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Special Report

## Energy efficiency in enterprises

Some energy savings but weaknesses  
in planning and project selection



EUROPEAN  
COURT  
OF AUDITORS

# Contents

	Paragraph
<b>Executive summary</b>	<b>I-XII</b>
<b>Introduction</b>	<b>01-20</b>
<b>Energy efficiency in the EU</b>	<b>01-15</b>
<b>The role of the Commission and of the Member States</b>	<b>16-20</b>
<b>Audit scope and approach</b>	<b>21-33</b>
<b>Observations</b>	<b>34-120</b>
<b>Unclear linkage between EU funding and enterprise needs</b>	<b>34-64</b>
The Commission did not identify the need for EU funds	35-39
Most Member States set objectives linked to energy efficiency in enterprises, but not necessarily linked to the objectives of the NEEAPs	40-45
Planned support has decreased in recent years and most funds are concentrated in a few Member States	46-51
The OPs mainly provided grants and did not justify this choice	52-64
<b>Member State procedures often encouraged efficiency</b>	<b>65-106</b>
Most selection procedures require applications to include the expected energy savings, usually validated by energy audits	67-73
Managing authorities generally set minimum performance standards	74-80
Investing in energy efficiency can be efficient without public support	81-88
Financial indicators, powerful performance tools neglected by managing authorities	89-106
<b>The current performance framework does not measure the overall contribution of EU funding</b>	<b>107-120</b>
The common performance framework did not make consolidated information on outputs and results accessible	108-116
According to estimates, EU-funded energy efficiency projects will deliver a modest contribution to the EU objectives	117-120
<b>Conclusions and recommendations</b>	<b>121-139</b>

## **Annexes**

**Annex I – Analysis of projects in the database**

**Annex II – Sample characteristics**

## **Acronyms and abbreviations**

## **Glossary**

## **Replies of the Commission**

## **Timeline**

## **Audit team**

# Executive summary

**I** Energy efficiency is an important part of the EU ambition to become carbon-neutral by 2050. Greater energy efficiency improvements would be required in the future if the EU is to meet this objective.

**II** All sectors of the economy have the potential to contribute to energy efficiency. Having in recent reports looked at energy efficiency measures in large energy-intensive industries, buildings and products, we decided to complement our analysis by examining support for the energy efficiency investments in enterprises. We aimed to provide new analytical insights from data on EU co-funded energy efficiency projects.

**III** The European Regional Development Fund and the Cohesion Fund have been the most significant of the EU funds aiming at improving energy efficiency in enterprises, allocating €2.4 billion in the period 2014-2020.

**IV** Our audit examined whether funds have been soundly spent, by analysing if:

- the Commission and Member States assessed the appropriate use of EU funds considering the energy efficiency objectives;
- Member States procedures promoted the selection of efficient projects; and
- the results of the funding can be demonstrated.

**V** While the European Regional Development Fund and the Cohesion Fund offered the possibility of co-financing energy efficiency in enterprises through this specific priority, the Commission and Member States have not assessed the potential for improvement in enterprises or justified the enterprises' EU funding needs in the period 2014-2020.

**VI** At programme level, we found that planning of funds was not aligned with the national energy efficiency priorities and did not justify the choice of the funding instrument.

**VII** To select projects, authorities required estimates of expected energy savings, which experts had validated. The authorities also required projects to demonstrate that they achieve minimum energy savings and to comply with efficiency criteria, such as ratios of costs to savings.

**VIII** We noted that, according to estimates, it was cheaper to save one unit of energy than to pay for the same amount of electricity, the energy source predominantly used. This means that investments were generally efficient.

**IX** Beneficiaries used financial indicators to assess project viability, and in particular the payback time. Most authorities have not used such indicators during the selection. Payback times above the investment lifetime meant that projects had a lower efficiency, i.e. higher cost of achieving the same amount of energy savings. The use of efficiency criteria did not reduce the average cost of saving energy.

**X** Indicators measuring energy efficiency improvements in enterprises are programme-specific and so cannot be aggregated at EU level. The current programming period (2021-2027) sets common performance indicators for energy efficiency, but they are not consistent with other EU reporting requirements and leave room for monitoring renewables energy investments as energy efficiency projects.

**XI** We extrapolated the average energy savings expected to be achieved by each euro invested in projects in our sample to the whole database of energy efficiency projects. The result indicated that the potential annual savings across all programmes represent approximately 0.3 % of the annual saving effort of EU-27 to reach the current energy efficiency targets for 2030.

**XII** We recommend that the Commission:

- o assess the potential and actual contribution of cohesion policy funds to energy efficiency;
- o verify whether the choice of funding instrument is appropriately justified.

# Introduction

## Energy efficiency in the EU

**01** Energy efficiency is an important part of the EU ambition to become carbon-neutral by 2050. This ambition is reflected in the Commission's European Green Deal and Fit for 55 initiatives. Achieving energy efficiency means improving the ratio of output to energy input, i.e. reducing the energy consumption needed to achieve the same output or to achieve more output with the same energy input.

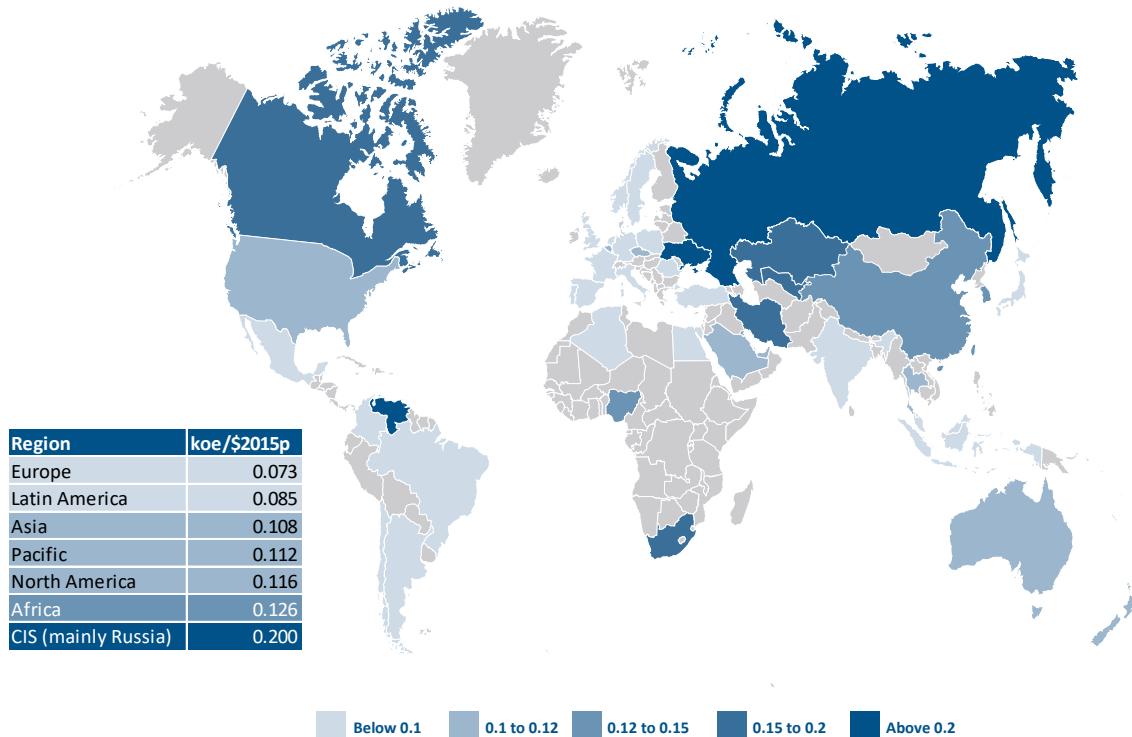
**02** Improving energy efficiency helps reduce the energy intensity of the economy, i.e. the ratio between gross inland energy consumption and gross domestic product (GDP). Energy intensity also decreases with structural economic changes such as moves from manufacturing to the service sector.

**03** While per capita energy consumption is relatively high, Europe is the region with the lowest primary energy intensity per unit of GDP at purchasing power parity, according to the World Energy Council<sup>1</sup>. This means that Europe is relatively efficient in terms of converting energy into GDP. *Figure 1* presents the energy intensities of different countries and regions in 2019.

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<sup>1</sup> World Energy Council, *Energy efficiency: A straight path towards energy sustainability*, 2016.

**Figure 1 – Energy intensity in 2019**



Source: [Global Energy Statistical Yearbook 2020](#), Enerdata.

**04** Despite ongoing improvements, the International Energy Agency has estimated that there was potential to decrease energy intensity in Europe by at least 2.5 % per annum between 2017 and 2030<sup>2</sup>. The European Commission estimated that the economic potential of reducing final energy consumption by 2030, compared to business as usual, is of 16 % for the commercial sector and of 23.5 % for industry<sup>3</sup>.

**05** The EU has set targets for improving energy efficiency, i.e. decreasing final energy consumption by 20 % by 2020 and by 32.5 % by 2030, compared to energy consumption projected for those years in the 2007 reference scenario, based on the PRIMES model<sup>4</sup>. The European Commission estimates that the existing EU targets for renewable energy sources and energy efficiency will together cut EU emissions by

<sup>2</sup> IEA, [Annual average change in energy intensity by region and scenario, 1990-2030](#).

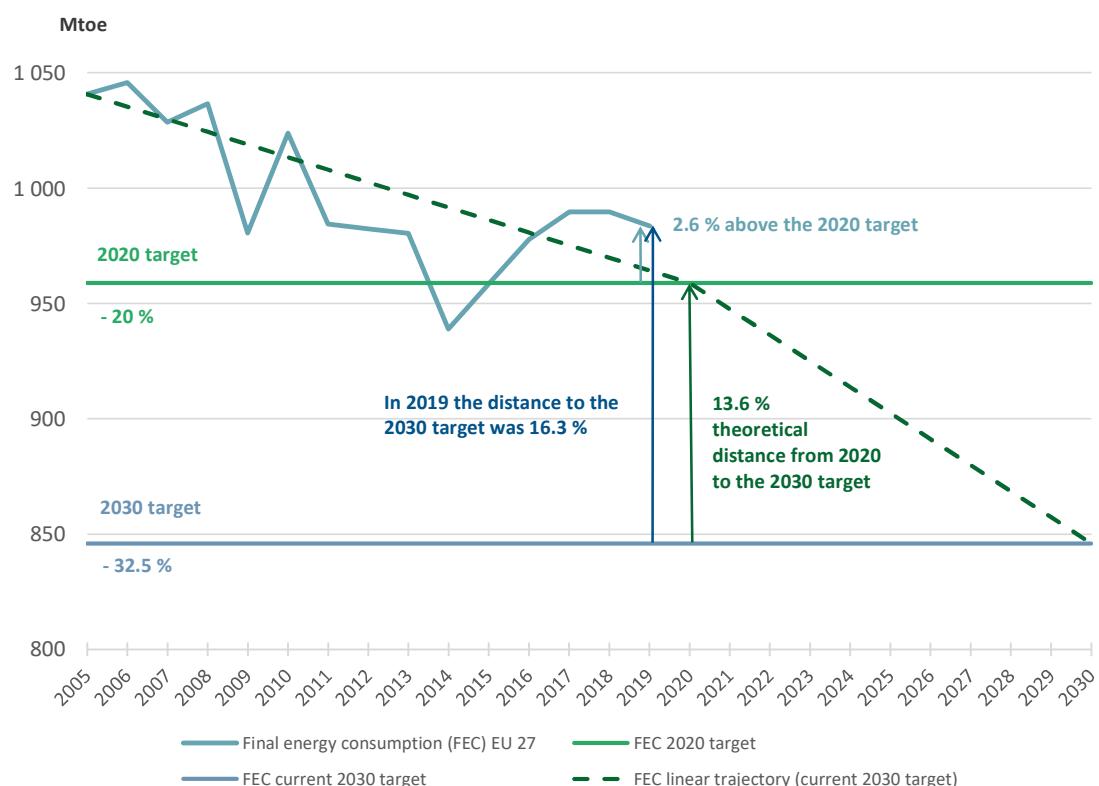
<sup>3</sup> Table 1 of the European Commission study “Technical assistance services to assess the energy savings potentials at national and European level, Summary of EU results”, February 2021.

<sup>4</sup> European Commission (2008), EU-27 Energy baseline scenario – Update 2007.

around 45 % by 2030<sup>5</sup>. More recently, in the framework of achieving climate neutrality by 2050, the Commission proposed that energy efficiency further improves, i.e. final energy consumption reduced by 36 % until 2030 based on the 2007 reference scenario<sup>6</sup>.

**06** The Commission analyses Member States' aggregated progress towards the EU 2020 and 2030 targets. Its latest assessment of progress shows that the EU final energy consumption in 2019 was 2.6 % above the EU 2020 target, as adapted for EU-27 (see *Figure 2*)<sup>7</sup>.

**Figure 2 – Progress in achieving EU energy efficiency commitments**



Source: ECA, based on DG ENER data, 2020.

**07** Member States have individual targets for reducing their energy consumption or energy intensity. Member States set the national targets taking into account

<sup>5</sup> European Parliament, [European policies on climate and energy towards 2020, 2030 and 2050, IPOL\\_BRI\(2019\)631047](#).

<sup>6</sup> [Proposal for a Directive of the European Parliament and of the Council on energy efficiency \(recast\), COM\(2021\)558 final](#) of 14.7.2021.

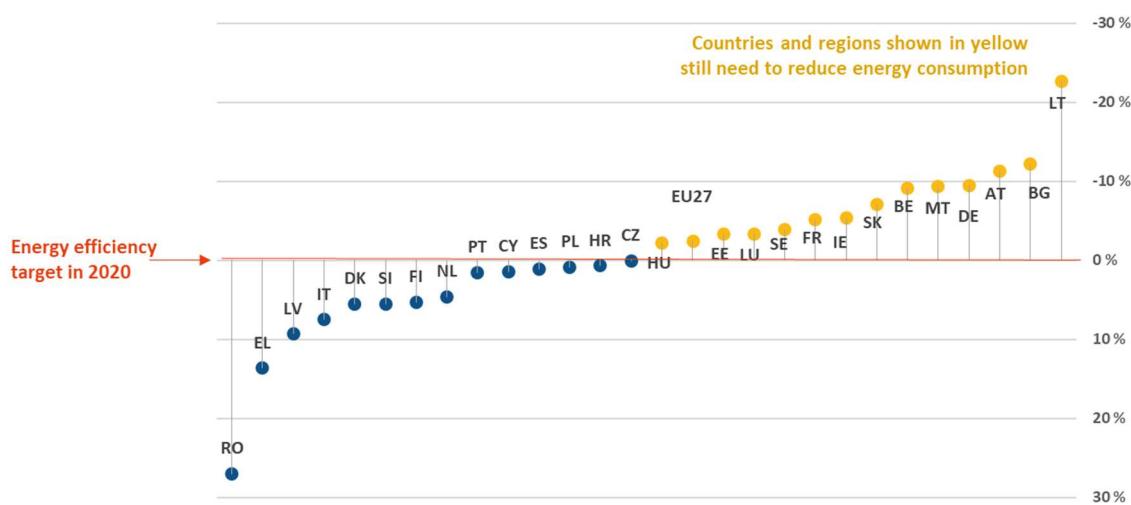
<sup>7</sup> Page 13 of the report "State of the Energy Union 2021 – Contributing to the European Green Deal and the Union's recovery", [COM\(2021\) 950 final](#).

economical and structural considerations, contributing to the achievement of the overall EU target for energy efficiency.

**08** Since 2014, Belgium, Bulgaria, Germany, Estonia, France, Lithuania, Austria and Sweden had a target to reduce consumption. Other Member States should have maintained or constrained the growth in consumption in order to meet the targets.

**09** *Figure 3* shows that in 2019, before the impact of COVID-19, 13 of the 27 Member States (represented in yellow), including all Member States with a target to reduce their energy consumption, were above their indicative targets for 2020.

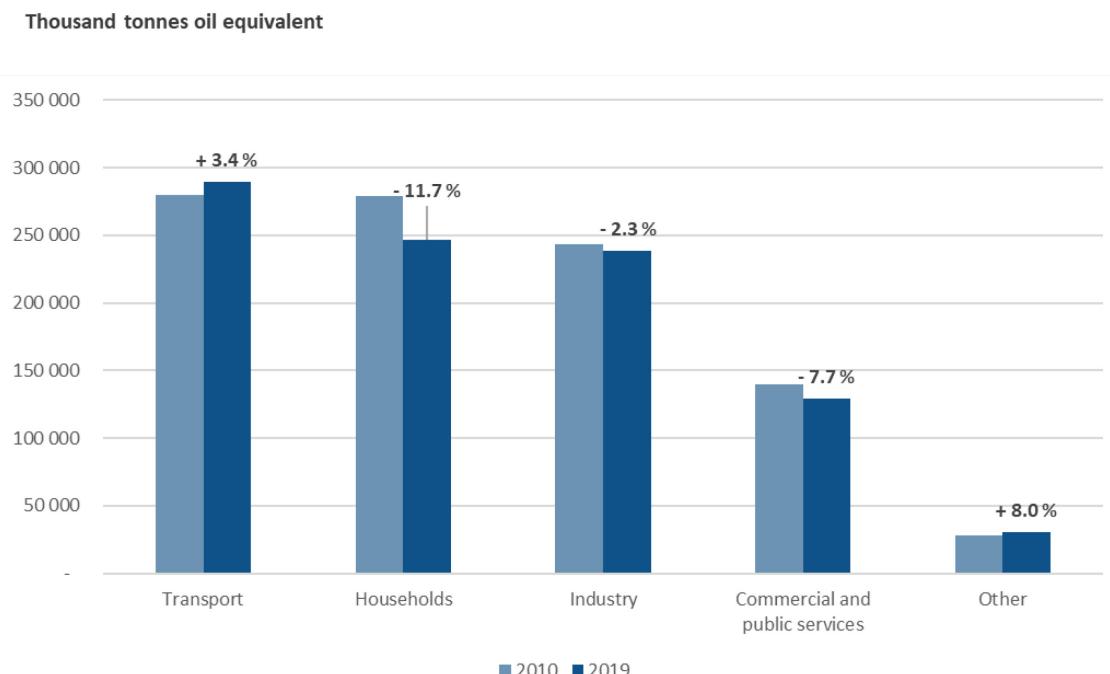
**Figure 3 – Final energy consumption in 2019 compared to 2020 target**



Source: ECA, based on data from DG ENER (2021).

**10** The various sectors of the economy are expected to make differing contributions to reducing the overall energy consumption. *Figure 4* provides a breakdown of each sector's contribution to the decrease of energy consumption in the EU in 2019 compared to 2010. In 2019, industry remained the third largest category of the final end use of energy in the EU-27 with a 26 % share.

**Figure 4 – EU-27 final energy consumption by sector in 2019 versus 2010**



Source: ECA, based on [Eurostat](#) data and [JRC report](#) “Energy Consumption and Energy Efficiency trends in the EU-28, 2000-2018”.

**11** Enterprises can be part of all sectors above, except households. The Commission defines an enterprise as any entity engaged in an economic activity, irrespective of its legal form<sup>8</sup>. We use this definition throughout the report.

**12** The Energy Efficiency Directive<sup>9</sup> is the key legal instrument in the area of energy efficiency. It requires Member States to put in place measures to achieve the national energy efficiency target, contributing to the achievement of the EU targets. Member States detail in their National Energy Efficiency Action Plans (NEEAPs) measures in the supply, transmission and distribution of energy as well as energy end-use sectors<sup>10</sup>.

<sup>8</sup> Article 1 of the Annex to Commission Recommendation 2003/361/EC concerning the definition of micro, small and medium-sized enterprises ([OJ L 124, 20.5.2003](#), p. 36).

<sup>9</sup> Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency ([OJ L 315, 14.11.2012](#), p. 1).

<sup>10</sup> Commission Implementing Decision 2013/242/EU establishing a template for National Energy Efficiency Action Plans under Directive 2012/27/EU of the European Parliament and of the Council ([OJ L 141, 28.5.2013](#), p. 48).

**13** The Member States need to prepare and submit NEEAPs, which are strategic documents setting a coherent approach to improve energy efficiency at national level. They propose measures and the indicative financing needs, including from EU funds<sup>11</sup>. Member States provide sometimes substantial national funding, in accordance with their NEEAPs, to support the proposed measures.

**14** Besides setting targets to reduce EU energy consumption and monitoring their achievement in accordance with the Energy Efficiency Directive and the Regulation on the Governance of the Energy Union and Climate Action<sup>12</sup>, the EU supports energy efficiency improvements in enterprises through additional financing mechanisms, such as cohesion policy funds or research and innovation funds. The total EU funds planned amounted to around €3.8 billion, according to our assessment.

**15** The European Regional Development Fund (ERDF) and the Cohesion Fund (CF) channel the largest amount of EU funding for energy efficiency in enterprises, i.e. up to €2.4 billion planned in the period 2014-2020, equivalent to about 60 % of the €3.8 billion. The majority of the cohesion policy funds (93 %) go through the ERDF and the remainder through the CF.

## The role of the Commission and of the Member States

**16** The Commission (Directorate-General for Energy) develops and implements the EU energy policy. It formulates proposals to promote energy efficiency, supervises the implementation of the directives and monitors the Member States' progress towards energy targets.

**17** The Directorate-General for Regional and Urban Policy and the Member States jointly manage the ERDF and the CF. Consequently, the Commission shares with Member States the responsibility for the efficiency and effectiveness of the spending.

**18** In practice, Member States prepare Partnership Agreements and Operational Programmes (OPs) and designate managing authorities to manage and implement the

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<sup>11</sup> SWD(2013) 180 final, section 3.1.9.

<sup>12</sup> Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action (OJ L 328, 21.12.2018, p. 1).

OPs. The OPs set priorities and the corresponding funding, up to the limit of the national allocation.

**19** The priorities of the NEEAPs should be the basis for determining the nature of support under the energy efficiency investment priority<sup>13</sup>. The managing authorities may disburse financial support under the OPs in the form of grants or through financial instruments (e.g. loans).

**20** The Commission approves the OPs prepared by the Member States at the start of the financial period and monitors the execution of these programmes by participating in monitoring committees and reviewing the annual implementation reports. Finally, it should evaluate the results of the funding.

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<sup>13</sup> European Commission. [Thematic guidance fiche for desk officers – Energy efficiency investments](#), 2014, section 2.1.

# Audit scope and approach

**21** The EU has recently agreed to increase its climate ambition. Having in recent reports looked at energy efficiency measures in large energy-intensive industries<sup>14</sup>, buildings<sup>15</sup> and products<sup>16</sup> we decided to complement our analysis by specifically examining support for energy efficiency investments in enterprises through the ERDF and the CF, the main channels for EU funding.

**22** We aimed to make the data on EU co-funded energy efficiency projects more accessible to stakeholders, and provide new analytical insights on its basis.

**23** The main audit question was:

**“Were EU cohesion policy funds for energy efficiency in enterprises soundly spent?”**

**24** To answer the main audit question, we answered the following sub-questions:

- (a) Did the Commission and the Member States assess the most appropriate use of EU funds considering the energy efficiency objectives?
- (b) Have Member States used procedures allowing the selection of efficient projects?
- (c) Can project results demonstrate improvements in energy efficiency in enterprises?

**25** We focused on the efficiency and effectiveness of the EU co-funded energy efficiency investments in enterprises during the 2014-2020 programming period in the EU-27.

**26** We assessed both the work of the Commission and of the Member States, and in particular, how they planned and used the ERDF and the CF for energy efficiency

<sup>14</sup> Special report 18/2020 – The EU’s Emissions Trading System: free allocation of allowances needed better targeting.

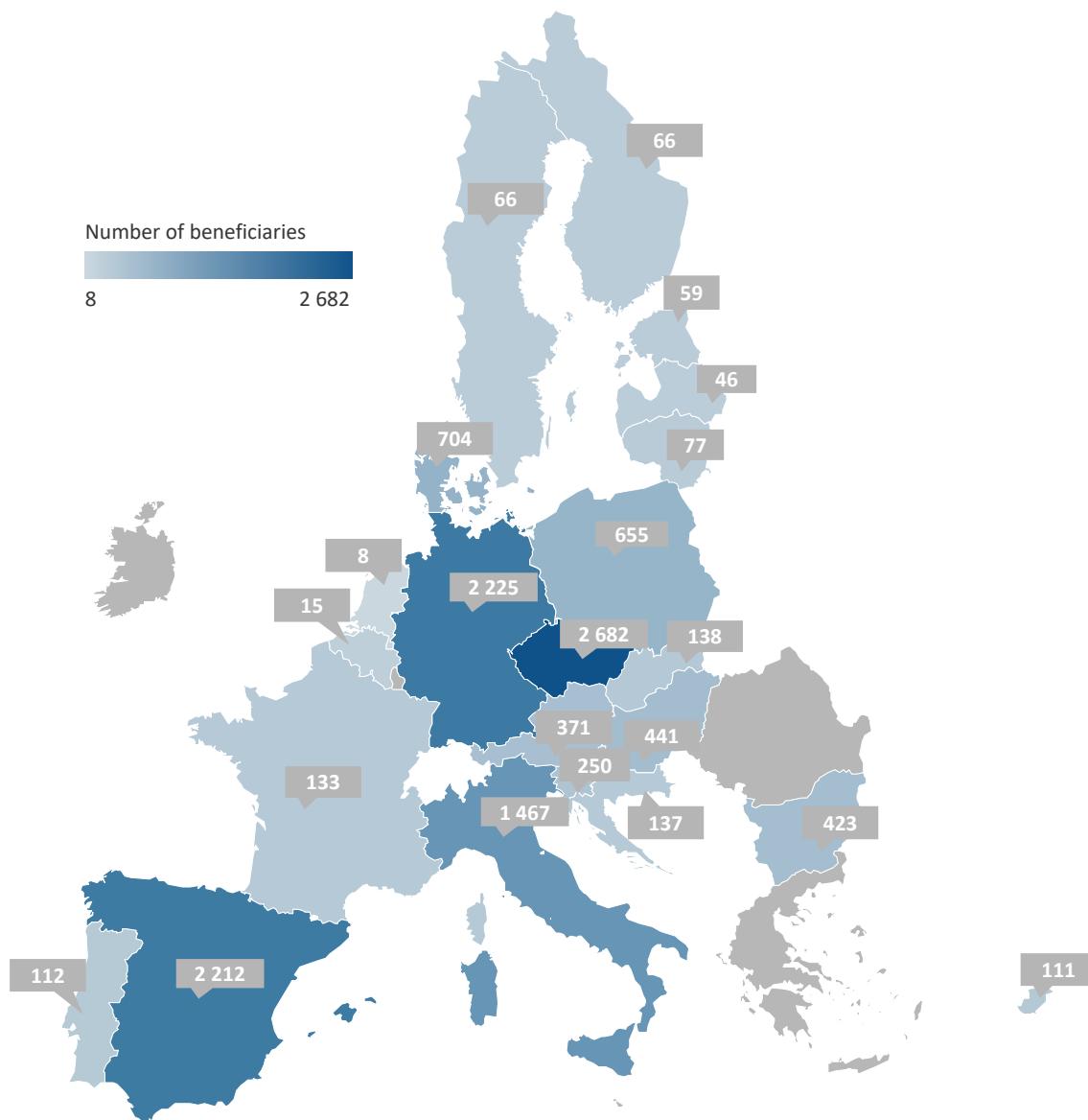
<sup>15</sup> Special report 21/2012 – Cost-effectiveness of cohesion policy investments in energy efficiency and special report 11/2020 – Energy efficiency in buildings: greater focus on cost-effectiveness still needed.

<sup>16</sup> Special report 01/2020 – EU action on Ecodesign and Energy Labelling: important contribution to greater energy efficiency reduced by significant delays and non-compliance.

objectives, promoting efficient and effective projects. Finally, we assessed the monitoring framework and the actual results of the co-funded projects.

**27** Using information from the Member States, we compiled a list of over 12 000 projects labelled as energy efficiency (situation as of the end of October 2020). These projects, funded through grants, are located in 22 Member States and across 83 OPs. *Figure 5* shows their mapping and concentration based on the number of projects. *Annex I* presents an overview of the project information received from the authorities.

**Figure 5 – Project location**



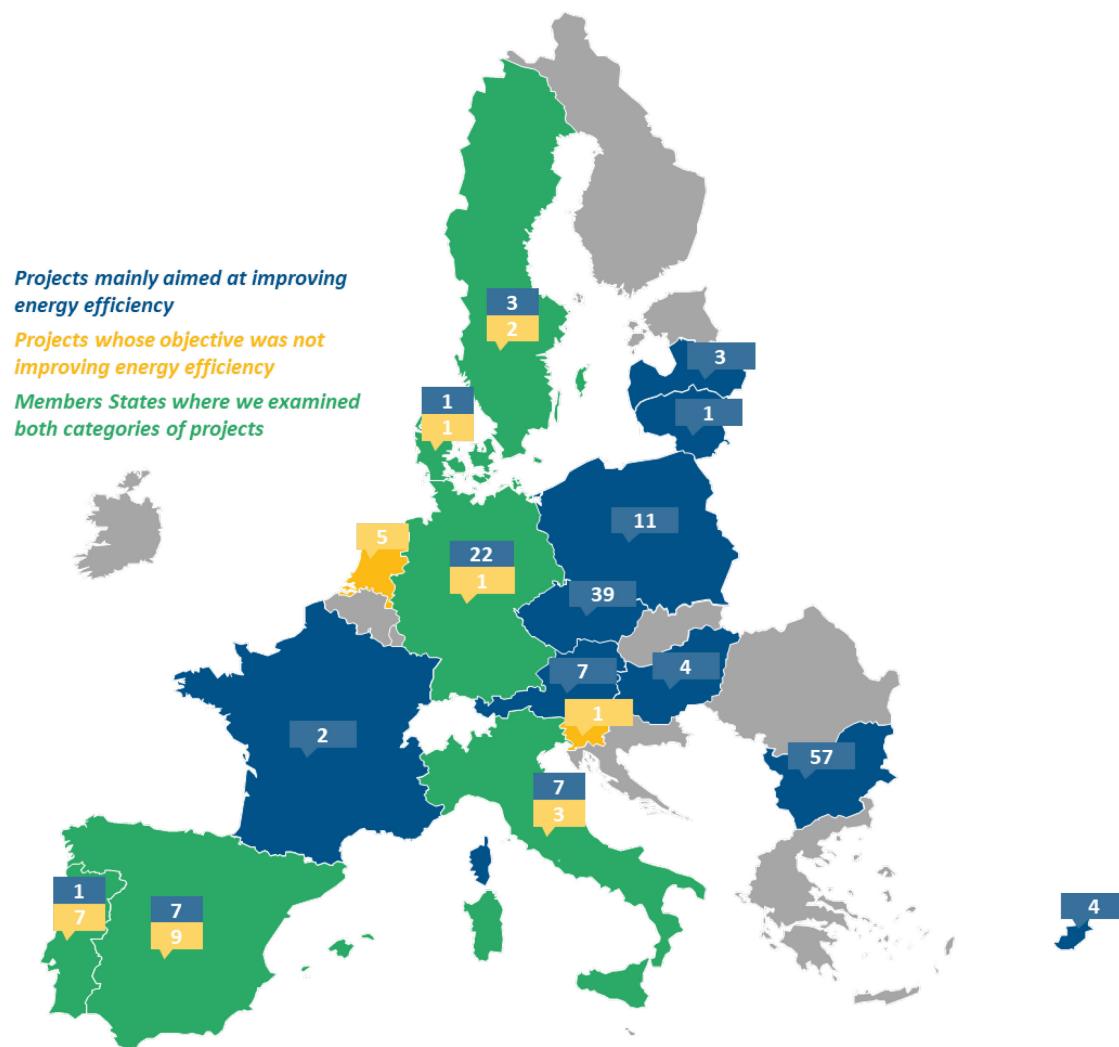
**Countries in grey have not planned funds or selected any energy efficiency projects.**

Source: ECA, based on project information received from managing authorities.

**28** Based on the brief description provided by the authorities, we noted that at least 18 % of the projects, representing at least 11 % of the selected funds were not energy efficiency projects.

**29** From the project list, we selected the completed projects (about 5 000). From the latter, we selected a statistical sample of 198 projects, using Monetary Unit Sampling, to analyse the financial support received, and its contribution to the project scope and results. The ERDF funded 195 of the sampled projects across 40 OPs and 16 Member States, and the CF funded the remaining three, all from one OP of another Member State. *Figure 6* shows their mapping and *Annex II* presents an overview of the sampled projects' characteristics.

**Figure 6 – Our sample of projects**



Source: ECA based on project information from managing authorities and from project applications.

**30** Out of our sample of 198 projects, we noted that there were 163 energy efficiency investment projects and 6 projects relating to energy advice and audits (the latter in Germany, Lithuania and Sweden), making up to 85 % of the projects.

**31** In addition to those projects, our sample included 29 projects of a different type (15 %) that we cannot consider as energy efficiency, of which 12 were renewable energy projects.

**32** For the selected energy efficiency investment projects, we assessed energy savings and their efficiency by reviewing project documents and the survey replies provided by beneficiaries. We sent the survey to all sampled beneficiaries. The questions aimed to gather additional information on the investment (i.e. timing, the extent to which financial performance indicators were used, the investment lifetime and energy savings achieved), on the energy source used and its cost, and on the beneficiaries' opinion of the usefulness of EU funds for their projects. We received replies from 142 of the 163 energy efficiency projects (87 %).

**33** We did not examine projects financed exclusively through financial instruments and issues relating to eligibility, legality and regularity, including compliance with aid intensity rules.

# Observations

## Unclear linkage between EU funding and enterprise needs

**34** We assessed whether the EU funds were planned appropriately in the light of the energy efficiency objectives. We consider sound planning to have the following features:

- (a) the Commission identifies the energy efficiency potential and justifies the public financing needs of enterprises before setting the priority of energy efficiency in enterprises;
- (b) funding from the OPs is aligned with the objectives identified in the NEEAPs;
- (c) encourages a good uptake of the various OPs;
- (d) the authorities can justify that their choice of funding instrument was a cost-effective way of reaching the energy efficiency objectives.

## The Commission did not identify the need for EU funds

**35** We assessed the Commission work prior to setting the investment priority “energy efficiency in enterprises”. We reviewed the results of the modelling tools used by the Commission (PRIMES model) and the Impact Assessment of ERDF and CF for the period 2014-2020. We sought to identify the data on the enterprises’ potential and public funding needs to be addressed by the planned spending framework.

**36** The modelling tools provided data on energy consumption and potential for energy savings for each sector of activity (i.e. buildings, transport, industry) but not for enterprises specifically. Considering that Member States collect sectoral statistical data using a common European classification system that does not identify enterprises within each sector, obtaining specific data on enterprises is challenging.

**37** The impact assessment of the ERDF and the CF was more general, addressing at a higher level the thematic objectives rather than the proposed funding priorities. It did not address the potential for energy efficiency improvements in enterprises or identify specific public financing needs of enterprises in this respect.

**38** The cohesion policy funds Regulations proposed that ERDF and the CF support all enterprises, not specific sectors, through the investment priority of “promoting energy efficiency and renewable energy use in enterprises”.

**39** The impact assessment of ERDF and the CF did not estimate these funds’ contribution to the energy efficiency targets<sup>17</sup> or the expected performance of funds invested in these enterprises.

### Most Member States set objectives linked to energy efficiency in enterprises, but not necessarily linked to the objectives of the NEEAPs

**40** The NEEAPs should be the basis for identifying the need for and the nature of financial support for energy efficiency in enterprises, including from EU sources. Public funds should in particular finance areas where there are weaknesses in achieving the goals set out in NEEAPs and there should be strong coherence between the strategic energy efficiency documents and the ERDF/CF strategic documents (partnership agreement and the OP)<sup>18</sup>.

**41** Member States in our sample set “specific objectives” in their national or regional OPs (see *Box 1* for the sampled programmes). Most of the programmes (73 %) include objectives directly related to energy efficiency in enterprises. others (15 %) have a “specific objective” that can be considered as equivalent: CO<sub>2</sub> emissions reduction. 12 % set objectives that were quite distinct from the concept of energy efficiency in enterprises.

#### Box 1

##### Examples of OP “specific objectives”

###### Energy efficiency objectives

- Improving energy efficiency in enterprises (certain programmes in Denmark, Spain, Poland, Portugal and Sweden).
- Improving energy efficiency and the use of renewable energy in the business sector or enterprises (Czechia, Germany, Italy, Hungary).

<sup>17</sup> Commission Staff Working Paper SEC(2011) 1138 final of 6.10.2011.

<sup>18</sup> “Thematic guidance fiche for desk officers – Energy efficiency investments”, 2014.

- Increasing energy savings from enterprises (Germany, Cyprus, Latvia).
- Annual increase of around 5 % in energy efficiency (Austria).
- Reducing energy intensity of the economy (Bulgaria) or in industrial plants (Lithuania).

#### **CO<sub>2</sub> reduction objectives**

- Reducing enterprises' CO<sub>2</sub> emissions (Germany, Sweden).

#### **Other objectives not linked to energy efficiency in enterprises**

- A decrease in energy consumption in cities with more than 30 000 inhabitants (Denmark).
- A higher proportion of innovations (Netherlands, Poland).
- Increasing the international competitiveness of SMEs (Slovenia).

**42** In Member States covered by the audit, the NEEAPs set out energy efficiency measures for various sectors of activity. They do not include a specific analysis of potential and needs of enterprises (this is not required under the Energy Efficiency Directive). As we reported in ECA special report 11/2020<sup>19</sup>, for timing reasons, the needs identified by the Member States in the NEEAPs could not be properly considered when designing the 2014-2020 OPs.

**43** Setting a more general priority at EU level allowed Member States to tailor support corresponding to their specific needs. However, the investment priority of energy efficiency in enterprises in the OPs was not clearly linked to the needs assessment in the NEEAPs in most of the 17 Member States we considered.

**44** As an exception, Bulgaria and Slovenia made a specific link between the energy efficiency in enterprises objective and the NEEAPs in their programmes, while Spain, France, Italy and Cyprus (across seven programmes in these countries) introduced the requirement for projects to be consistent with national or regional strategies.

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<sup>19</sup> ECA special report 11/2020 – Energy efficiency in buildings: greater focus on cost-effectiveness still needed.

**45** For the new programming period, the Common Provisions Regulation<sup>20</sup> explicitly requires that the Commission take into account relevant challenges identified in the integrated National Energy and Climate Plans, which replace the NEEAPs in 2021, when approving OPs.

### Planned support has decreased in recent years and most funds are concentrated in a few Member States

**46** The 2014-2020 Common Provisions Regulation<sup>21</sup> prioritises growth friendly expenditure, including in the area of energy efficiency. When Member States decide to support energy efficiency in enterprises financially, they need to match funding to the identified needs to make the best use of the resources in the EU spending framework.

**47** We identified 24 Member States that planned funds for energy efficiency in enterprises across 110 OPs (situation at the beginning of 2020), seven of those being territorial cooperation (TC) programmes.

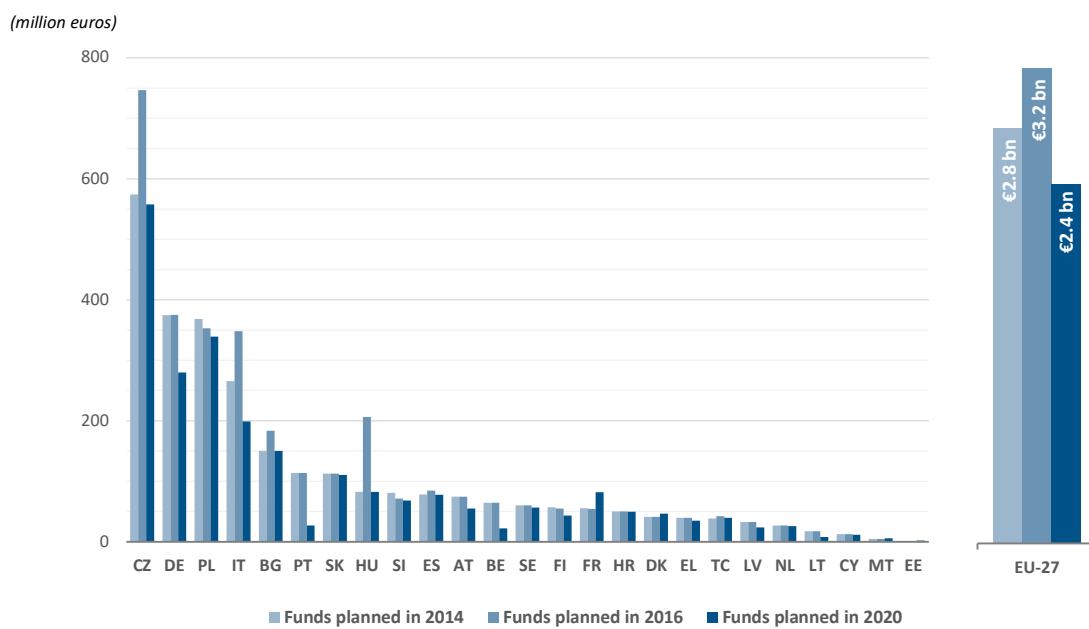
**48** Overall, the funds allocated for the period initially amounted to €2.8 billion. Member States increased this to €3.2 billion by 2016 and then reduced it to €2.4 billion in 2020. *Figure 7* shows these changes.

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<sup>20</sup> Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021 laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and financial rules for those and for the Asylum, Migration and Integration Fund, the Internal Security Fund and the Instrument for Financial Support for Border Management and Visa Policy ([OJ L 231, 30.6.2021, p. 159](#)).

<sup>21</sup> Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund ([OJ L 347, 20.12.2013, p. 320](#)).

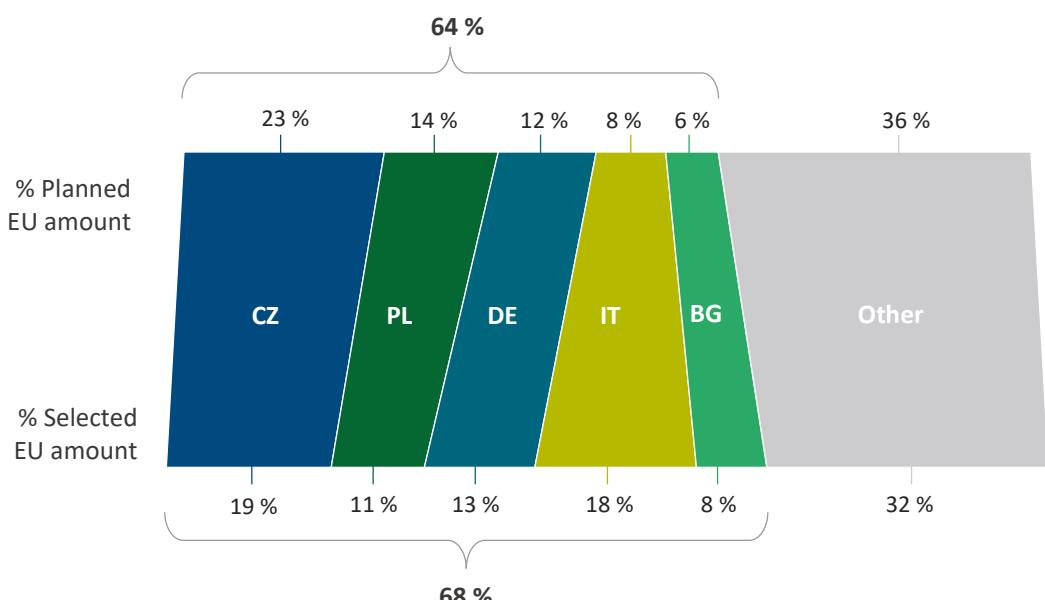
**Figure 7 – The amount of ERDF/CF planned for energy efficiency in enterprises decreased over time (EU-27)**



Source: ECA, based on SFC (European Union Structural Funds Communication System) data from Member States' and Territorial Cooperation (TC) programmes.

**49** Five Member States (EU-27) accounted for 64 % of the allocation for energy efficiency in enterprises. These had provisionally selected projects accounting for 68 % of total funds. *Figure 8* shows the details.

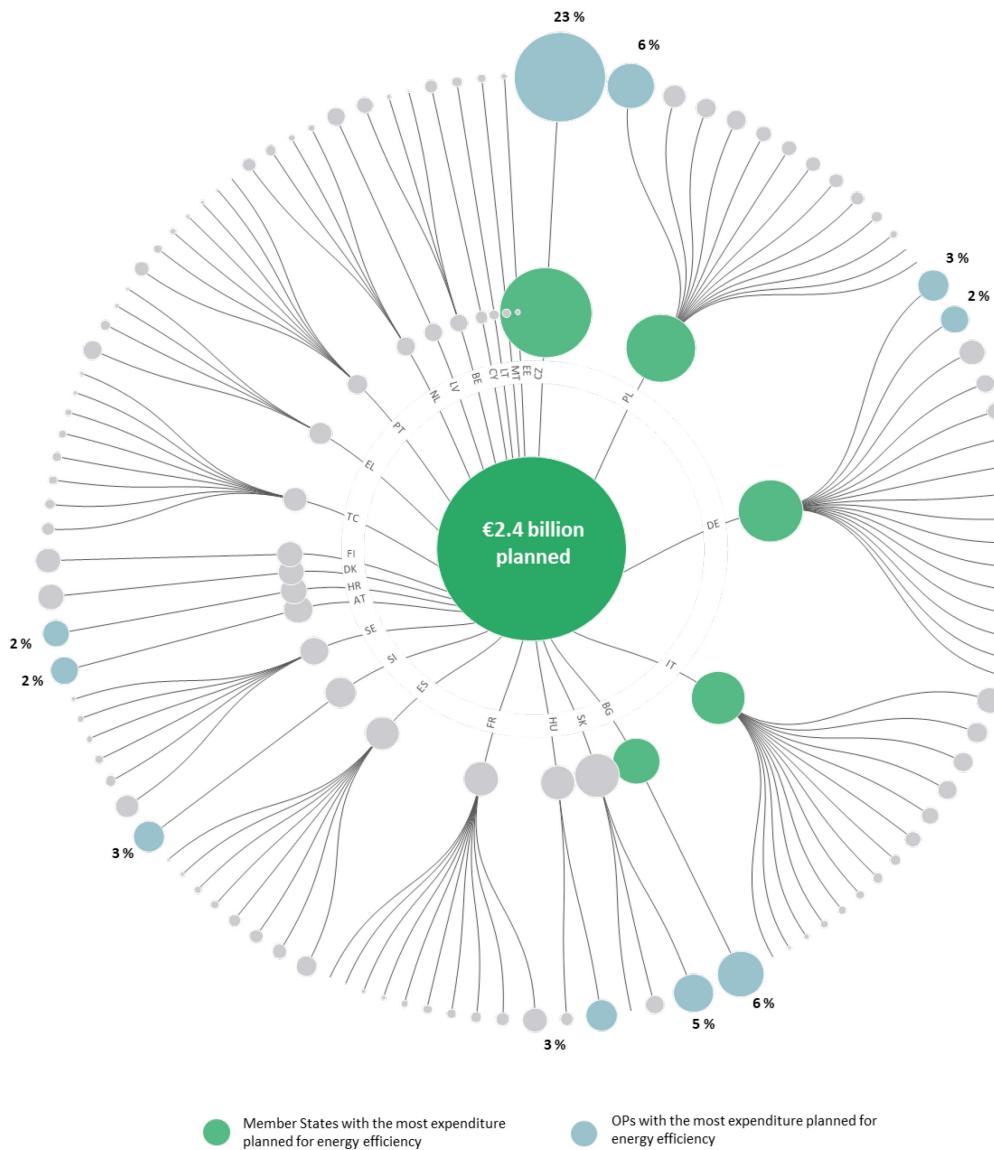
**Figure 8 – ERDF/CF planned and selected for energy efficiency in enterprises (EU-27)**



Source: ECA, based on SFC data at the end of 2020, extracted from Infoview (DG REGIO) in April 2021.

**50** Ten OPs covered 55 % of the total funds planned for energy efficiency in enterprises across the 110 OPs (see *Figure 9*) and 49 % of the funds for selected operations. The remainder of the energy efficiency funds for enterprises are distributed between 100 other OPs, most with very small allocations, i.e. equal to or less than 2 % of the total EU-27 allocation for energy efficiency in enterprises.

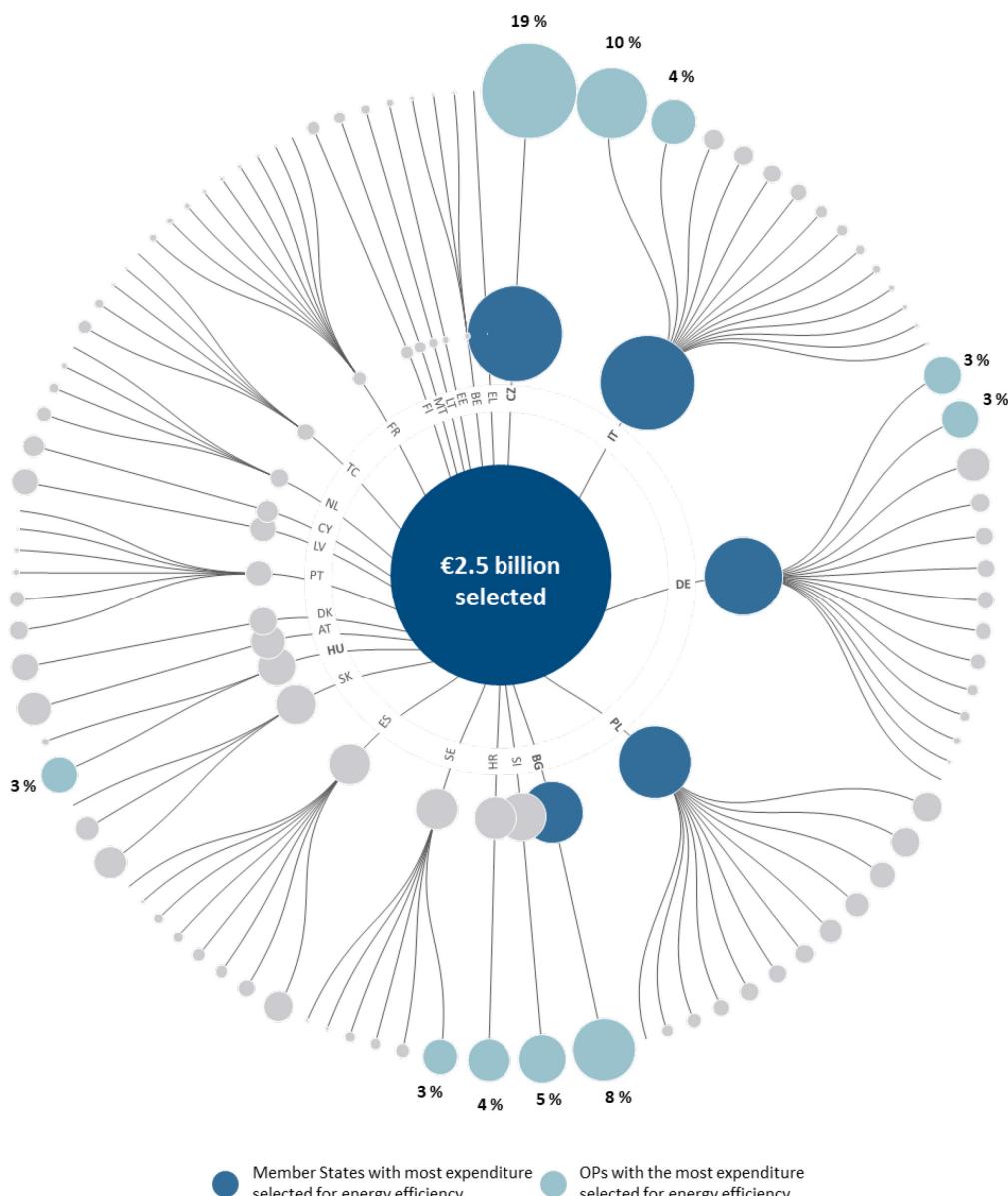
**Figure 9 – Breakdown of planned funds in Member States and programmes (EU-27)**



Source: ECA, based on SFC financial data at the end of 2020.

**51** By the end of 2020, according to Member State data submitted to the Commission, the OPs have fully allocated the funds planned for energy efficiency in enterprises (105 % of the planned funds). The largest 10 OPs considering the amounts planned for energy efficiency in enterprises had selected on average more than they planned (110 %) and more compared to the other 100 OPs. The latter selected operations up to an average of 85 % of the planned funds. *Figure 10* shows the share of funds for selected operations.

**Figure 10 – Breakdown of funds for selected operations in Member States and programmes (EU-27)**



Source: ECA, based on SFC financial data at the end of 2020.

## The OPs mainly provided grants and did not justify this choice

**52** The managing authorities should justify the funding instruments considered appropriate to achieve the policy objectives in an efficient manner. We examined whether justifications were provided in the OPs and how the funding instruments are structured.

**53** According to the 2014-2020 Common Provisions Regulation, the authorities should perform an *ex ante* assessment when deciding to disburse EU funds through financial instruments. They do not need to justify their choice when using grants. In a few cases, the authorities explained in their replies that the *ex ante* assessments indicated the lack of beneficiary interest in loans, but the authorities did not justify in the OPs the choice of funding instruments. The 2021-2027 Common Provisions Regulation requires this justification<sup>22</sup>.

**54** To make an analysis of the extent of the use of financial instruments, we requested a list of final recipients of the ERDF and CF support through such instruments from managing authorities. We also analysed the share of loans in the ERDF and CF support.

**55** Although not providing a quantification, the Commission considered, at the beginning of the programme, that EU funds should trigger a maximum of private investment with a minimum of public support and that financial instruments should support investments expected to be financially viable, while grants should primarily support energy audits or innovative technologies in enterprises<sup>23</sup>.

**56** During the audit, the Commission indicated that its experience with energy efficiency financing showed that a grant component, even as part of a financial instrument, is often necessary to make investment decisions.

**57** Most of the OPs proposed exclusively grants. While many beneficiaries (72 %) replied that the EU grant helped them take the investment decision, more than half (63 %) also indicated that they had already planned the investment, and that the EU grant helped advance its timing.

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<sup>22</sup> Article 22 (3)(b) and (d)(vii) of Regulation (EU) 2021/1060.

<sup>23</sup> “Thematic guidance fiche for desk officers – Energy efficiency investments”, 2014.

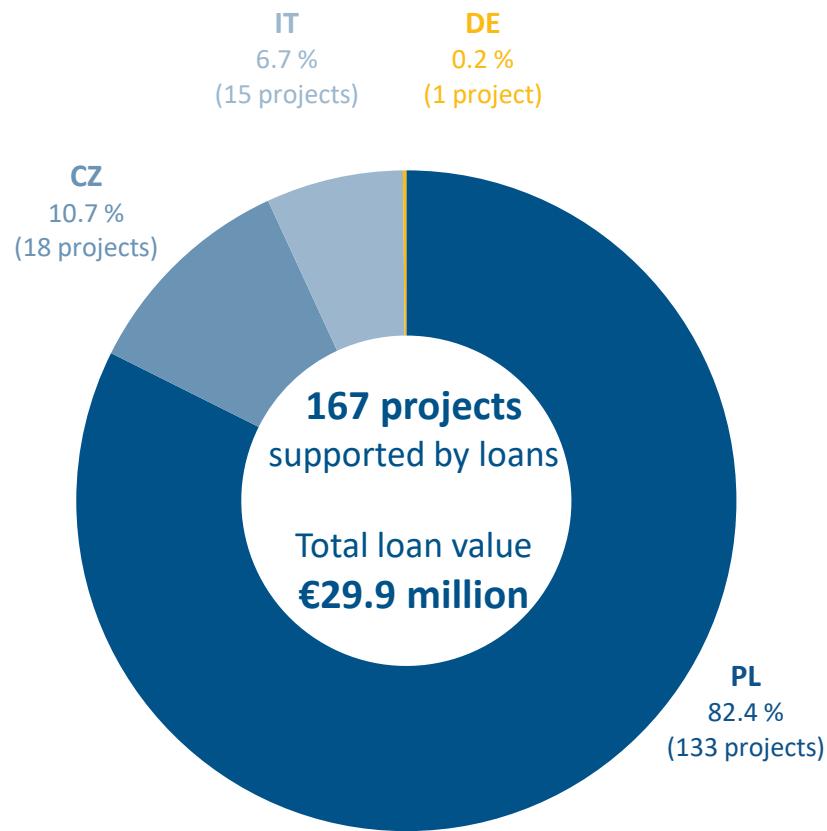
**58** Innovation in energy efficiency, one of the areas in which the Commission considered that grants were necessary, was seldom amongst the selection criteria (only two of the 41 OPs in our sample), and it had a very low significance in the overall score during project selection.

**59** Other grant mechanisms, such as repayable grants or grant – loan combinations were used less frequently. Three OPs in our sample, in two Member States, have used repayable grants, linked to certain performance conditions, to support projects.

**60** Another eight OPs in two Member States used grants combined with loans. In particular, the database showed 794 projects in Italy and 170 projects in Hungary supported through this mechanism. They represent 8 % of the projects receiving grants.

**61** Seven OPs in four other Member States funded some projects exclusively through loans and others through grants. In total, we identified 167 projects supported exclusively by loans. The total loan value was of €30 million, i.e. 1 % of the total funds for selected operations. *Figure 11* shows loan distribution among countries.

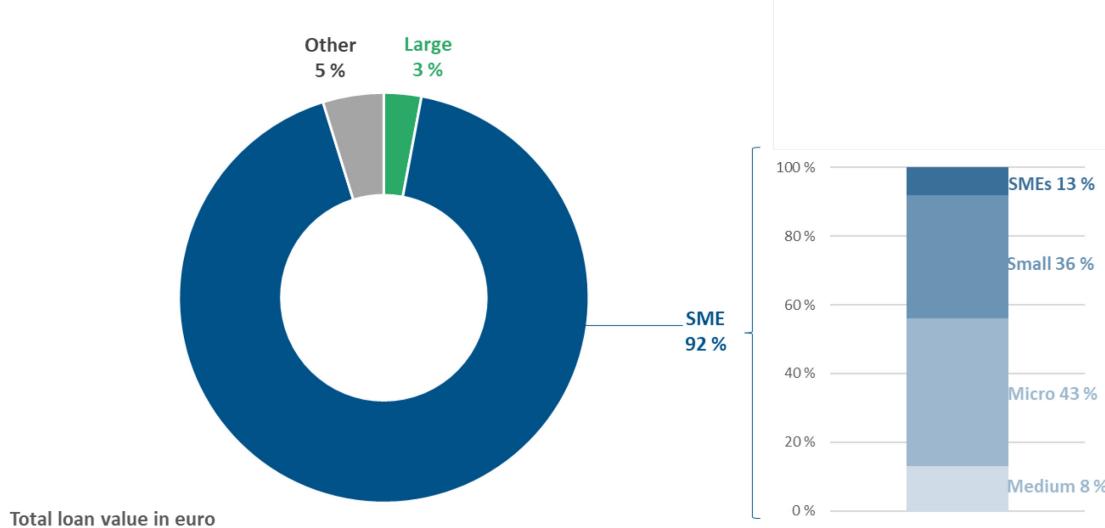
**Figure 11 – Loans for energy efficiency in enterprises**



Source: ECA, based on project lists sent by the managing authorities and by the European Investment Bank.

**62** We found that the majority of “pure”-loan ERDF/CF projects went to SMEs, i.e. more than 92 % of the total amount loaned. Large enterprises took very few loans (1 % of total loan recipients) and those loans form a low share of total loans granted (3 %). [Figure 12](#) shows the details. Similarly, SMEs also represented the majority of the recipients for loans combined with grants (91 %).

**Figure 12 – SMEs are the main recipients of ERDF/CF loans**



**SMEs = micro, small and medium enterprises combined, without distinction by size.**

Source: ECA, based on the project lists sent by managing authorities and the European Investment Bank.

**63** We also noted in the project database that managing authorities for six other OPs that had considered using financial instruments had not contracted any projects by July 2020, the date of our final request for information. These OPs are in Bulgaria, Germany, Spain, Croatia, Malta and Slovakia.

**64** Finally, we analysed the proportion of public and private funds in the sample and database of projects. We found that for both, a little more than half of the total eligible costs were covered by private funds (52 %). The rest were public funds. ERDF and CF represented the majority of the public funds used in selected operations (86 %).

## Member State procedures often encouraged efficiency

**65** We assessed whether selection procedures encouraged efficiency and effectiveness of energy efficiency projects. Our work involved reviewing and assessing the selection procedures, based on the sample of 163 energy efficiency projects.

**66** We consider that sound selection procedures should:

- require, for the energy efficiency investment projects, the submission and validation of energy savings, in the application and after project completion;
- allow the managing authorities to select effective and efficient investment projects;

- (c) result in the selection of efficient projects;
- (d) use appropriate data as criteria.

**Most selection procedures require applications to include the expected energy savings, usually validated by energy audits**

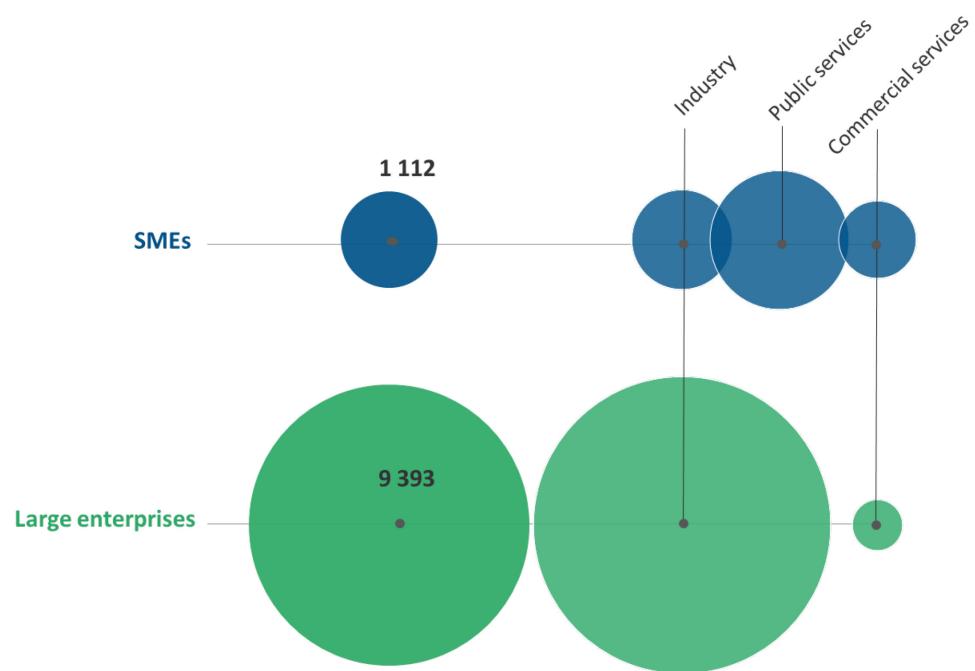
**67** We assessed the selection procedures to verify whether they required the applications to include quantified estimates of energy savings. We then examined whether project applications included the expected savings and whether independent experts or energy audits validated the latter.

**Applications include the expected savings**

**68** For all the energy efficiency projects in our sample, the selection procedures required the applications to include at least the expected energy savings and, most of the time, the estimated CO<sub>2</sub> savings.

**69** *Figure 13* provides some insight regarding the sectoral breakdown of the average expected energy savings of the sampled energy efficiency projects, based on the estimates in the applications. It indicates, as expected, that large enterprises achieve on average much higher total energy savings than SMEs in industry, and that industrial enterprises achieve larger savings compared to those operating in services. We included public sector entities performing commercial activities, classified by the authorities as enterprises.

**Figure 13 – Estimated average annual energy savings for our sample**



Type of enterprise and sector	Average planned energy savings MWh / year
SMEs	1 112
Industry	1 185
Energy efficiency	1 204
Energy efficiency and renewables integrated	992
Public services	2 280
Energy efficiency	2 280
Commercial services	698
Energy efficiency	763
Energy efficiency and renewables integrated	561
Large enterprises	9 393
Industry	10 464
Energy efficiency	10 464
Commercial services	298
Energy efficiency	298

Source: ECA, based on project applications and *ex ante* energy audits for the sampled energy efficiency projects.

**70** Most projects (88 %) also needed to include in the application their estimated CO<sub>2</sub> savings. With a few exceptions, the authorities did not require the certified emission reductions. Other 20 energy efficiency projects did not estimate their CO<sub>2</sub> savings.

**Expected savings are generally validated by independent experts or energy audits, but actual results less frequently**

**71** Energy audits provide clear and independently verified information, allowing enterprises to identify their energy saving potential. The Energy Efficiency Directive requires large enterprises to perform energy audits and Member States' authorities to encourage SMEs to undergo energy audits, for example by setting up support schemes to cover costs of an energy audit and of the implementation of cost-effective recommendations from the energy audits.

**72** In our sample, most authorities required beneficiaries to validate the expected energy savings of the funded investment. As a result, *ex ante* energy audits or independent expert reports certified the expected energy savings for most projects (87 %). Projects were not required to demonstrate that the proposed investments were cost-effective actions resulting from an energy audit.

**73** After project completion, 90 % of the beneficiaries reported project results, with 66 % achieving or exceeding the planned savings and 24 % lying below expectations. Less than a quarter (23 %) of the energy efficiency projects had an *ex post* independent assessment to verify the provided figures.

**Managing authorities generally set minimum performance standards**

**74** To maximise the impact of the limited resources, public spending should fund efficient and effective projects, and take into account cost reductions.

**75** Standards are important when deciding on energy efficiency investments. Selection procedures in particular should be in line with EU or national and regional energy efficiency standards and with the priorities of the OP.

**76** EU law sets out buildings<sup>24</sup> and industrial standards<sup>25</sup> but there are no specific standards for enterprises across the EU. However, the Commission facilitates the exchange of best practices for sustainable energy investment projects. An example is the De-risking Energy Efficiency Platform (DEEP), an open-source initiative maintained by the Commission with financial institutions. It includes bottom-up information from energy efficiency projects from all over the EU, such as payback time and median avoidance cost of energy savings. We used this database as benchmark in our project analysis.

**77** In Member States, all the calls analysed promoted the selection of projects in line with the objectives set in the respective OPs. The authorities selected 141 of all the 163 energy efficiency projects sampled (87 %) under calls requiring minimum energy savings compared to the situation before or compared to national standards.

**78** We noted that minimum energy savings requirements under the OPs and their level of ambition vary significantly between OPs. **Box 2** presents examples of programme-specific standards for the minimum energy savings.

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<sup>24</sup> Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13) and [Commission Recommendation \(EU\) 2016/1318](#) of 29 July 2016 on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings.

<sup>25</sup> Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17) and Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (OJ L 275, 25.10.2003, p. 32).

## Box 2

### Examples of minimum energy saving requirements

#### Productive investments/industry:

- A confirmed effect of at least 5 % energy savings for the measure under the energy audit (Bulgaria).
- Improvements in energy efficiency must reduce primary energy consumption by at least 10 %. For heating/cooling recovery systems, they must have a recovery rate of at least 70 % (Germany).
- Achieve a share of energy savings compared to primary energy consumption greater than or equal to 10 % (Italy).
- Improve energy efficiency by at least 25 % as a result of the project implementation (Poland).

#### Enterprises' buildings:

- Energy efficiency measures that go beyond the legal standards (Germany and France).
- A minimum saving of 40 % for lighting, 5 % for industry, manufacturing and biomass-based systems and 20 % for heating and cooling (Spain).
- Major renovation to achieve energy class minimum B in the energy performance certificate (energy performance certificate) or savings of more than 40 % of the total energy consumption of the building (Cyprus).
- The planned thermal energy consumption for heating after the implementation of energy efficiency improvement measures shall not exceed 110 kWh/m<sup>2</sup> per year (Latvia).

*Source:* Call conditions and selection checklists from a range of audited OPs.

**79** In 11 OPs in 6 Member States the authorities set a minimum ceiling for CO<sub>2</sub> savings in the selection criteria. Specifically, 25 of the 163 energy efficiency projects were subject to such selection criteria (15 %).

**80** When examining the use of performance standards, we noted that 76 % of the energy efficiency projects (124 out of 163) were selected in calls setting efficiency criteria that took into account costs and energy savings (see examples in *Box 3*).

### Box 3

#### Examples of efficiency criteria used in project selection

- Maximum amount of funds granted for each kWh/MWh/GJ saved in a year (Czechia, Germany, Latvia, Austria).
- Energy to cost ratio, i.e. selection of the best ranking projects (Bulgaria, Spain).
- Minimum amount of energy saved in a year per million euro invested (Spain).
- Cost-benefit ratio, i.e. selection of the best ranking projects (Italy).

#### Investing in energy efficiency can be efficient without public support

**81** To analyse overall project efficiency, we compared the cost of saving one unit of energy for our projects with relevant benchmarks. We found the information on the median cost of saving energy in the DEEP database and the cost of electricity, the energy source predominantly used by the sampled beneficiaries, as relevant benchmarks for our projects.

**82** Electricity cost had, in 2020 and for non-household users in the EU-27, a median value of €104/MWh<sup>26</sup>. This cost excludes recoverable taxes and VAT.

**83** To make our comparison, for each project we first calculated the energy savings achieved by each euro invested. This is the ratio of total energy savings achieved over the investment lifetime to the total eligible project costs.

**84** Then we obtained the inverse, i.e. the costs to achieve one MWh of energy savings (known as “avoidance cost”), taking into account the cumulative savings over the projects’ lifetime. The calculation is similar to the calculation used for the DEEP database projects.

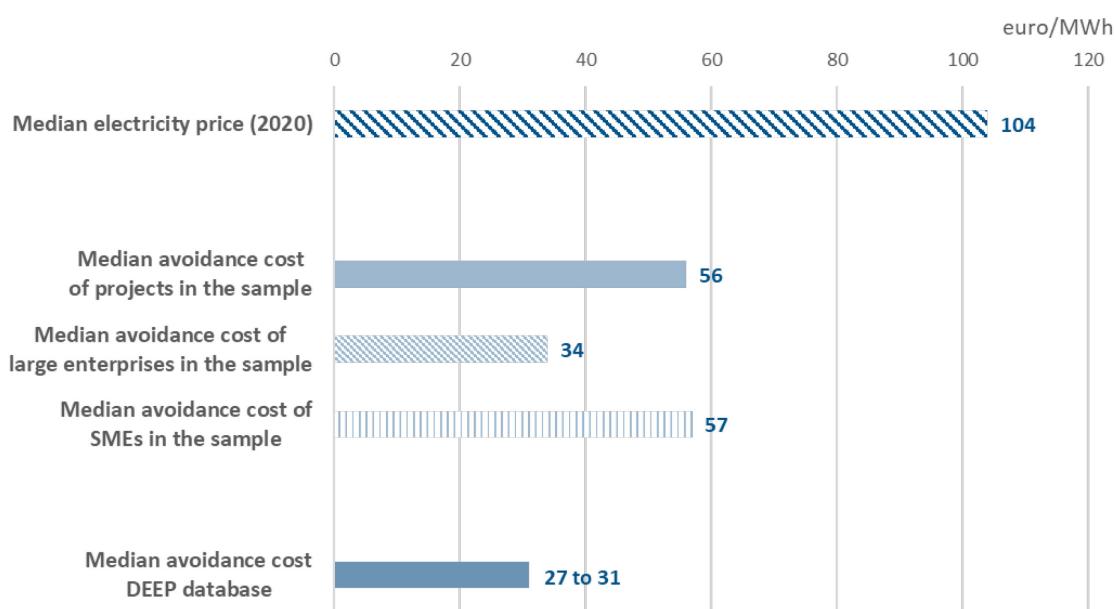
**85** Based on this data, we identified that the median avoidance cost of all projects is €56. The median avoidance cost was of €57 for SMEs and €34 for large enterprises.

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<sup>26</sup> According to Eurostat, data from 2020.

**86** *Figure 14* shows that the median costs to achieve one MWh of energy savings (€56) was half the median cost of electricity (€104). A more in-depth analysis showed that also at OP level, in most OPs (28 out of 30 with energy efficiency projects), the median values of the avoidance cost were also below the electricity price.

**Figure 14 – Comparison of median avoidance costs for the sampled projects with electricity price and with EU benchmarks, per type of enterprise**

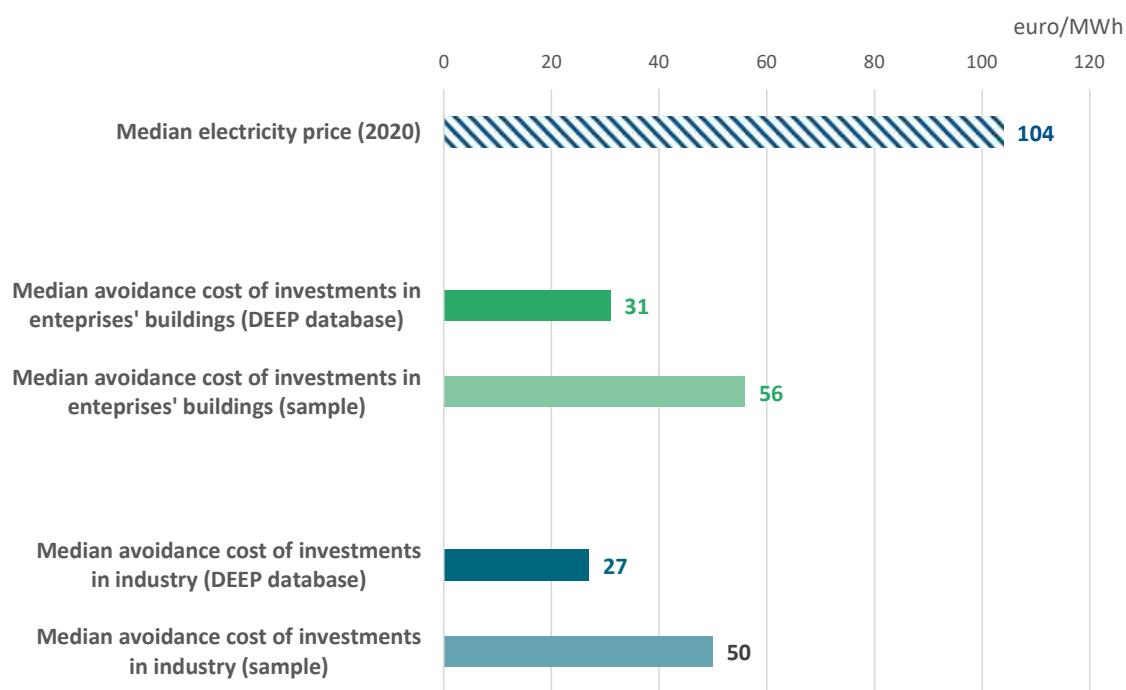


Source: ECA, based on Eurostat data, sampled project data and on DEEP values.

**87** This result indicates that globally, projects were efficient. In particular, it was more cost-effective to invest in saving energy than to pay for electricity, even in the absence of an EU grant.

**88** However, the projects we examined were on average less efficient than the DEEP projects (see *Figure 14* and *Figure 15*). In particular, the median avoidance costs for the sampled projects was higher than the median DEEP value (for both large enterprises and SMEs or for industry and buildings).

**Figure 15 – Comparison of median avoidance costs for the sampled projects with electricity price and with EU benchmarks, per sector**



Source: ECA, based on Eurostat data, sampled project data and on DEEP values.

### Financial indicators, powerful performance tools neglected by managing authorities

**89** Most of the beneficiaries who replied to our survey used financial performance criteria for their own project assessment:

- (a) Payback time: (73 % of the beneficiaries).
- (b) Internal Rate of Return (45 % of the beneficiaries).
- (c) Net Present Value (38 % of the beneficiaries).
- (d) Indicators assessing the benefits of less maintenance, more productivity, less of other collateral services, environmental certification etc. (40 % of the beneficiaries).

**90** A few managing authorities used financial indicators in their assessment of the project merits. We focused our analysis on the use of the payback time, the financial indicator most frequently used by the beneficiaries.

**91** In contrast to the beneficiaries, the authorities used the payback time in project assessment in just two of the 30 OPs with energy efficiency projects. In particular, only projects with payback times over a certain limit (e.g. 2 years) would receive funding. The authorities did not set an upper limit to the payback times to identify if projects were feasible.

**92** We assessed what would be the impact of using the payback time during selection on project efficiency. Using the data provided by the beneficiaries, we first estimated the payback time of the investments. We used the total eligible cost divided by the annual cost savings derived from energy savings provided in the applications, where available. Where not, we estimated these cost savings based on the energy price and on the amount of energy saved per year. We did not take into account additional benefits and cost savings generated by those benefits, as the main objective of the funds was to improve energy efficiency.

**93** We were able to estimate payback times for 150 of the 163 energy efficiency projects we sampled. Of the 150 projects with estimates of payback times, 132 also provided information on the investment lifetime.

**94** We compared the estimated payback times with the investment lifetime for each of those projects. We noted that 6 % were just above that lifetime (less than 10 % difference) and a third (29 %) had estimated payback times much longer than the investment lifetime.

**95** Considering that the latter projects were likely not financially viable, this prompted us to make an in-depth analysis of their efficiency. In particular, based on the estimated payback times and investment lifetime, we investigated how those affected the average energy avoidance cost.

**96** We calculated the average cost of saving one unit (MWh) of energy in two steps:

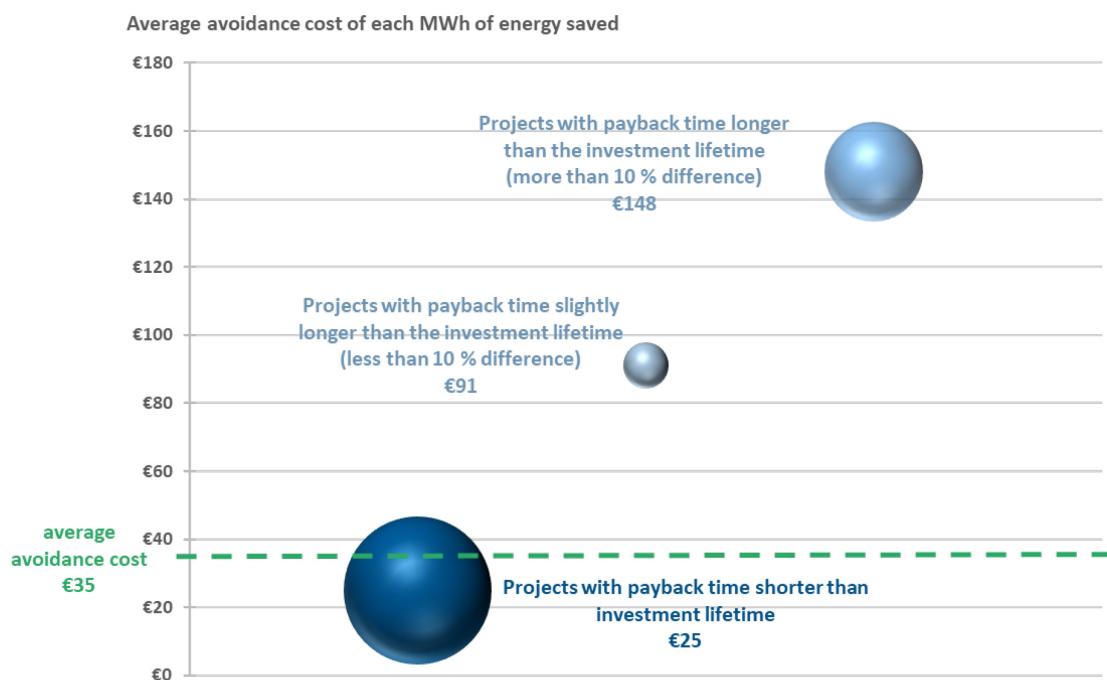
- (a) Starting from each euro invested, as using monetary unit sampling, we first calculated the average energy saved per euro invested for the given (sub)population (MWh/€).
- (b) We then calculated the average cost of saving one unit of energy (or “avoidance cost”), for the same (sub)population as the inverse value of the above (€/MWh).

**97** We analysed the 132 projects for which we had all the necessary data on avoidance costs, payback and investment lifetime periods. We identified three categories (sub-populations) of projects, whose estimated payback times were:

- (a) shorter than the investment lifetime (86 projects);
- (b) slightly longer than the investment lifetime, i.e. up to 10 % difference (8 projects); and
- (c) longer than the investment lifetime, i.e. more than 10 % difference (38 projects).

**98** We noted that average energy avoidance costs increased substantially when payback periods were longer than the investment lifetime (see *Figure 16*). This calls into question the use of EU funds for such projects.

**Figure 16 – Variation of avoidance cost with the payback time**



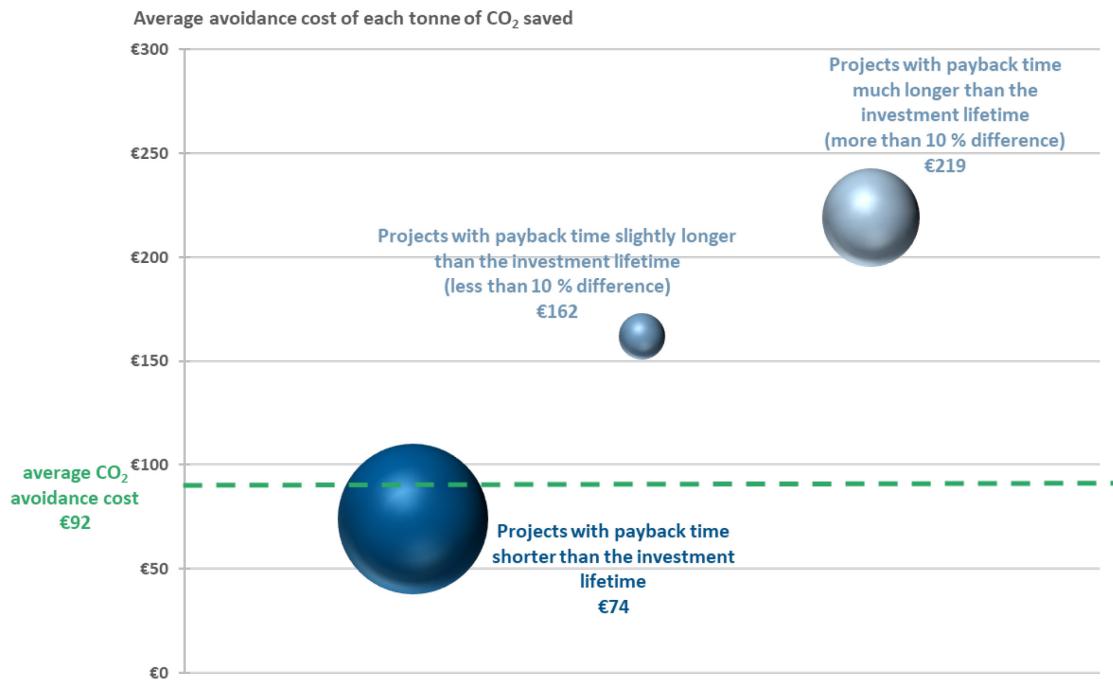
Source: ECA, based on data from project applications and beneficiary replies.

**99** For the projects with very short payback times, i.e. less than 5 years, the costs were significantly lower than the average (€26). This calls into question the need for EU grants to develop them.

**100** We also analysed how the relationship between payback time and investment lifetime affected the average CO<sub>2</sub> avoidance cost for the 129 projects for which we had all these data, based on the same sub-populations as for energy avoidance costs (with

85, 8 and 36 projects respectively). We noted the same trend, as illustrated in [Figure 17](#) below.

**Figure 17 – Relation between payback times, investment lifetime and CO<sub>2</sub> avoidance costs**



Source: ECA, based on data from project applications and beneficiary replies.

**101** We finally analysed the potential influence of the efficiency criteria set out by the authorities for limiting the cost of energy and CO<sub>2</sub> savings over the investment lifetime. In particular, we sought to identify if those criteria promoted project efficiency.

**102** Of the 124 projects subject to energy-related efficiency criteria, i.e. indicators assessing the ratio of costs to energy savings, 107 projects provided sufficient data to enable us to calculate the avoidance costs. For the 39 projects not subject to such criteria, 35 had sufficient data to enable us to calculate the avoidance costs.

**103** For the 142 projects for which we had all necessary data, we noted that the use of efficiency criteria during selection did not lead to a significantly lower average avoidance cost. The projects subject to such criteria (107) had an average energy avoidance cost of €34 while those not subject to thresholds (35) had an average avoidance cost of €37.

**104** We also analysed the link between the CO<sub>2</sub> avoidance costs and setting CO<sub>2</sub> cost-effectiveness criteria. 25 of the 163 projects were subject to such criteria. Using the same methodology as above, we noted that setting CO<sub>2</sub> cost-effectiveness criteria did not decrease the average CO<sub>2</sub> avoidance costs.

**105** We conclude that using efficiency criteria limiting the cost of energy and CO<sub>2</sub> savings had little influence on reducing the average energy or CO<sub>2</sub> avoidance costs. By contrast, using the payback time as additional criterion for project selection would have facilitated the channelling of EU funds to feasible projects and increased the efficiency of the funds (lowering costs of energy savings). ECA special report 11/2020 recommended using a mix of criteria for energy efficiency in buildings.

**106** Using these performance criteria would facilitate the authorities' decision on a suitable funding instrument or the need for public funds. For projects with very short payback times and low avoidance costs, loans would have been the most cost-effective option; those projects would have likely taken place even in the absence of an EU grant. By contrast, we consider that EU support was not appropriate for the less efficient projects (see paragraph [94](#)).

### The current performance framework does not measure the overall contribution of EU funding

**107** The Commission should monitor the results of the operational programmes, based on what it expected the ERDF and the CF to achieve in addressing enterprises' energy saving needs and globally, the energy efficiency targets.

### The common performance framework did not make consolidated information on outputs and results accessible

**108** The 2014-2020 ERDF and CF Regulations established a common performance framework to monitor the results flowing from EU funding. For some of the common EU investment priorities, i.e. energy efficiency in buildings or renewable energy projects, the Regulations established a set of common indicators allowing the monitoring of outputs and results (see [Box 4](#)).

## Box 4

### Common indicators for energy

#### Renewable energy

- Additional capacity of renewable energy production (MW).

#### Energy efficiency

- Number of households with improved energy consumption classification.
- Decrease of annual primary energy consumption of public buildings (kWh/year).

**109** For energy efficiency in enterprises, the Regulation did not set specific common indicators. The Commission considered that quantifying the energy saving impacts of energy efficiency measures based on a bottom-up calculation is challenging, and adding up measures can only be an approximation<sup>27</sup>.

**110** After approving the OPs, the Commission estimated that cohesion policy funds would contribute to reducing annual greenhouse gas emissions by around 30 million tonnes of CO<sub>2</sub> and would fund energy efficiency and other low-carbon initiatives in about 57 000 enterprises in EU-28<sup>28</sup>. This information does not allow the identification of exclusive benefits of energy efficiency projects.

**111** In the absence of common EU indicators for energy efficiency for enterprises, managing authorities proposed programme-specific result and output indicators. Most of the indicators measure energy savings or the reduction in energy intensity. Some of the authorities used the common performance indicator that measures the reduction of CO<sub>2</sub> emissions to quantify outputs of energy efficiency improvements.

**112** At OP level, the programme-specific indicators, by definition, differ from one programme to the other (see *Box 5*). Sometimes even between OPs of the same Member State (e.g. Germany and Italy). Moreover, some of them are context

<sup>27</sup> Commission Staff Working Document “Impact assessment accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2012/27/EU on Energy Efficiency” SWD(2016) 405 final, 30.11.2016.

<sup>28</sup> “Contribution of the European Structural and Investment Funds to the 10 Commission priorities: Energy Union and Climate”, European Commission, 2015.

indicators, presenting data for the whole economy and not output or result indicators relating to the projects.

### **Box 5**

#### **Energy efficiency indicators vary between programmes**

##### **Examples of result indicators:**

- Energy intensity of the economy, toe to €1 000 of GDP (Bulgaria).
- Commodity productivity at current prices (GDP/consumption of raw materials), €1 000/tonne (Germany).
- Final energy intensity, ktoe/million euro (Spain).
- Electricity consumption in industrial enterprises, GWh (Italy).
- Primary energy savings in the enterprise sector (services and industry sector – non-ETS), toe (Cyprus).
- Energy intensity in manufacturing (at constant 2010 prices), kg oil equivalent/€1 000 (Latvia).
- Primary energy consumption, PJ (Hungary).
- Final energy use per value added for small and medium-sized industrial companies, MWh/million SEK (Sweden).

##### **Examples of output indicators:**

- Number of energy audits carried out (Bulgaria).
- Estimated annual decrease in energy consumption, GJ (Denmark).
- Decrease in primary energy consumption in the subsidized companies, kWh/year (Germany).
- Reduction of final energy consumption of public infrastructures and enterprises, ktoe/year (Spain).
- Decrease in annual primary energy consumption of productive activities, toe (Italy).
- Energy savings for supported economic operators, MWh/year (Latvia).
- Reduction in primary energy consumption achieved by energy efficiency improvements with non-refundable aid, PJ/year (Hungary).

- Reduced energy consumption at project participating companies and organizations, MWh (Sweden).

**113** In line with the programme-specific output indicators, some projects included in the application estimates of primary energy savings, other projects final savings and some other projects did not specify what kind of estimates they provided.

**114** In their current form, it is not possible to aggregate the outputs and results at EU level or to obtain information on the projects contribution to the energy saving obligations, as Member States do not collect the same type of disaggregated data.

**115** For the 2021-2027 programming period, the ERDF and CF Regulation<sup>29</sup> establishes common performance indicators for energy efficiency. The initial proposal contained several such indicators, as illustrated in *Box 6*, but as they evolved during the co-decision procedure, the final text maintains one indicator mentioning enterprises specifically.

#### Box 6

#### Common indicators for energy efficiency (2021-2027)

Indicators initially proposed by the Commission <sup>30</sup>	Revised (final) indicators <sup>31</sup>
(a) RCR 26 – Annual <u>final</u> energy consumption (of which: residential, <b>private non-residential</b> , public non-residential);	(a) RCR 26 – Annual <u>primary</u> energy consumption (of which: dwellings, public buildings, <b>enterprises</b> , other);
(b) RCR 28 – <b>Buildings</b> with improved energy classification	

<sup>29</sup> Regulation (EU) 2021/1058 of the European Parliament and of the Council of 24 June 2021 on the European Regional Development Fund and on the Cohesion Fund ([OJ L 231, 30.6.2021, p. 60](#)).

<sup>30</sup> Commission proposal for a Regulation of the European Parliament and of the Council on the European Regional Development Fund and on the Cohesion Fund, [COM\(2018\) 372 final](#) of 29 May 2018.

<sup>31</sup> Regulation (EU) 2021/1058.

<p>(of which: residential, <b>private non-residential</b>, public non-residential);</p> <p>(c) RCR 30 – <b>Enterprises</b> with improved energy performance;</p> <p>(d) CCO 06 – Investments in measures to improve energy efficiency;</p> <p>(e) CCR 05 – Beneficiaries with improved energy classification.</p>	<p>(b) CCO 06 – Investments in measures to improve energy performance; and</p> <p>(c) CCR 05 – Savings in annual <u>primary</u> energy consumption.</p>
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CCO: Core Cohesion Output Indicators.

CCR: Core Cohesion Result Indicators.

RCR: Regional Policy Common Result Indicator.

## 116 We identified the following weaknesses in the revised indicators:

- (a) The common indicators are not aligned with indicators reported under the Regulation on the Governance of the Energy Union and Climate Action, which requires Member States to report primary and final energy savings or primary and final energy consumption (2020 versus 2030).
- (b) Using an indicator that measures primary energy consumption (decrease in overall energy needed) allows the inclusion of renewables in the monitoring of energy efficiency spending and results. While renewables decrease the quantity of energy needed from the grid, the projects use the same amount of energy for their activity (final energy consumption).

**According to estimates, EU-funded energy efficiency projects will deliver a modest contribution to the EU objectives**

**117** To assess the project contribution to energy efficiency, we calculated the estimated impact of the funds invested, i.e. the amount of energy savings generated (MWh). We based our assessment on 142 projects for which we had the necessary data.

**118** We first divided for each project, the total estimated energy savings by the investment financed by the EU. Our calculation indicates that, on average, €1 000 invested in energy efficiency projects would, over the period of the investment, save, if *ex ante* estimates were accurate, 28 MWh of energy.

**119** We then extrapolated this estimate to all the energy efficiency projects in our database, as the latter showed similar characteristics to the sample. The total eligible amount invested in the energy efficiency projects of our database was of €3.5 billion. Our extrapolation indicates that, if *ex ante* estimates were accurate, the energy efficiency projects funded by ERDF and CF, as of October 2020, would generate savings of around 100 million MWh over the projects' lifetime (8.7 Million tonnes of oil equivalent (Mtoe)).

**120** Their average investment lifetime being 18 years, the yearly amount of savings is roughly 0.48 Mtoe. Considering that the current saving effort to the 2030 energy efficiency targets is of 137 Mtoe, the project savings represent about 0.3 % of that effort.

## Conclusions and recommendations

**121** Increasing energy efficiency is a key component of the EU's climate change mitigation efforts and the "European Green Deal". Significant efforts are still needed to achieve the enhanced EU targets for energy efficiency and enterprises are an important part of this effort. The Commission and the Member States are jointly responsible for developing and putting in place policy measures in the field of energy efficiency ([01-15](#)).

**122** During the 2014-2020 period, the ERDF and the CF provided €2.5 billion for selected operations promoting energy efficiency measures in enterprises ([14](#) and [15](#)). The Member States and the Commission jointly manage these funds ([16-20](#)).

**123** We examined whether EU cohesion policy funds for energy efficiency in enterprises were soundly spent. Overall, we found that the planned spending was not well integrated within the EU energy efficiency strategy, while certain projects had efficiency issues. Member States set up efficiency criteria for projects, but these alone did not lead to improved project efficiency. The expected results, although not captured by the existing monitoring framework, indicate that the projects contribution to the energy efficiency objectives will be limited.

**124** We considered whether the Commission and Member States had assessed the appropriate use of EU funds to support the achievement of the energy efficiency objectives. We found that, while the ERDF and the CF offer the possibility of co-financing energy efficiency in enterprises, the Commission did not justify how the ERDF and CF would contribute to addressing the specific financing needs for energy efficiency in enterprises, in terms of total and public investment ([34-39](#)).

**125** The OPs set clear priorities and objectives for energy efficiency in enterprises, although most do not state their intended contribution to the implementation of the NEEAPs ([40-45](#)).

## **Recommendation 1 – Assess the potential and actual contribution of cohesion policy funds to energy efficiency**

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The Commission should improve the use of funds by carrying out a robust assessment of:

- (a) the potential contribution of EU funds invested for energy efficiency in enterprises at the programming stage, taking into account public financing needs expressed in the National Energy and Climate Plans.

**Timeframe: 2022.**

- (b) the specific impact of energy efficiency projects for enterprises when evaluating the 2014-2020 programme period.

**Timeframe: 2024.**

**126** A small number of OPs planned significant amounts and proportions of the total ERDF and CF contribution for improving energy efficiency in enterprises at national or regional level. These programmes also had a higher proportion of selected funds compared to the rest of the programmes ([46-51](#)).

**127** We found that Member States' authorities used mostly grants. The authorities did not justify their choice of financial support in the OPs. It is not possible to determine the extent to which projects would have gone ahead without EU support, but the information we obtained from beneficiaries replies suggests that a small majority of projects may have done so. Public grants provided around half of the total project investment, and the EU component (ERDF and CF) contributed the largest share of public support ([52-64](#)).

**128** We also assessed whether the Member State procedures allowed for the selection of efficient projects. We found that in general, the selection process promoted efficient projects, although weaknesses affect the overall performance of the programme.

**129** We found that most Member States required enterprises to submit validated estimates of energy savings and offered in a few instances even financial support for *ex ante* energy audits to those enterprises. *Ex post* validation of project results was less frequent ([67-73](#)).

**130** Most managing authorities generally required projects to comply with minimum energy savings and performance standards, even in the absence of EU efficiency standards for enterprises. The level of ambition of these requirements differed, but most promoted substantial savings. We also found that some Member States' authorities had set efficiency criteria for investments ([74-80](#)).

**131** Overall, projects appeared to be efficient: the median cost of achieving energy savings was lower than the median price of electricity across Member States, although below the DEEP benchmark ([81-88](#)).

**132** Financial indicators were seldom used in project selection, despite the fact that most beneficiaries had used them. We noted that for a third of projects, the payback times were longer than the investment lifetime, meaning that they were not efficient ([89-94](#)).

**133** By analysing how much the payback times influence the cost of saving energy, we noted that very long payback times, i.e. longer than the investment lifetime, mean significantly higher costs of achieving energy savings ([95-100](#)). Setting efficiency criteria relating to energy and CO<sub>2</sub> costs did not significantly decrease the average cost of savings ([101-103](#)).

**134** Using payback times would have been more efficient and could have helped in identifying suitable funding instruments. Projects with very short payback times and low avoidance costs would have likely taken place even in the absence of an EU grant; they could have been funded through loans ([99](#) and [106](#)). The new Common provisions Regulation requires authorities to justify, for the new OPs, their choice of funding instrument ([53](#)).

## **Recommendation 2 – Verify whether the choice of the funding instrument is appropriately justified**

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The Commission should verify whether the choice of funding instrument is reasonably justified by the Member States in their programme proposals and that grants are not used where financial instruments would be more appropriate.

**Timeframe: 2022.**

**135** EU support should not be provided where payback times largely exceed the investment lifetime, meaning that projects are less efficient and likely not financially viable ([106](#)). A third of the projects for which we had data were in this situation ([94](#)).

**136** Finally, we assessed whether project results demonstrate improvements in energy efficiency in enterprises based on indicators and on our own analysis.

**137** While the priority of improving energy efficiency in enterprises is set at EU level, there are no common indicators measuring its outputs and results in the period 2014-2020. Indicators measuring the number of enterprises with low-carbon investments or CO<sub>2</sub> emission reductions apply to several priorities, and it is not possible to identify the outputs and results of the energy efficiency priority ([108-110](#)). Member States set programme-specific indicators, but their outputs and results cannot be aggregated at EU level ([111-114](#)).

**138** The cohesion policy funds legislation for 2021-2027 introduced common energy efficiency indicators ([115](#)). However, they are not aligned with other EU reporting requirements, such as the Regulation on the Governance of the Energy Union and Climate Action, which is more detailed. The new indicators allow authorities to consider renewable energy sources as energy efficiency investments affecting climate tracking and the monitoring of spending for energy efficiency ([116](#)).

**139** Finally, we estimated that energy savings generated by the co-funded projects have a limited contribution, of about 0.3 %, to the energy saving needs towards 2030 ([117-120](#)).

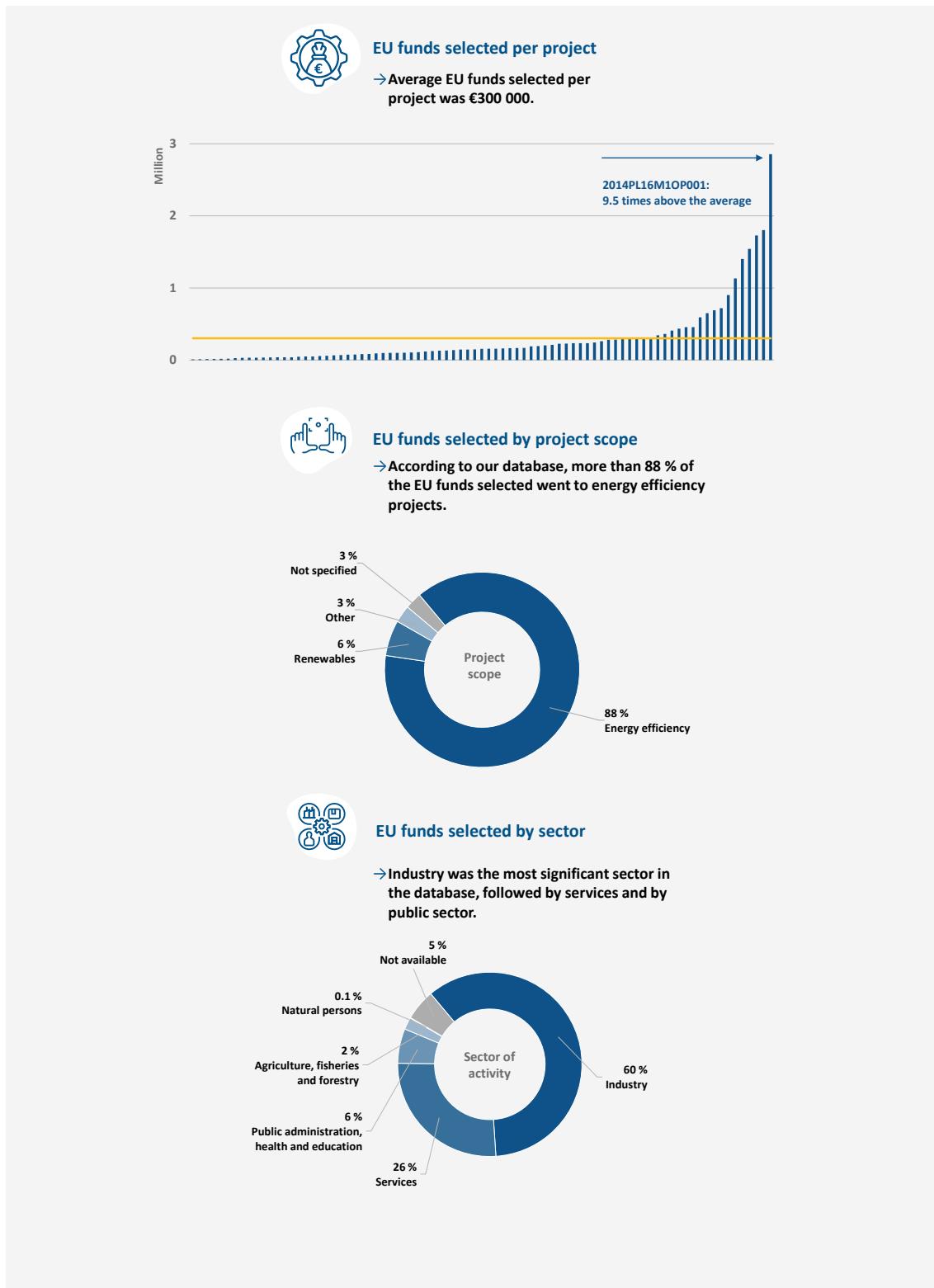
This Report was adopted by Chamber I, headed by Mr Samo Jereb, Member of the Court of Auditors, in Luxembourg on 24 November 2021.

*For the Court of Auditors*

Klaus-Heiner Lehne  
*President*

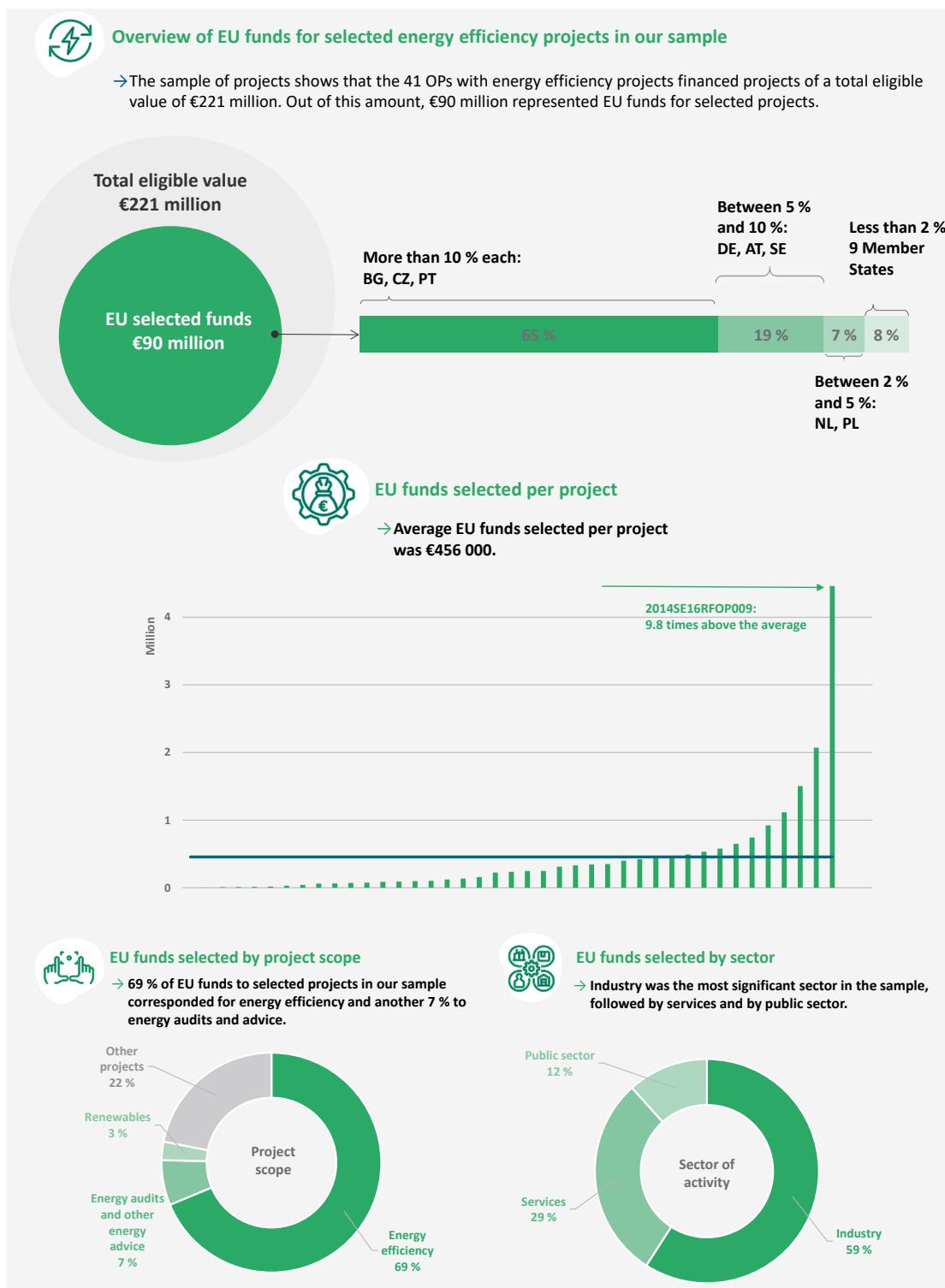
# Annexes

## Annex I – Analysis of projects in the database



Source: ECA, based on project lists received from the managing authorities.

## Annex II – Sample characteristics



Source: ECA, based on the sampled projects.

# Acronyms and abbreviations

**CF:** Cohesion Fund

**CO<sub>2</sub>:** Carbon dioxide

**DEEP:** De-Risking Energy Efficiency Platform

**DG ENER:** Directorate-General for Energy

**DG REGIO:** Directorate-General for Regional and Urban Policy

**ERDF:** European Regional Development Fund

**GDP:** Gross Domestic Product

**GWh:** Giga Watt hour

**Koe/\$2015p:** Kilogram oil equivalent at 2015 prices, expressed in US dollars

**MWh:** Mega Watt hour

**NEEAP:** National Energy Efficiency Action Plan

**OP:** Operational Programme

**PJ/GJ:** Peta/Giga Joule

**SFC:** European Union Structural Funds Communication System

**SMEs:** Small and medium enterprises

**TC:** Territorial Cooperation

**(M)(k)TOE:** (Million)(kilo) Tonnes of oil equivalent

# Glossary

**AVOIDANCE COST:** The cost of saving (avoiding) one MWh of energy consumption (euro).

**DEEP:** De-Risking Energy Efficiency Platform, an open-source initiative to up-scale energy efficiency investments in Europe through the improved sharing and transparent analysis of existing projects.

**ENERGY AUDIT:** Energy Efficiency Directive defines an energy audit as a systematic procedure with the purpose of obtaining adequate knowledge of the existing energy consumption, identifying and quantifying cost-effective energy savings opportunities, and reporting the findings.

**ENERGY EFFICIENCY:** The ratio of output of performance, service, goods or energy, to input of energy, according to the Energy Efficiency Directive, 2012/27/EU.

**ENERGY EFFICIENCY IMPROVEMENT:** An increase in energy efficiency as a result of technological, behavioural and/or economic changes.

**ENERGY INTENSITY:** The ratio between gross inland energy consumption (GIEC) and gross domestic product (GDP), calculated for a calendar year.

**ENERGY PRODUCTIVITY:** A measure of the economic benefit we receive from each unit of energy we use. It is calculated by dividing total economic output (e.g. GDP) by the amount of energy consumed (e.g. tonnes of oil equivalent). It provides a picture of the degree of decoupling of energy use from growth in GDP.

**ENERGY SAVINGS:** An amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption.

**FINAL ENERGY CONSUMPTION:** Means all energy supplied to industry, transport, households, services and agriculture. It excludes deliveries to the energy transformation sector and the energy industries themselves.

**MANAGING AUTHORITY:** The regional or national authorities managing the operational programmes and bearing the main responsibility for the effective and efficient implementation of the ERDF or CF.

**MEMBER STATES:** The 27 countries members of the European Union in 2021.

**OPERATIONAL PROGRAMME:** The programming document detailing investment priorities, specific objectives, results and output indicators and setting the management and control system put in place to ensure the effective and efficient implementation of the ERDF or CF.

**PRIMARY ENERGY CONSUMPTION:** Gross inland consumption, excluding non-energy uses.

**PRIMES modelling tool:** PRIMES is a model of the EU energy system providing projections for the medium and long term starting from 2010 and running up to 2030.

## Replies of the Commission

<https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=60620>

## Timeline

<https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=60620>

## 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 Samo Jereb. The audit was led by ECA Member Samo Jereb, supported by Kathrine Henderson, Head of Private Office and Jerneja Vrubic, Private Office Attaché; Emmanuel Rauch, Principal Manager; Oana Dumitrescu, Head of Task; Lorenzo Pirelli, Lucia Rosca, Asimina Petri, Malgorzata Frydel, Timo Lehtinen and Nicholas Edwards, Auditors. Graphic design by Marika Meisenzahl.



*Back row from left to right:* Lorenzo Pirelli, Lucia Rosca, Emmanuel Rauch, Malgorzata Frydel, Nicholas Edwards

*Front row from left to right:* Asimina Petri, Timo Lehtinen, Oana Dumitrescu, Samo Jereb, Marika Meisenzahl

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**Energy efficiency is essential to achieve EU carbon neutrality by 2050.** We analysed energy efficiency projects in enterprises co-financed by cohesion policy funds. We found that the Commission had not assessed the potential for energy savings of enterprises or financing needs, while programmes do not specify how the funds contribute to energy efficiency priorities. Ex post indicators cannot assess this contribution, but we estimated it at 0.3 % of the effort to 2030. Investments in energy efficiency were overall efficient. Using financial indicators in the selection process would have avoided some inefficiencies and allowed for a better choice of funding instrument. We recommend that the Commission clarify the EU funds' contribution and verify if the choice of financing instrument is reasonable.

ECA special report pursuant to Article 287(4), second subparagraph, TFEU.



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