reporting years. A distinct attribution problem affects reform-linked capacity: several countries reported aggregate national RES capacity growth as reform achievements, conflating general market trends with RRF-induced additionality and inflating the Facility's apparent contribution. We also find a disconnect between milestone and target fulfilment and CSR progress in the renewable energy sector, suggesting that the available evidence does not demonstrate a clear link between administrative completion of milestones and structural reform outcomes. Furthermore, renewable energy-related CSRs have been notably slower than the overall CSR progress. The weighted RES improvement (4 percentage points) is one-third of the all-CSR average (12 percentage points), and no RES CSR reached full implementation, suggesting that reforms in this sector face specific structural bottlenecks that milestone-based disbursement alone cannot overcome.

The Commission's intention to expand results-based funding and streamline indicators in the post-2027 framework, as declared in its budget expenditure tracking and performance framework (COM(2025) 545 final) (European Union, 2025b), makes these lessons particularly salient, and we can draw the following specific implications. From a methodological perspective, first, future performance frameworks should place greater weight on performance indicators with clear definitions and verification protocols, rather than equating milestone completion with outcome achievement. Second, the indicator architecture needs stabilisation before scaling up: stable definitions over time, transparent baselines and units, consistent country reporting guidance, and a trail for external plausibility checks. Third, an EU-wide project/measure traceability layer linking financing source(s),

measure identifiers, delivery stage, and claimed output/result indicators is needed to reduce possible double-counting and attribution ambiguity across funds. Fourth, reforms should be evaluated with counterfactual logic, including dynamic baselines and evaluation designs that separate general trends from reform-induced additionality (see, for example, EC, 2025a, Tool#60). Otherwise, the values of achievements may be overvalued.

Finally, from a policy perspective, the evidence does not establish a clear overall winner between the two instruments for supporting renewable energy. Each instrument is suited to a different task. The RRF's performance-based, front-loaded design is well matched to time-critical, fast-deployable investments and to reform milestones where the speed and conditionality of disbursement add value. The CPF's multiannual, territorially embedded model is better suited to a diversified technology portfolio, to less mature or region-specific solutions, and to investments that require longer lead times. For the European Commission, it implies that collapsing the post-2027 architecture into a single performance-based logic risks narrowing the EU's renewable energy support to what is fastest to deploy, at the expense of the diversification and cohesion that the energy transition also requires. The policy recommendation is therefore to preserve both logics within the next framework, with clear functional roles, rather than to treat the RRF as a wholesale template for the CPF. For Member States, the systematic over-optimism observed in renewable energy milestone planning argues for grounding future performance-based commitments in realistic deployment pipelines and administrative capacity, and for addressing early the structural bottlenecks that disbursement conditionality alone cannot resolve. Finally, the RRF's temporary nature also raises a continuity challenge: with commitments ending in 2026, sustaining the current scale of renewable energy support will depend on how effectively the CPF21-27 and the post-2027 framework absorb the project pipeline built up under the Facility.

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Opus 4.8 (Anthropic) for the purposes of supporting the processing of the CSR database and the generation of Figure 4. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Additional Data

Table A1. EU financing for renewable energy—per country, per type of RES, per funding¹⁷.

Country	Fund	Wind	Solar	Biomass	Other
BE	RRF	7.4%	38.8%		53.8%
	CPF21–27			100.0%	
	CPF14–20				100.0%
CZ	RRF		33.6%		66.4%
	CPF21–27	48.2%	18.0%	16.6%	17.2%
	CPF14–20	1.3%	66.9%	30.7%	1.1%
DE	RRF				
	CPF21–27		52.6%		47.4%
	CPF14–20		5.7%	26.1%	68.2%
EL	RRF	32.1%	58.4%	1.5%	8.0%
	CPF21–27	10.4%	60.0%	5.0%	24.6%
	CPF14–20			43.7%	56.3%
ES	RRF		100.0%		
	CPF21–27	13.4%	31.3%	10.1%	45.1%
	CPF14–20	12.5%	62.8%	17.1%	7.6%
IT	RRF		51.2%	20.4%	28.4%
	CPF21–27	3.2%	72.6%	3.1%	21.2%
	CPF14–20		89.1%	0.8%	10.1%
LT	RRF	14.5%	78.9%	3.8%	2.8%
	CPF21–27	0.1%	67.5%	15.6%	16.8%
	CPF14–20		47.6%	52.3%	0.05%
LU	RRF		100.0%		
	CPF21–27		33.3%	33.3%	33.3%
	CPF14–20			100.0%	
LV	RRF				
	CPF21–27			100.0%	
	CPF14–20			100.0%	
MT	RRF		100.0%		
	CPF21–27	100.0%			
	CPF14–20		100.0%		
PL	RRF	92.9%			7.1%
	CPF21–27	4.4%	70.0%	8.4%	17.2%
	CPF14–20	0.8%	86.1%	6.7%	6.4%
PT	RRF		14.1%		85.9%
	CPF21–27	20.2%	38.8%	0.5%	40.5%
	CPF14–20			5.3%	94.7%
RO	RRF		55.9%		44.1%
	CPF21–27		20.0%	20.0%	60.0%
	CPF14–20		5.3%	3.7%	91.0%
SK	RRF	1.5%	56.4%	10.8%	31.2%
	CPF21–27	3.8%	30.7%	4.9%	60.6%
	CPF14–20		28.1%	27.2%	44.7%
EU	RRF	19.4%	58.2%	6.3%	16.1%
	CPF21–27	11.6%	49.4%	9.3%	29.7%
	CPF14–20	1.4%	64.8%	18.1%	15.8%

Source: CPF 2014–2020—Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020-Categorisation/ESIF-2014-2020-categorisation-ERDF-ESF-CF-planned-/3kkx-ekfq/about_data, as of 2023, accessed on 13 April 2026)—distribution of spent amounts, CPF 2021–2027—Cohesion data (as of January 2026)—distribution of planned amounts, RRF—Sector database (https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/rff-sectoral-database_en, accessed on 13 April 2026)—distribution of planned amounts.

Table A2. Reported RRF achievements in operational renewable capacity (EU-wide).

Country (A)	RRF (%) (B)	MW in 2019 (C)	RRF (MW) (BxC)
Austria (AT)	7.2	20,336.7	1458.3
Belgium (BE)	16.3	10,337.0	1683.7
Bulgaria (BG)	1.0	5149.4	50.3
Croatia (HR)	47.5	3006.3	1428.9
Cyprus (CY)	57.6	309.0	178.0
Czechia (CZ)	16.7	5123.5	855.5
Denmark (DK)			No data
Estonia (EE)	0.0	622.6	0.2
Finland (FI)	0.6	7626.0	44.7
France (FR)			No data
Germany (DE)	1.0	121,987.0	1205.3
Greece (EL)	95.2	9847.9	9370.5
Hungary (HU)			No data
Ireland (IE)			No data
Italy (IT)	73.7	54,813.8	40,378.8
Latvia (LV)	3.4	1765.1	60.0
Lithuania (LT)	0.0	1574.0	0.7
Luxembourg (LU)	5.0	1501.4	75.2
Malta (MT)	0.3	155.3	0.4
Netherlands (NL)			No data
Poland (PL)	2.8	10,505.8	291.4
Portugal (PT)	1.4	13,975.7	195.7
Romania (RO)	3.0	11,240.3	337.0
Slovakia (SK)	0.2	3259.0	5.3
Slovenia (SI)			No data
Spain (ES)	7.5	57,538.2	4312.8
Sweden (SE)			No data
Total			61,932.7

Source: RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/RRFCI02.html, accessed on 13 April 2026) for column B, Eurostat (https://ec.europa.eu/eurostat/databrowser/product/page/nrg_inf_epcrw_custom_19610374, accessed on 13 April 2026)—[nrg_inf_epcrw_custom_19610374] for column C. Due to rounding of the values, the total RRF value presented in the above table is slightly lower than the officially reported number on the Scoreboard, as of February 2026—62,444 MW.

Table A3. CPF and RRF: Renewable energy financing—comparison among the selected countries (in million EUR).

Country	CPF	CPF	CPF	RRF	RRF vs. CPF		
	2014–2020 EU planned	2014–2020 EU spent	2021–2027 EU planned	2020–2026 EU planned	RRF/CPF 2014–2020 (planned)	RRF/CPF 2014–2020 (spent)	RRF/CPF 2021–2027 (planned)
BE	12.9	4.1	5.6	140.7	10.9×	34.4×	25.2×
CZ	85.1	40.4	642.9	907.1	10.7×	22.5×	1.4×
DE	103.5	83.7	29.0	3120.0	30.1×	37.3×	107.6×
EL	33.8	11.4	87.9	3882.8	115×	339.5×	44.2×
ES	839.9	192.7	1821.1	9568.7	11.4×	49.7×	5.3×
IT	47.1	14.8	776.2	9346.6	198.5×	632.3×	12×
LT	237.5	278.0	288.2	677.8	2.9×	2.4×	2.4×
LU	1.8	1.2	2.1	15.1	8.4×	12.4×	7.1×
LV	26.3	100.9	18.2	0.0	-	-	-
MT	13.9	13.1	6.0	3.0	0.2×	0.2×	0.5×
PL	1553.7	1587.9	1978.6	5150.9	3.3×	3.2×	2.6×
PT	161.0	135.6	154.7	507.2	3.2×	3.7×	3.3×
RO	87.0	30.9	50.0	1273.8	14.6×	41.2×	25.5×
SK	180.2	173.2	391.2	182.3	1.0×	1.1×	0.5×
Total	3383.6	2668	6252	34,776	10.3×	13×	5.6×

Source: CPF 2014–2020—Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020-Categorisation/ESIF-2014-2020-categorisation-ERDF-ESF-CF-planned-/3kkx-ekfq/about_data, as of 2023, accessed on 13 April 2026), CPF 2021–2027—Cohesion data (as of January 2026), RRF—Sector database (https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/rrf-sectoral-database_en, accessed on 13 April 2026) and State of the Union 2025 report¹⁸ (https://energy.ec.europa.eu/publications/state-energy-union-report-2025-country-fiches_en, accessed on 13 April 2026).

Table A4. CPF and RRF: Additional renewable energy production/operational capacity—EU aggregate for the selected 14 countries (in MW)—detailed.

Country	CPF 2014–2020 Production Capacity			CPF 2021–2027 Production Capacity			CPF 2021–2027 Operational Capacity			RRF 2020–2026 Production Capacity				RRF 2020–2026 Operational Capacity (N)
	Target (A)	Decided (B)	Implemented (C)	Target (D)	Decided (E)	Implemented (F)	Target (G)	Decided (H)	Implemented (I)	Planned Investments (J)	Planned Reforms (K)	Fulfilled Investments (L)	Fulfilled Reforms (M)	
BE	74	78.4	0	98	63	17	64	34	2	700 ^a				1684
CZ	164	147.5	78	672	412	146				494.7 ^b	3000	283.6		856
DE	341	443.1	142	113	5	-	82	6		800 ^c				1205
EL	53	36	30	214	14	-	335			45 ^c	3000		7549.6	9371
ES	974	1406	192	2128	204	-	1144	80		4680	6000		18,125.0	4313
IT	101	92.1	54	888	292	115	165	82	34	2452 ^d				40,379
LT	512	775.3	310	810	774	310					263.2			0.7
LU	5	3	3	8	2	-				74.7				75
LV	23	50.6	21	18	16	-								60
MT	25	19.62	22	5	-	-				0.1				0.4
PL	2772	4128	2515	2975	4269	313	1151	1493	212	315 ^c	500		590	291
PT	61	78.23	33	126	-	-	105			125.5		11.1		196
RO	738	60	12	307	54	-				1289.3	3000			337
SK	488	384.9	395	460	330	61				190.0	300			5.3
Total	6331	7703	3807	8822	6435	962	3046	1695	248	11,166.3	16,063.2	294.7	26,264.6	58,773.4

Source: for the CPF14–20—Open Cohesion data (https://cohesiondata.ec.europa.eu/2014-2020/ESIF-2014-2020-Achievement-Details-timeseries/aesb-873i/about_data, 2014–2020 achievement details, accessed on 13 April 2026), for the CPF21–27—Open Cohesion data (https://cohesiondata.ec.europa.eu/2021-2027-Indicators/2021-2027-Achievement-Details-multi-funds-timeseri/xi3a-zddk/about_data, 2021–2027 achievement details, accessed on 13 April 2026), for the RF (planned and fulfilled investments/reforms—MT dataset (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/milestones_and_targets.html, accessed on 13 April 2026) and RRF Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/common_indicators.html, accessed on 13 April 2026)). a: Solar power generation only. For wind, the effects of measure BE-C[C73]-I[I-719] will be direct, but no target was set—this measure consists of rationalising the systems of air navigation, introducing new technologies and optimising operational procedures, which shall contribute to reducing the protection areas around airports, thus freeing up additional space for the construction of new wind farms, thus increasing the share and accelerating the deployment of renewable energy; b: Solar capacity only, no targets are discerned for biomass and other (geothermal); c: Hydrogen; d: Solar power generation capacity installed and hydrogen.

Notes

- ¹ The indicator is missing from the Commission's Proposal for a Regulation establishing a budget expenditure tracking and performance framework and other horizontal rules for the Union programmes and activities, COM(2025) 545 final (European Union, 2025b), Appendix A.
- ² As established in Commission Implementing Regulation (EU) No 215/2014: 009 Renewable energy: wind; 010 Renewable energy: solar; 011 Renewable energy: biomass; 012 Other renewable energy (including hydroelectric, geothermal and marine energy) and renewable energy integration (including storage, power to gas and renewable hydrogen infrastructure) (European Union, 2014).
- ³ As established in Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021: 047 Renewable energy: wind; 048 Renewable energy: solar; 049 Renewable energy: biomass; 050 Renewable energy: biomass with high greenhouse gas savings; 051 Renewable energy: marine; 052 Other renewable energy (including geothermal energy) (European Union, 2021c).
- ⁴ As established in Regulation (EU) 2021/241 establishing the Recovery and Resilience Facility: 028 Renewable energy: wind; 029 Renewable energy: solar; 030 Renewable energy: biomass; 030bis Renewable energy: biomass with high GHG savings; 031 Renewable energy: marine; 032 Other renewable energy (including geothermal energy) (European Union, 2021b).
- ⁵ The primary green share commitment contributing to the green transition pillar is 37.97% (RRF Scoreboard); the calculations appear in the financial progress section below.
- ⁶ Definitions as per the Cohesion data platform.
- ⁷ The comparisons were performed on a six-point ordinal scale (No Progress, Limited Progress, Some Progress, Substantial Progress, Full Implementation, Not Assessed). Each CSR was classified as Improved, Declined, or No change based on whether its last assessment category exceeded, fell below, or matched its first.
- ⁸ Available at: https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/rrf-sectoral-database_en, accessed on 13 April 2026.
- ⁹ Available at: https://ec.europa.eu/economy_finance/country-specific-recommendations-database/, accessed on 13 April 2026.
- ¹⁰ No data available at disaggregated level for Germany, while for Latvia, there are no RRF investments categorised as such.
- ¹¹ The RRF green transition implementation rate was calculated in line with the methodology, as follows: Implementation rate = $(69,740,701,774 / 334,634,761,150) * (1 / 0.3797) * (334,634,761,150 / 485,450,000,000) = 0.3783565 \approx 37.84\%$.
- ¹² The lack of data on the financial progress of the RRF in the renewable energy sector prevents meaningful country-level comparisons.
- ¹³ As noted in the RRF Databases—Manual (https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/rrf-sectoral-database_en, accessed on 13 April 2026), the percentages are based on the annual distribution of the indicative implementation date of milestones and targets per measure, as indicated in the Council Implementation Decisions by the Member States. They provide an ex ante indicative timeline for implementation.
- ¹⁴ RRF Scoreboard data, as of 15.02.2025—MTs classified as “Renewable energy and networks”.
- ¹⁵ RRF sectoral dataset—MTs, which contain the search word “renewable”.
- ¹⁶ The figure presents data for annual and multiannual CSRs. For RES CSRs, the number of cases is as follows: 2022—105; 2023—223; 2024—337; 2025—369. For all CSRs, the number of cases is: 2022—1084; 2023—1549; 2024—2045; 2025—2229.
- ¹⁷ See Note 10.
- ¹⁸ For the RRF, the main source of data on the intervention codes was the Sector database (https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/rrf-sectoral-database_en, accessed on 13 April 2026), but calibration was performed to the extent possible, to exclude some measures, which bundled together non-RE elements, and the State of the Union 2025 report (https://energy.ec.europa.eu/publications/state-energy-union-report-2025-country-fiches_en, accessed on 13 April 2026) was used to sense check the values.

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