

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT
STRUCTURAL AND COHESION POLICIES **B**



Agriculture and Rural Development

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**Research for REGI
Committee - Financial
instruments for energy
efficiency and renewable
energy**

STUDY



DIRECTORATE-GENERAL FOR INTERNAL POLICIES
Policy Department for Structural and Cohesion Policies

REGIONAL DEVELOPMENT

Research for REGI Committee - Financial instruments for energy efficiency and renewable energy

STUDY

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AUTHORS

European Policies Research Centre, University of Strathclyde: Fiona Wishlade, Rona Michie, Phil Vernon

CASE STUDY AUTHORS

Estonia: Kristiina Tõnnisson, University of Tartu; France: Timothée Lehuraux, EPRC; Lithuania: ESTEP; Slovakia: Martin Obuch, Consulting Associates; Spain: Red2Red; Sweden: Fiona Wishlade, EPRC; United Kingdom: Rona Michie, EPRC

Research manager: Diana Haase

Project and publication assistance: Lyna Pärt

Policy Department for Structural and Cohesion Policies, European Parliament

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Abstract

This study analyses ESIF financial instruments for energy efficiency and renewable energy sources and their implementation. The results suggest that, because implementation is highly context-dependent, transferability of lessons and good practice is limited. EE and RES FIs require specialist support and are constrained by operational programme lifecycles. More could be done to measure the impact of EE and RES FIs, though assessing the performance of both low carbon policies and financial instruments is highly challenging.

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LIST OF ABBREVIATIONS

AIR	Annual Implementation Report
CF	Cohesion Fund
COCOF	Committee of the Coordination of Funds
CPER	Contrat de plan État-region
CPR	Common Provisions Regulation
CSG	Community Strategic Guidelines
EAFRD	European Agriculture Fund for Rural Development
ECA	European Court of Auditors
EE	Energy Efficiency
EED	Energy Efficiency Directive
EEOS	Energy Efficiency Obligation Scheme
EFSD	European Fund for Strategic Investments
EIB	European Investment Bank
EIF	European Investment Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
FA	Funding Agreement
FI	Financial Instrument
FiT	Feed-in Tariff
FOF	Fund of Funds
GBER	General Block Exemption Regulation

GHG Greenhouse Gases

HF Holding Fund

JEREMIE Joint European Resources for Micro to Medium Enterprises

JESSICA Joint European Support for Sustainable Investment in City Areas

MA Managing Authority

NEEAPS National Energy Efficiency Action Plans

NHF Specific funds outside holding funds

NREAPS National Renewable Energy Action Plans

OP Operational Programme

OTS Off-the-shelf

RED Renewable Energy Directive

RES Renewable Energy Sources

SF Structural Funds

SHF Specific funds under a holding fund

TC Territorial Cooperation

TFEU Treaty on the Functioning of the European Union

TO Thematic Objective

TOE Tonnes of oil equivalent

UDF Urban Development Fund

VC Venture Capital

EXECUTIVE SUMMARY

This study concerns **EU energy and climate change policy and the role of Cohesion policy financial instruments** (FIs) for energy efficiency (EE) and renewable energy sources (RES). EE and RES have become important aspects of EU Cohesion policy: the broad context is set by the **Europe 2020 'headline' targets**, implemented through national action plans which help determine the nature of ESIF support for EE and RES. Moreover, cohesion policy contributes to the Europe 2020 flagship initiative *a resource efficient Europe*. Reflecting this, Thematic Objective 4 - *supporting the shift towards a low carbon economy* is one of 11 'thematic objectives' under the European Structural and Investment Funds (ESIF) in 2014-20. At the same time, the **Commission has expanded the role for FIs** in Cohesion policy delivery. FIs mainly take the form of loans, guarantees and equity. For most ESIF Managing Authorities, FIs are relatively new tools for using within their programmes, and in 2014-20, the role of FIs is being reinforced both in breadth of policy areas and scale of funding.

The aim of this study is to **analyse the use of ESIF FIs for the low carbon economy**, especially energy efficiency and renewable energy sources. More specifically:

- to give an overview of Cohesion policy support for EE and RES;
- to analyse the implementation of FIs, and to identify specific challenges and lessons;
- to analyse and assess the performance of FIs, including their contribution to broader Cohesion policy goals.

Energy efficiency is increasingly regarded as the 'first fuel'. **Buildings represent the greatest potential for energy efficiency**. Energy efficiency obligations schemes are the most widely used measure used to achieve EE targets, followed by financial incentives.

Across the EU, some 16 percent of energy is derived from renewables. **Feed-in tariffs and premia are the most widely used instruments to encourage RES use**. These compensate for the extra costs of RES energy generation, however, private investment is sensitive to the design of these measures.

National contexts for energy policy vary. Factors include climate (heating is more important in northern than southern Europe), building quality (with poor quality housing in many central and eastern European countries), resources (geography, topography and network infrastructure affect the availability and accessibility of RES), policies (differences in regulation, budgetary and administrative capacity), and sectoral issues (buildings, transport, industry, agriculture) having diverse implications. The **domestic policy landscape for supporting EE and RES investment is complex and fragmented**, involving a patchwork of national and subnational measures. In some countries, especially in central and eastern Europe, there is significant ESIF cofinancing of incentives for EE and RES. However, quantitative data is not always available or comparable.

Meeting the Europe 2020 targets for EE and RES requires significant spending – around EUR 100 billion annually for EE and EUR 60-EUR 70 billion on RES installations. According to the Commission, this could be returned by 2050 through annual average fuel savings of EUR 175 billion to EUR 320 billion. Nevertheless, **there are significant obstacles to financing investment in EE and RES** in some contexts, concerning both the drivers of *demand* for investment and the *supply* of finance.

Cohesion policy is the largest EU source of funds for EE and RES, rising from EUR 10.8 billion in 2007-13 to EUR 29.2 billion in 2014-20. Most support for EE and RES is in the form of grants. In 2007-13, just EUR 467 million Structural Funds was paid to FIs set up specifically for EE and RES. However, additional Structural Funds were also invested through Urban Development Funds, some of which invested in EE and RES activities. The **absorption of funds in FIs for EE and RES is poor** - of the EUR 467 million paid to energy-specific FIs in 2007-13, only EUR 233 million had reached final recipients by end 2015. There was almost full absorption in Denmark and Estonia, but low levels or no absorption in Germany, Italy and France. Barriers to absorption included slow mobilisation of projects due to the resources needed to reach target groups; expertise required to understand the complexities of FIs and the technical aspects of EE and RES investment; and the reluctance of some target groups to engage with repayable support. For 2014-20, **a substantial increase in the use of FIs** for EE and RES is envisaged: over EUR 3 billion across 19 Member States are planned for FIs for the low carbon economy. However, by end 2015 only five FIs had had funds paid to them, totalling less than EUR 200 million.

ESIF cofinanced FIs for EE and RES are diverse in objectives, target recipients, scale and governance. Four broad groupings can be identified:

- Energy efficiency in housing, which can be provided to individuals, housing associations or landlords, typically in the form of loans.
- Energy efficiency and renewables in public places and buildings, normally undertaken in the wider urban development context, and usually through loans and guarantees to municipalities and other public authorities to invest in areas such as renovation or public buildings and street lighting or transport.
- Investment in energy efficiency and renewables infrastructure; including support for projects such as solar installations, smart grids and energy management infrastructure, through ESCOs, PPPs and public or private entities.
- Innovation and development of new EE and RES technologies, targeting new or spin-out companies seeking to demonstrate, pilot or upscale projects for commercialisation.

The **choice of financial product is closely tied to objectives**: loans predominate for investment in buildings; and equity for investment in low carbon innovation by SMEs. FIs for EE and RES are affected by the same implementation challenges as other FIs. However, the new emphasis on low carbon in 2014-20 involves engaging with different stakeholders, addressing specific technical challenges associated with energy policy, and increasing the acceptability of FIs.

The **key lessons** from FIs for EE and RES do not substantially differ from those for FIs for general business support, in addition a number of specific needs were identified:

- for specialist input;
- an overarching vision to demonstrate how energy projects deliver sustainable development in order to improve 'buy-in';
- for intensive awareness-raising and applicant support;
- to tailor delivery mechanisms to target recipients;
- for recognition of the role of wider regulatory issues, such as feed-in tariffs, and their impact on the attractiveness of FIs;
- for 'pilot projects' in preparing future policy directions.

Variations in domestic contexts limit the scope for transferability of good practice between countries, but drawing lessons from one period to the next (within a programme) is important. 'Off-the-shelf' instruments which provide a template for dealing with the main compliance issues aimed to facilitate the use of FIs in 2014-20. However, **no use has been made of off-the-shelf instruments for EE and RES**, partly because they became available too late, but also because they did not meet identified needs. **The legislative framework for FIs is generally regarded as complicated**, though most issues are not specific to FIs for EE and RES. Technical assistance has been welcomed, but would have been more useful if available earlier.

The **wider funding landscape for EE and RES is complex**. As well as domestic policy measures under the national action plans (some of which are cofinanced by ESIF or funded through EIB-backed measures) there are EU-level FIs for EE and RES. Among some Managing Authorities, understanding of the roles of, and relationship between, domestic, shared management and EU instruments is limited.

Measuring the 'success' of cofinanced FIs of all types has been problematic for 2007-13. **The challenge of measuring the performance of support for EE and RES is not limited to FIs**: it is difficult to assess the impact of ESIF programmes on carbon emissions in a region or country, and more so the role played by FIs. This is partly due to the tension between standardised indicators that enable comparative assessment of operations and the need to capture the specificities of interventions. 'Simple' quantitative indicators may fail to capture wider qualitative and/or indirect benefits of EE and RES FIs.

Future policy should acknowledge the heterogeneity of EE and RES FIs. Their highly context-dependent implementation limits transferability of lessons and practice. However, in general, EE and RES FIs require specialist support and suffer from being constrained by ESIF OP lifecycles. The focus on thematic concentration in 2014-20 has potentially distortive effects, and more could be done to measure the impact of EE and RES FIs.

1. INTRODUCTION

The overall context for the present study concerns EU energy and climate change policy and the role of Cohesion policy financial instruments for energy efficiency and renewable energy sources.

The legal basis for EU energy policy is Article 194 Treaty on the Functioning of the European Union (TFEU). This sets out the overarching objectives of policy, which include 'promoting energy efficiency and energy saving and the development of new and renewable forms of energy' (Article 194(c) TFEU). EU action in the area is primarily in the form of Directives that set out targets to achieve, with the means by which this is done mainly a matter for Member States, but subject also to wider legislative frameworks such as those concerning State aid.

Energy efficiency (EE) and renewable energy sources (RES) have become an increasingly important dimension of EU Cohesion policy, which seeks to contribute to the Europe 2020 flagship initiative *a resource efficient Europe*. Reflecting this, Thematic Objective 4 (TO4) - *supporting the shift towards a low carbon economy* is one of 11 thematic objectives under the European Structural and Investment Funds (ESIF/ESI Funds) in 2014-20. The priority given to this has been reinforced through TO4 investment targets of 12-20 percent of ERDF spend, with over EUR 29 billion explicitly planned for energy efficiency and renewables in the 2014-20 Operational Programmes (OPs), compared with almost EUR 11 billion in 2007-13.

At the same time, the **Commission has increasingly emphasised the role that financial instruments can play in Cohesion policy delivery**. Financial instruments (FIs) take the form of loans, guarantees, equity and other risk-bearing mechanisms, such as mezzanine finance and have long played an important role in domestic policies in some countries, at both national and subnational levels. By contrast, for many Managing Authorities they are relatively new tools for using within their programmes, particularly for ESF, EAFRD and Cohesion Fund programmes, where limited or no use of them was made before 2014-20. In 1994-99 ERDF spend in the form of FIs was estimated at just EUR 300 million rising to some EUR 1.2 billion in 2000-06 (CSES, 2007); the most recent summary of FI spend for 2007-13 shows ERDF and ESF OP commitments to FIs of just over EUR 12 billion (European Commission, 2016a).¹

The 2007-13 programming period saw a new and significant emphasis on the use of FIs as measures to implement Cohesion policy with an initial focus on support for small and medium-sized enterprises (SMEs) and urban development funds; provision was made for the use of FIs in energy efficiency and renewables later in the planning period. The promotion of FIs was justified on the basis that such instruments are sustainable (because any resources returned must be reused for the benefit of similar actions and final recipients in the same programme area), that they generate better quality projects (because funds have to be repaid and commercial expertise can enhance project selection) and that they are a more efficient use of public funds (because private sector monies are leveraged in to supplement public spending). Thus, the overarching rationale for the use of FIs in the context of Cohesion policy is that **facilitating access to finance through the use of repayable instruments contributes to sustainable regional economic growth and**

¹ These figures are simply nominal amounts and take no account of inflation. As such, they should be treated with caution. Nevertheless, it is clear that OP spending commitments on financial instruments are rising.

employment (European Commission, 2012). Underpinning this are three largely distinct premises for intervention (Wishlade and Michie, 2015).

First, FIs are designed to **address market imperfections in the availability of finance**. Publicly-funded FIs are justified on the basis of two main types of market imperfection. One is information asymmetry; that certain types of projects – such as start-ups and new firms in high technology sectors - lack sufficient track records or other information for potential investors to be able to assess risks. Another is that commercial assessments of returns on investment do not necessarily capture all positive externalities or wider social benefits. For example, lack of access to finance may constrain investment in R&D and innovation, leading to suboptimal investment in new technologies that would benefit society more widely; similarly, urban development or energy efficiency projects offer societal gains that justify public intervention, but might not attract commercial funding because of long payback times or uncertain risks.

Second, policymakers may argue that repayable instruments can **improve the quality of investments** (compared to grant-funded projects) because the obligation to repay the investment alters the mind-set of those undertaking projects, and the due diligence deployed in assessing investment proposals involves commercially-oriented expertise. Both these factors, it could be argued, may improve the viability of projects compared to grants.

Third, policymakers may consider that the use of FIs will **increase the cost-effectiveness of public funds** since repayments, including interest and dividends (or the 'non-draw-down' of a guarantee), create a revolving legacy that can be reinvested, and that FIs create mechanisms to draw in private sector finance. This argument has become particularly prominent in the context of the financial crisis which has affected not only public spending, but also the willingness of the private sector to lend and invest.

Crucially, however, the **feasibility of using financial instruments depends on a number of factors**: the capacity of projects to generating cost savings or revenue; the presence of sufficient numbers and scale of viable projects that are not commercially funded; the scope for timely exits and repayments; the costs involved in running repayable funds; and the need for losses and fees not to erode returns.

In 2014-20, the role of financial instruments is being reinforced both in terms of the breadth of policy areas for which they can be used (now open to all thematic objectives addressed by Cohesion policy) and the scale of funding, with the Commission encouraging Member States to double the use of FIs in ESI Funds, in line with the objectives of the Investment Plan for Europe (European Commission 2014a). This had proposed that Member States should:

'commit to increase significantly their use of innovative financial instruments in key investment areas such as SME-support, energy efficiency, Information and Communication Technology, transport and R&D support. This would achieve at least an overall doubling in the use of financial instruments under the European Structural and Investment Funds for the programming period from 2014 to 2020.'

In order to achieve this, Member States are recommended to deliver through FIs a specific percentage of the allocations made in their Partnership Agreements to each of the 'key investment areas':

- 50% in the field of SME support
- 20% in the field of CO₂ reduction measures

- 10% in the field of Information and Communication Technology
- 10% in the field of sustainable transport
- 5% in the field of support for Research Development and Innovation
- 5% in the field of environmental and resource efficiency.

This recommendation was followed-up with a letter to the Member States from the four ESIF DGs in February 2015 and if implemented would imply a rise in overall ESIF FI spend (i.e. all thematic objectives) from around 3.5 percent (EUR 12 billion) in 2007-13 to up to 7 percent (EUR 25 billion) in 2014-20, excluding national cofinancing.

Financial instruments were used for EE and RES in 2007-13, although specific provision was not made for them until part way through the planning period, which likely led to lower levels of FI commitment than might otherwise have been achieved. In 2014-2020, the **Commission has emphasised the role of FIs in the achievement of a low carbon economy** (European Commission, 2015a), and, as noted, a target of 20 percent of spend in the form of FIs has been floated, but the context of OP commitments for EE and RES that are significantly higher than in 2007-13. This implies a very significant increase in the use of FIs for EE and RES.

Against this background, the aim of this study is to provide an analysis of the use of FIs in support of the low carbon economy, and in particular for energy efficiency and renewable energy sources. More specifically, the objectives are to:

- give an overview of the role of Cohesion policy in supporting energy efficiency and renewable energy sources;
- analyse the implementation of FIs in the field and to identify specific challenges and lessons learned; and
- analyse and assess the performance of FIs in this field, including their contribution to broader Cohesion policy goals.

Reflecting these objectives, the study is structured in four main sections, following this introduction. Section 2 sets out the wider policy context for EE and RES. Section 3 provides an indication of the relative scale of past and planned Cohesion policy support for EE and RES. Section 4 examines the experience with cofinanced EE and RES FIs, focusing on a number of case study instruments. Section 5 considers the criteria for 'success' of EE and RES FIs and the broader question of their contribution to regional development goals. Section 6 concludes.

The main body of the report is supported by a number of annexes. These provide both statistical information on EE and RES FIs in 2007-13 and 2014-20, as well as structured information on the selected case study instruments. The case studies, which were agreed in advance with the European Parliament, are:

- Estonia: Renovation Loan for Apartment Buildings (2007-13);
- Slovakia: JESSICA Initiative (2007-13);
- Spain: JESSICA FIDAE (2007-13);
- UK (East of England): Low Carbon Innovation Fund (2007-13);
- France (Auvergne-Rhône-Alpes): OSER (Opérateur de Services Energétiques Régional/ Regional Operator for Energy Services) (2014-20) ;

- Lithuania: Energy Efficiency Fund (ENEF) (2014-20);
- Sweden: Green Fund (2014-20).

The study is based on a mix of desk research and case study interviews. The desk research included a consideration of the relevant literature, covering policy reports such as evaluations, the national energy efficiency and renewable energy action plans and other studies. It also involved analysis of data on spend, or planned spend, using information from the Commission's open data portal, data from the ex post evaluation and Eurostat. Case study interviews were undertaken with Managing Authorities and other stakeholders relevant to the FIs under study.

2. THE ROLE OF THE ENERGY POLICY CONTEXT AND NATIONAL/REGIONAL FRAMEWORK CONDITIONS

Key findings

- The broad context for Cohesion policy FIs for EE and RES in 2014-20 is set by the Europe 2020 targets on greenhouse gases, renewables and energy saving.
- National action plans for EE and RES are the 'point of departure' for determining the nature of ESIF support for energy efficiency and renewables in the OPs.
- Buildings account for 39 percent of energy consumption and offer most scope for efficiencies.
- Energy efficiency obligations schemes and financial incentives are the main instruments used by Member States to achieve energy-saving targets.
- Some 16 percent of energy is derived from renewables, of which biomass is the single largest source; renewables targets range from 49 percent (Sweden) to 10 percent (Malta).
- Feed-in tariffs and premia are the most widely used instruments to encourage RES, the design of these instruments has an impact on private investment which is sensitive to changes in the regulatory framework.
- National contexts (climate, building quality, energy resources and infrastructure) and policies (regulation, budgetary capacity) for EE and RES vary very widely.
- The domestic policy landscape for supporting EE and RES investments is complex and often fragmented, involving a patchwork of national and subnational measures.
- In some countries, especially in central and eastern Europe, there is significant ESIF cofinancing of EE and RES financial incentives (including FIs) included in the action plans, but quantitative data is not always available or easy to compare.
- Overall, there are significant financial barriers to investment in EE and RES, but these vary widely between countries, project types and technologies.

The focus of this study is on financial instruments cofinanced through the European Structural and Investment Funds, but the broader energy policy context and domestic framework conditions play an important part in determining policy choices and their effectiveness. This section begins by outlining the key objectives of EU energy and climate change policies. It then sets the parameters for national energy efficiency and renewable energy policies in the European context, before considering domestic policy responses and the role of FIs in supporting energy efficiency and renewable energy investments.

2.1. EU energy and climate change objectives

The broader context for energy policy is increasingly set by international considerations and commitments relating to climate change. Policy priorities at European and domestic levels have emphasised the importance of improving the **security and sustainability of energy supplies while addressing global climate change objectives** (Global Commission on Economy and Climate, 2016; IEA, 2014a; European Commission, 2010a; European Commission, 2011; European Commission, 2015b). The promotion of energy efficiency and

renewable energy sources are part of the wide-ranging Energy 2020 package (European Commission, 2010b)² which emphasised the need to build a pan-European energy market, implement the Strategic Energy Technology Plan³ (European Commission, 2007), protect consumer rights and safety standards and ensure good relations with external energy suppliers. More recently, the Commission announced a further series of measures and proposals to reinforce the 'clean energy transition' (European Commission, 2016b), with a particular focus on energy efficiency and renewable energy sources (as well as a 'fair deal' for consumers).

A **resource efficient Europe** was one of seven 'flagship' initiatives under Europe 2020 (European Commission, 2010a).⁴ Europe 2020 was launched in 2010 and is the EU's growth strategy for the decade to 2020. It is based around three mutually reinforcing priorities, namely, a smart, sustainable and inclusive economy, which aim to deliver high levels of employment, productivity and social cohesion. This is translated into concrete objectives on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020. Each Member State has adopted its own national targets in each of these areas.

The resource efficient Europe flagship initiative is implemented through a combination of (sometimes existing) mandatory requirements, including those introduced by the Energy Efficiency Directive (EED)⁵ and the Renewable Energy Directive (RED)⁶ as well as EU and domestic initiatives and their coordination. Europe 2020 included the following 'headline' targets:⁷

- to reduce greenhouse gas (GHG) emissions by at least 20 percent;
- to increase the share of renewable energy to at least 20 percent of consumption; and
- to generate energy savings of 20 percent or more.

The commitments and obligations flowing from these initiatives are transposed into widely differing domestic environments, which in turn shape the context for financial instruments for energy efficiency and renewable energy cofinanced through European Structural and Investment Funds.

Though the ultimate objectives of energy efficiency and use of renewable energy sources are clearly linked, the regulatory frameworks underpinning the commitments are distinct, as are the policy tools.

² See also European Parliament (2016a) and European Parliament (2015) for an overview of the package.

³ The so-called SET Plan aims to accelerate the development and deployment of low carbon technologies by coordinating national research efforts in this area and helping finance projects. See: <https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan>

⁴ The other six were: Digital agenda for Europe; Innovation Union; Youth on the move; an industrial policy for a globalisation era; an agenda for new skills and jobs; and European Platform against poverty.

⁵ Directive 2012/27/EU.

⁶ Directive 2009/28/EU.

⁷ With higher targets agreed for 2030 (European Commission, 2014b). For 2030 the aim is to cut greenhouse gases by at least 40 percent compared to 1990 levels, to improve energy efficiency by at least 27 percent and to increase the share of energy from renewables to at least 27 percent.

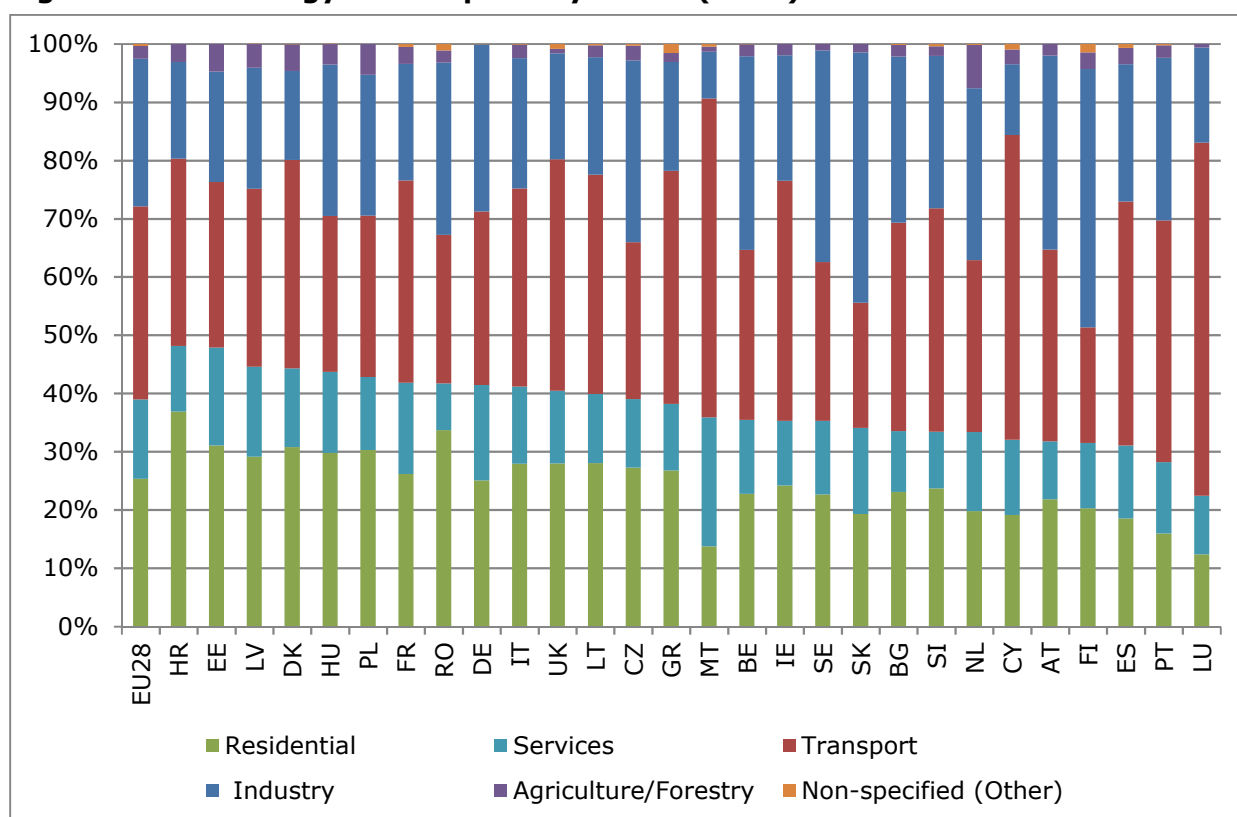
2.2. Energy efficiency

The Energy Union Strategy (European Commission, 2015b) emphasised the need to 'fundamentally rethink' energy efficiency and treat it as an energy 'source' in its own right, while others have pointed to the need to scale up investment in energy efficiency (e.g. IAE, 2014a). The most recent package of Commission proposals involves 'putting energy efficiency first' on the basis that the cheapest and cleanest source of energy is that which does not need to be produced or used (European Commission, 2016b). In considering energy efficiency, subsection 2.2.1 outlines the main areas of energy consumption (and hence the potential for efficiencies). Subsection 2.2.2 reviews the energy efficiency measures provided for in the National Energy Efficiency Action Plans (NEEAPs), which are regarded as the 'point of departure' for determining the nature of support for energy efficiency under the ESI Funds (European Commission, 2014c).

2.2.1. Energy consumption

Energy *consumption* is concentrated in certain areas and activities, though the precise composition varies significantly between countries, depending on characteristics such as climate, demography, sectoral patterns, quality of the housing stock, and so on.

Figure 1: Final energy consumption by sector (2015)



Source: Eurostat

The main areas of energy consumption at the EU28 level are:

- **Buildings (residential and services)**, which account for around 39 percent of final energy consumption, of which most is household consumption (25 percent) and the rest (14 percent) public and private service sector buildings. This aggregate conceals wide variations. For example, in Croatia, residential buildings account for 37 percent of energy consumption, but in Malta the figure is just 14 percent; on the

other hand the service sector in Malta accounts for about 22 percent of energy consumption, while in Romania the figure is just 8 percent.

- **Transport**, which accounts for 33 percent across the EU28, but also shows significant variations between countries, ranging from 61 percent in Luxembourg to 20 percent in Finland.
- **Industry**, which accounts for 25 percent, but as much as 44 percent in Finland and just eight percent in Malta.
- **Agriculture**, which accounts for just two percent across the EU, but rising to over 7 percent in the Netherlands and over 5 percent in Poland.

Final **energy consumption in buildings represents the greatest potential for energy efficiency**. Importantly, however, this segment is far from homogenous from the perspective of energy efficiency investments (EEFIG, 2015). Under the Energy Efficiency Directive⁸ Member States must establish long-term strategies for mobilising investment in the renovation of national building stocks, though a review of these for selected countries suggests that they fall short of what is required (BPIE, 2014).

Within the **transport** sector, cars, vans and trucks account for 77 percent of final energy consumption, air transport some 14 percent, and buses, rail and water transport just two percent. Energy efficiency in transport may come from more efficient vehicles, but also from shifting traffic from private road transport to more energy efficient modes (ODYSSEE-MURE, 2015).

While **industry** accounts for a quarter of energy consumption across the EU, this share varies between countries partly depending on the make-up of the economy. Overall, the chemical industry is the single largest consumer of energy - 19 percent of final consumption by industry (ODYSSEE-MURE, 2015), with steel, non-metallic minerals and food also significant consumers. However, the industrial sector varies considerably by size, as well as energy-intensity, leading to very diverse needs and opportunities for energy efficiency investment (EEFIG, 2015).

2.2.2. Energy efficiency measures

Under the 2012 Energy Efficiency Directive (EED), Member States are required to set indicative national energy efficiency targets⁹ and to introduce energy efficiency obligation schemes (EEOS),¹⁰ or alternative measures,¹¹ with a view to achieving those targets. National priorities for achieving Europe 2020 energy efficiency targets are indicated in the NEEAPs, also required by the EED,¹² which had to be submitted by end April 2014, and updated every three years thereafter. For its part, the Commission evaluates the NEEAPs and the associated annual progress reports and may make recommendations to Member States.¹³

Energy efficiency obligation schemes require energy distributors and or retail energy suppliers to achieve an annual reduction in energy sales by volume to final consumers. To

⁸ Article 4, EED.

⁹ Article 2, EED.

¹⁰ Article 7(2), EED.

¹¹ Article 7(9), EED.

¹² Article 24(2), EED.

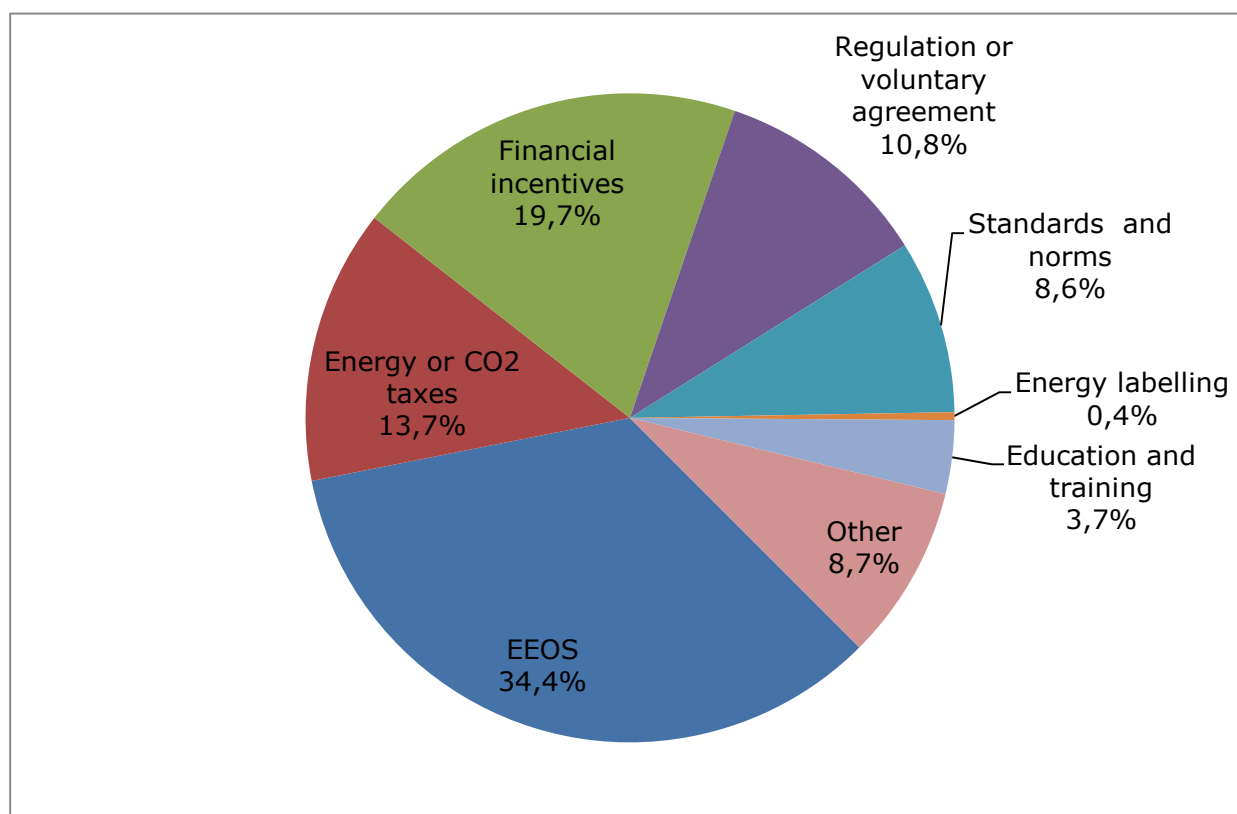
¹³ Article 24(3), EED.

reach this target, energy companies need to undertake measures which support final consumers in improving energy efficiency, such as insulation or installation of double glazing. Member States can also opt to take **alternative policy measures** to achieve their energy-efficiency targets. Under the EED, these may comprise (but are not limited to):

- a) energy or CO₂ taxes that have the effect of reducing end-use energy consumption;
- b) financing schemes and instruments or fiscal incentives;
- c) regulations or voluntary agreements;
- d) standards and norms that aim at improving the energy efficiency of products and services, including buildings and vehicles;¹⁴
- e) energy labelling schemes;¹⁵ and
- f) training and education, including energy advisory programmes.

At the EU level, **energy efficiency obligation schemes are calculated to contribute most to energy efficiency targets**. Indeed, around a third of targets are planned to be met through this mechanism. Financial incentives are the second most important mechanism for securing energy efficiencies.

Figure 2: Contribution of EEOS and alternative measures to energy efficiency targets (EU28)



Source: Own elaboration from data reported in Ricardo Energy & Environment, 2016

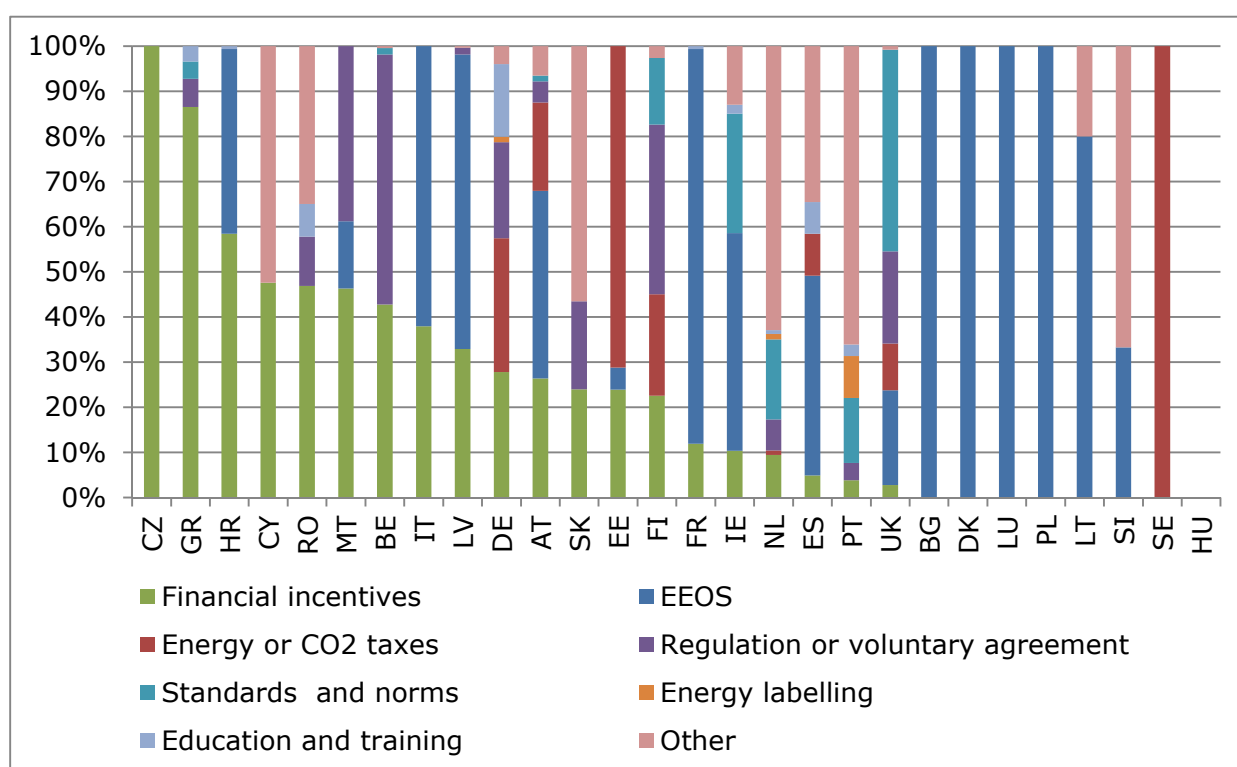
¹⁴ Except where these are mandatory under Union law.

¹⁵ Except where these are mandatory under Union law.

These aggregate figures conceal **considerable diversity in the instruments planned by Member States to achieve their energy-saving targets** (see Figure 3). At Member State level, eight countries rely wholly or mainly on EEOS (Bulgaria, Denmark, Luxembourg, Poland, France, Latvia, Lithuania and Italy), but EEOS are not used at all in 11 Member States.

Overall, financial and other incentives are the second most important instrument. The Czech Republic relies wholly on financial incentives to deliver energy-efficiency targets and in six other countries (Greece, Croatia, Cyprus, Romania, Malta, Belgium) they account for more than 40 percent of planned energy savings.

Figure 3: Contribution of EEOS and alternative measures to energy efficiency targets



Note: There was no return for Hungary.

Source: Own elaboration from data reported in Ricardo Energy & Environment (2016) Study Evaluating Progress in the Implementation of Article 7 of the Energy Efficiency Directive, final report to DG Energy.

2.3. Renewables

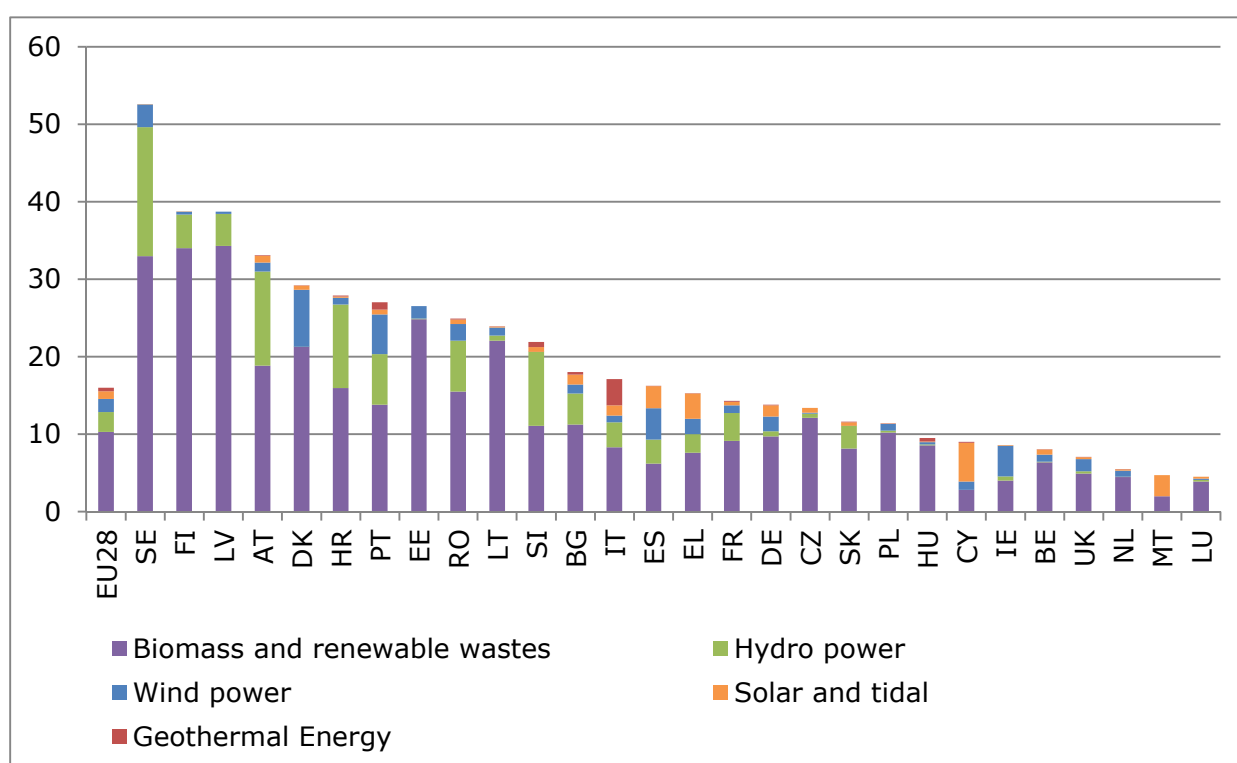
The **use of renewable energy sources is considered a central element of EU energy policy**. It is a key driver in providing clean energy and making the EU the global leader in the use of renewables while contributing to the five dimensions of the Energy union, namely: energy security; market integration; energy efficiency; decarbonisation; and innovation (European Commission, 2017). There are significant differences between Member States in the extent to which renewable sources are used (or available). This section provides a brief overview of renewable sources and target before outlining the key measures through which Member States aim to meet these targets. These are set out in the National Renewable Energy Action Plans (NREAPs) which are regarded as the 'point of departure' for determining the nature of Cohesion policy support for renewable energy investment (European Commission, 2014d).

2.3.1. Renewable energy sources and targets

The main renewable energy sources (RES) are biomass, wind, solar, hydro, tidal and geothermal energy.¹⁶ **At EU level, some 16 percent of gross final energy consumption is derived from renewables**, but levels vary widely around this average, as illustrated in Figure 4. At Member State level, the share of renewable sources in gross final consumption ranges from over 30 percent in Sweden, Finland, Latvia, and Austria, to less than five percent in Malta and Luxembourg; moreover, the composition of RES consumed also varies between countries:

- Biomass and renewable waste is the single largest source of renewable energy across Europe, with the exception of Malta and Cyprus where solar energy is more significant.
- Hydropower is most significant in Austria, Croatia and Slovenia, where it accounts for more than two-thirds of renewable energy.
- Wind power is most significant in Denmark, Spain, Ireland (where it is almost as significant as biomass) and the UK, where it accounts for more than 20 percent of renewable energy sources. However, with the exception of Denmark, the overall share of wind energy in total energy consumption is rather modest.
- The share of renewable energy from geothermal sources is only significant in Italy, where it accounts for almost 20 percent of renewable sources.

Figure 4: Share (%) of renewable energy in gross final energy consumption (2014)



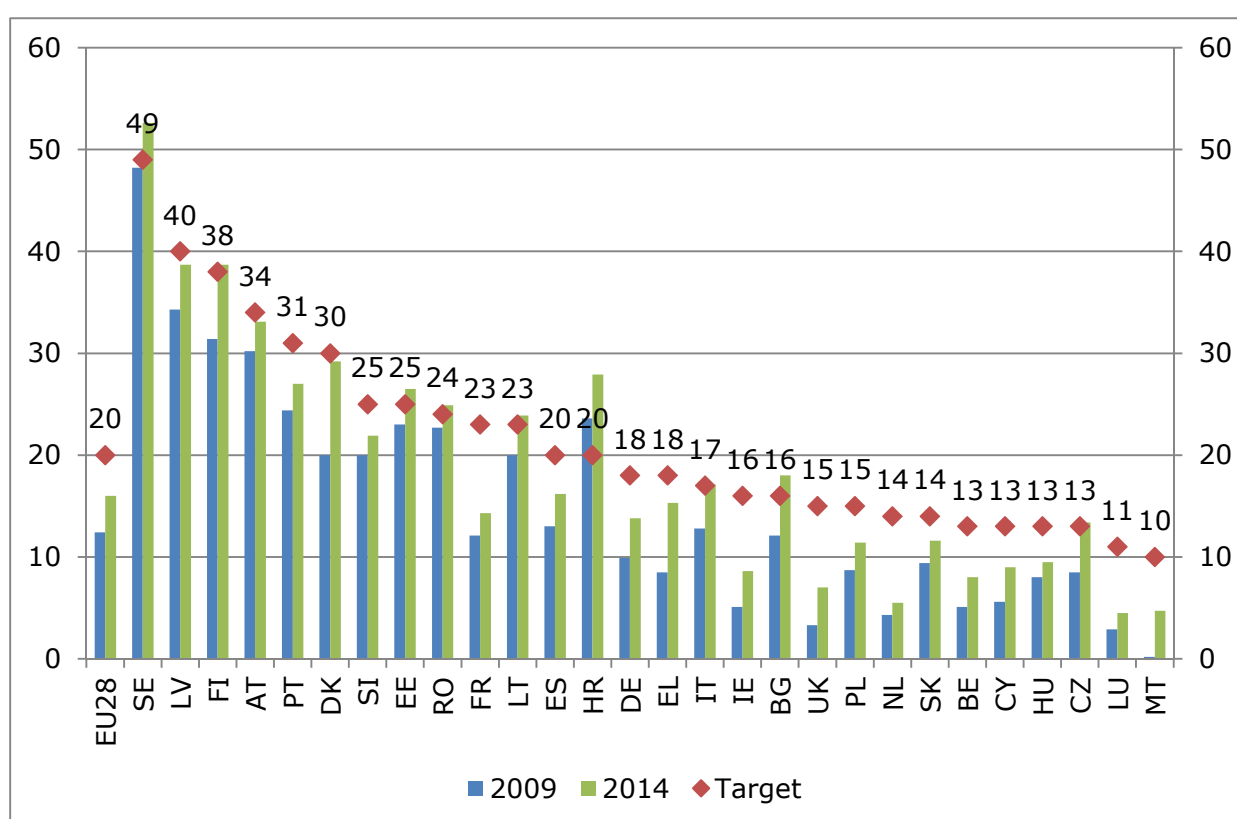
Source: Own calculations from Eurostat data

¹⁶ See: <https://ec.europa.eu/energy/en/topics/renewable-energy>

The 2009 Renewable Energy Directive (RED)¹⁷ establishes an overall policy for the production and promotion of energy from renewable sources. It requires the EU to fulfil at least 20 percent of its energy needs from renewables by 2020 through the achievement of individual national targets.

The targets for renewables vary by country reflecting their initial starting point and the potential for the use of renewables. These range from 49 percent in Sweden and 40 percent in Latvia to 11 percent in Luxembourg and 10 percent in Malta. Progress towards these targets is measured every two years in national renewable energy reports. The targets alongside progress made between 2009 and 2014 are illustrated in Figure 5. This shows that most countries have some way to go to meet their targets.

Figure 5: Share (%) of renewables in gross final energy consumption and RES targets



Source: Eurostat

As mentioned above, national policies for meeting the Europe 2020 targets on the share of RES are set out in NREAPs. These cover:

- the planned mix of renewable energy technologies;
- policy measures to achieve national targets, including cooperation between different tiers of government;
- policies to develop biomass resources; and

¹⁷ Directive 2009/28/EC on the promotion of the use of energy from renewable sources, OJEU L140/16 of 5 June 2009.

- measures to ensure that biofuels used to meet renewable energy targets also comply with EU sustainability criteria.

Progress towards RES targets as measured in national renewable energy reports is reviewed and summarised by the Commission to track the extent to which targets are being met. Reporting on the Europe 2020 RES targets distinguishes between three main areas (European Commission 2017):

- heating and cooling: by 2015 it was estimated that 18.1 percent of these energy needs would have been met through RES;
- electricity: by 2015 it was estimated that 28.3 percent would have been generated through RES; and
- transport: by 2015 it was estimated that just six percent would have been met through RES, set against a specific target of 10 percent for this sector, which is viewed as particularly challenging.

In terms of national targets, all but four Member States, namely Ireland, Luxembourg, the Netherlands and the United Kingdom (for the UK the distance from the target is very small), are projected to meet their 2020 target (European Commission 2017).

2.3.2. Promotion of renewable energy sources

For a number of reasons, **the market does not deliver an optimal level of energy from renewable sources**. In particular, renewable energy often requires significant upfront investment, but in a context where the returns are uncertain. In consequence, it is generally recognised that public intervention is required to correct and counter a number of market and regulatory imperfections. However, the timescale for such intervention varies, partly depending on the maturity of the technologies involved. The policy landscape for the promotion of renewable energy sources is complex; it involves not only a range of regulatory and financial mechanisms, but also the interaction of those mechanisms with other frameworks such as those relating to State aid control.

Policy measures designed to achieve the RED targets are outlined in the NREAPS. A detailed discussion of these is beyond the scope of this report, but some mention is necessary as they are part of the context of ESIF cofinanced financial instruments in this area. The main mechanisms used by Member States are summarised in Table 1.

Table 1: Renewable energy support schemes for electricity

	Feed in Tariffs	Feed in Premia	Quotas	Net-metering	Tax regulation	Subsidies	Loans
AT	✓					✓	
BE			✓	✓		✓	
BG	✓					✓	✓
HR	✓						✓
CY		✓				✓	
CZ	✓	✓				✓	✓
DK		✓		✓		✓	✓
EE		✓				✓	
FI		✓				✓	
FR	✓				✓		
DE	✓	✓					✓
EL	✓				✓	✓	✓
HU	✓					✓	
IE	✓				✓		
IT	✓	✓	✓	✓	✓		
LV	✓						
LT	✓				✓	✓	✓
LU	✓				✓	✓	
MT	✓						
NL		✓		✓	✓	✓	✓
PL			✓		✓		
PT	✓						
RO			✓			✓	
SK	✓				✓	✓	
SI	✓	✓				✓	✓
ES	✓	✓			✓		
SE			✓		✓	✓	
UK	✓		✓		✓		

Source: European Commission 2013c

All Member States use feed-in tariffs, feed-in premia and/or quotas to support the use of renewable energy sources, which can be regarded as the 'major support mechanisms' for renewables (Kitzing *et al*, 2012):

- **Feed-in tariffs** (FiT) can take a variety of forms but the essence is that generators of renewable energy (including householders, businesses, farmers, for example) are paid a cost-based price for renewable energy based on long term contracts.
- **Feed-in premia** are paid as a fixed add-on to the market price (so that the price fluctuates).
- **Quota based systems** oblige producers or suppliers of energy to have a set share of renewables in their portfolio – a quantity-based approach, as opposed to a price-based approach under the 'feed-in' systems.

The aim of these types of support is to mitigate some of the risk associated with RES by providing a degree of subsidy in pricing and / or predictability in volume. Less widely used is **net metering** which enables consumers who generate energy and feed it into the grid to consume energy from the grid with the consumption calculated net of energy generated (though the precise arrangements vary).

In addition, a number of countries operate investment-oriented support in the form of grants and loans for demonstration projects or large scale energy investment projects. Public intervention of this type is distinct from the price/quantity based intervention described above, but reflects the need for intervention to overcome difficulties in accessing finance arising from a range of factors including high upfront costs, high levels of risk, long payback times and regulatory uncertainty.

Importantly, the design and functioning of price/quantity based support has direct implications for the perception of risk in RES investment and hence its attractiveness to private investors. Indeed, according to the IEA (2014b), in the electricity sector, administrative signals or regulated rates of return have become, by far, the most important drivers for investment. That said, 'policy support for renewables remains fickle' and may be dampened by the fall in oil and gas prices (UNEP and Bloomberg, 2016).

In exploring issues of risk and its impact on investment, ECN et al (2016) distinguish three categories:

- Country-specific risk (including the general investment risk in the country as well as the those associated with RES in a specific country);
- Sector specific risks (including the risks associated with RES in general, but specifically those associated with each technology – wind, geothermal, solar etc.);
- Project specific risks (including those associated with the precise location, specific projects contracts and other project promoters).

Based on their analysis of these risks ECN et al/ conclude that:

- Member States RES policies and specifically **the stability of policy and incentive schemes have a significant impact on the cost of capital.**
- **There is not a general problem of access to finance for investment in RES.** Where policy is stable, mature technologies have access to private funding and the cost of this capital may even be relatively low given the wider macroeconomic environment. However, some projects do face barriers to finance, notably those where the technology is less mature and/or those being deployed in less stable RES policy environments.
- When large scale RES projects involving mature technologies reach the operational phase, private investors are usually keen to be involved in refinancing opportunities, but **in the development stages of a project, access to funding is much more problematic.**

In short, what emerges is a variegated picture of the interaction of measures to encourage RES and investment. OECD (2015) notes that:

'There is no shortage of available capital. The challenge for governments is to ensure that public policies and investment conditions facilitate a re-allocation of investment from high-carbon to low-carbon and climate-resilient (LCR) options.'

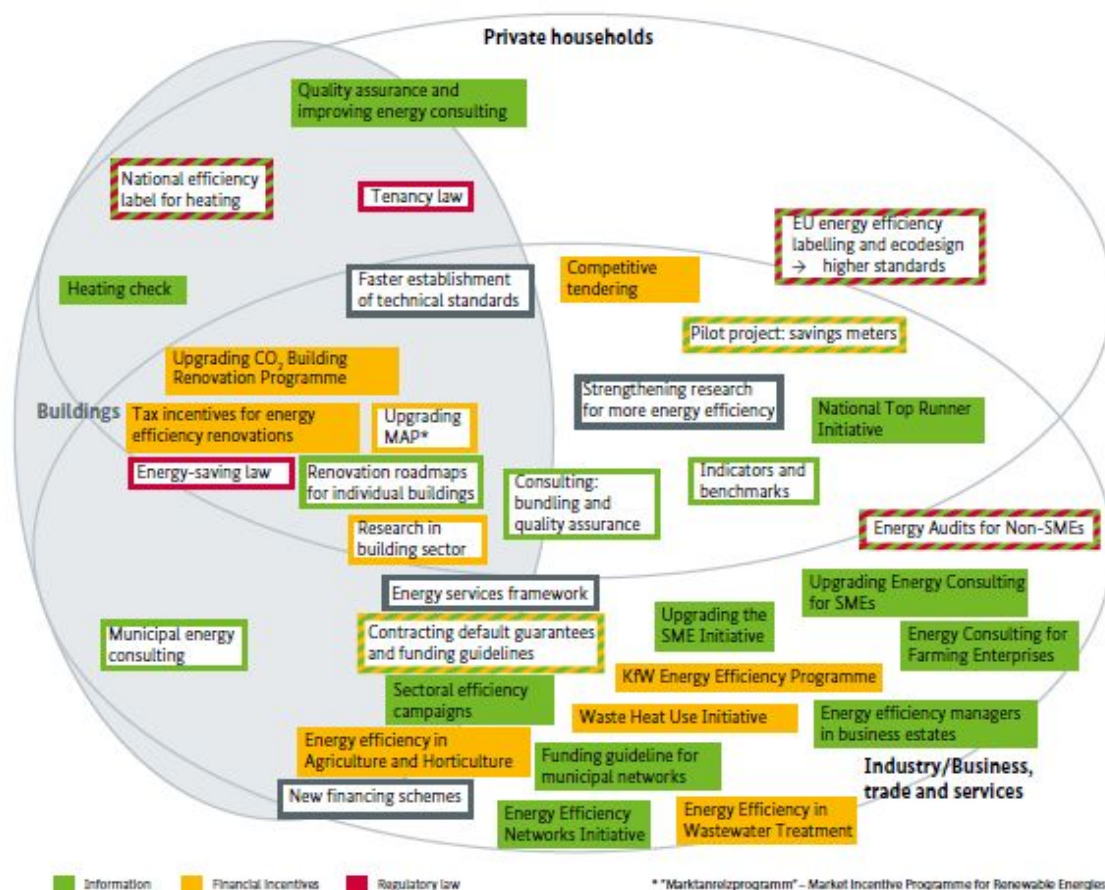
However, while there may not be a *general* problem of capital availability, there is also seen to be a need to *tailor* intervention – Ragwitz et al (2012) conclude that support schemes which are technology specific and which avoid unnecessary risks in project revenues are more effective and efficient than technology neutral support or those with higher revenue risk.

2.4. The domestic context for energy efficiency and renewable energy policy and the use of ESIF in NEEAPs and NREAPs

Reporting under the NEEAPs and NREAPs reveals a **vast array of measures deployed by Member States in pursuit of energy efficiency and renewable energy targets**. In addition, in some countries, there are further measures deployed at regional and local levels which are not all captured. A review of such measures is outside the scope of this report,¹⁸ but it is clear that these action plans reflect a **wide and complex range of measures** – though in practice it seems that most countries do not use the NEEAP as a policy planning tool, but rather as an inventory of measures to report the main successes of national energy efficiency policy (Martins et al, 2012). The role of the NEEAP and NREAP depends on the existing initiatives and strategies on energy efficiency and RES, but typically they are not used as main energy policy planning documents in themselves.

In some countries, measures catalogued in the NEEAPs and NREAPs are part of **comprehensive long-term strategies**. This is the case in Germany, for example. The 2014 German energy efficiency plan provides a good illustration of the range of measures used domestically and their scope of application – see Figure 6.

Figure 6: Energy efficiency policy measures - Germany

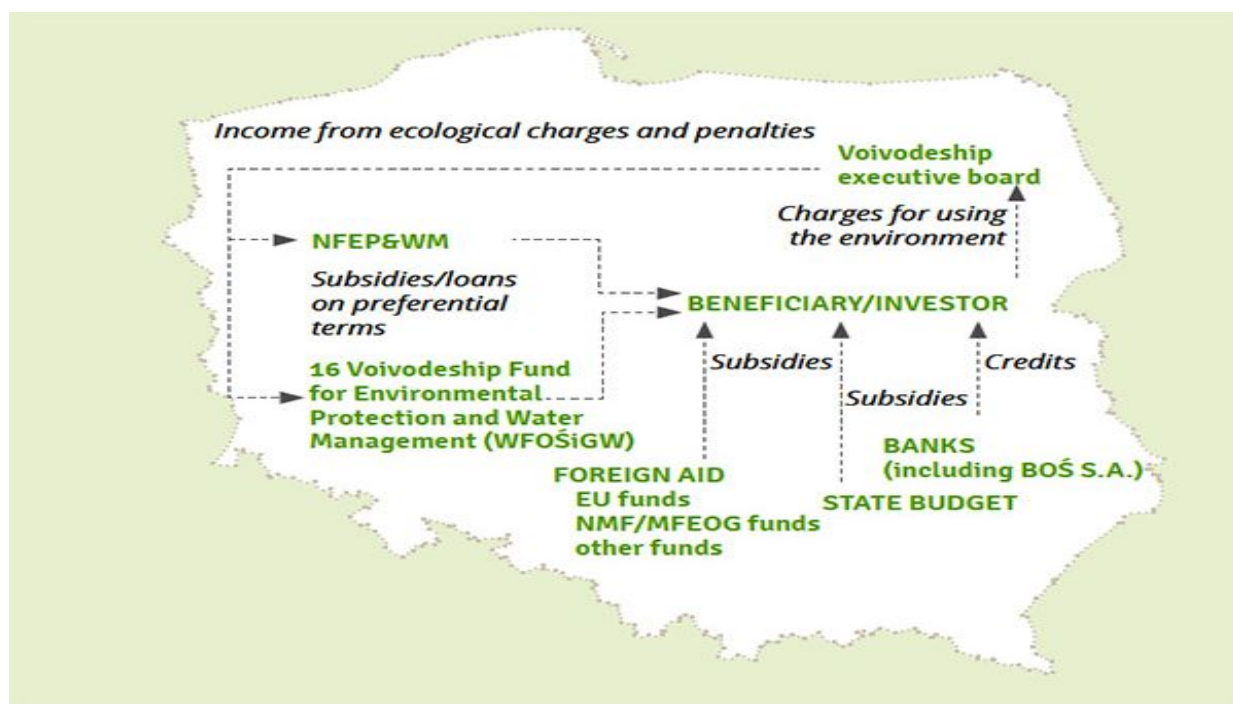


Source: BMWi 2014

¹⁸ But see, for example the Odysee-Mure database on energy efficiency measures: <http://www.measures-odysee-mure.eu/>; the RES legal database on support schemes for renewable energy sources: <http://www.res-legal.eu/>; and more generally the International Energy Authority database: <https://www.iea.org/policiesandmeasures/>; Energy Cities (2014); and Economidou and Bertoldi (2014).

In Poland the national fund for environmental protection provides repayable and non-repayable support for a range of energy efficiency and renewable investments including those in buildings and RES installations and for a range of beneficiaries – public authorities, private individuals and firms.

Figure 7: The financing system for environmental protection in Poland



Source: National Fund for Environmental Protection and Water Management: <http://nfosigw.gov.pl/en/nfepwm/>

The extent to which Cohesion policy funding plays a role in the achievement of EED and RED objectives varies widely between countries, but is also difficult to quantify. This is partly because the emphasis of the EED and RED is on mechanisms for reducing energy consumption (quantified in terms of tonnes of oil equivalent - toe), or increasing RES (measured as a proportion of consumption), rather than on specifying sources of funding in detail. In addition, the NREAPs and NEEAPs are inconsistent in the extent to which they specify levels and forms of spend, and the time periods covered do not necessarily coincide with those for data collected / reported for Cohesion policy. As such, the data cited in this discussion is not necessarily easy to reconcile with OP plans or AIRs where the emphasis is explicitly on spend or planned spend in a given period. Nevertheless, it can be seen that the role of Cohesion policy in NEEAPs and NREAPs is very significant in some countries, especially in central and eastern Europe where ESIF allocations are substantial, but generally negligible or non-existent in countries where Cohesion policy allocations are modest.¹⁹ For example:

- In **Germany, Denmark, Ireland, Luxembourg, the Netherlands, Sweden** and the **United Kingdom**, no mention is made of the use ESI Fund resources in measures to meet EED targets.

¹⁹ For a full set of the latest National Energy Efficiency Action Plans see: <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>; for National Renewable Energy Action Plans see: <https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans>

- Austria and Belgium do use ESIF to cofinance measures reported in the NEEAPs, but these appear comparatively small in scale. For example, in **Austria**, investment subsidies for energy efficiency in production processes, the thermal renovation of existing buildings and heat recovery systems are cofinanced by the ERDF under the Investment in Growth and Employment OP. In addition, energy advice and support programmes are offered at *Land* level especially through ESIF cofinanced programmes. In **Belgium**, the Brussels 'Greenbiz' incubator scheme cofinanced with ERDF in 2007-13 supported start-ups in the fields of environmentally-friendly construction and renewable energy. In **France** the national authorities took advantage of the 2009 extension of eligible expenditure under the ERDF to include energy efficiency in the housing sector, allocating EUR 320 million mainly to complement and supplement existing spend, especially that on the so-called eco-social housing loan. For 2014-20, the NEEAP notes that both the ERDF and the EAFRD earmark funds (EUR 1703 million and EUR 343 million respectively) for thematic objective 4, but the NEEAP does not specify how this will be spent or whether all of the measures concerned would be reported in the NEEAP or NREAP annual reports as contributing to targets.
- In a number of central and eastern European countries the use of ESIF in supporting progress towards energy efficiency and renewables targets is very significant. However, the relative importance of domestic and EU funds is difficult to quantify in terms of increased share of renewables, enhanced energy efficiency or scale of funding. Nevertheless, the examples below provide some indication of how ESIF are used within the context of the NEEAPs, in particular.
 - In **Bulgaria** the 2007-13 Regional Development OP supported investment in energy efficiency in public buildings, including hospitals and educational buildings and enabled investment in the use of renewable energy sources in municipal buildings. In addition, the 2007-13 Rural Development Programme aimed, among other things, at the improvement of living conditions in rural areas by improving access to quality infrastructure. This included supporting the production of renewable energy for use in municipal buildings and services and support for distribution networks for biofuels and heat or electricity produced from biomass or other RES. In 2014-20, the NEEAP for Bulgaria states that such activities will continue to be a priority and that the OP Innovation and Competitiveness will target the improvement of energy efficiency in enterprises through investment in low carbon technologies, systems for the production of RES and energy management systems and some EUR 270 million is earmarked for these activities.²⁰ Under the OP Regions in Growth, EE in municipal buildings will continue to be supported with the aim of saving 31.8 ktoe per annum, while the 2014-20 Rural Development Programme aims at saving some 22.2 ktoe per annum.
 - In **Croatia**, the NEEAP notes that ESIF will cofinance a programme for the energy renovation of family homes, of multi-family housing, of public buildings and energy efficient public lighting.
 - In the **Czech Republic**, as shown in Figure 3, financial incentives are the sole instrument used for achieving energy efficiency targets and Cohesion policy plays a significant part in this. The main instrument for achieving

²⁰ Note that this figure includes both grants and FIs and may also contain funding allocated under so-called multi TO priorities.

energy-saving in industry under the NEEAP is the OP Enterprise and Innovation for Competitiveness, which is allocated some CZK 20 billion (c. EUR 750 million). The Czech NEEAP also notes that JESSICA will contribute to energy targets over the period 2008-2020 by offering long-term loans (up to 30 years) covering up to 90 percent of the costs of upgrading multi-family housing. The Integrated Regional OP for 2014-20 in (Priority 4) supports energy efficient smart energy management systems, energy from renewables in public infrastructure, including buildings and housing. The OPs for Environment in both 2007-13 and 2014-20 are also mentioned in the NEEAP; these have or will support a range of EE and RES activities including deep renovation projects in buildings, heat recovery systems, construction of facilities for using RES and cogeneration.

- In **Hungary** several OPs are cited in the NEEAP. The energy and environment OPs for 2007-13 supported a range of measures including energy efficiency in buildings, modernisation of district heating systems and financed investments in the use of various RES, including biomass, biogas, solar, hydroelectric and wind energy. In 2014-20 support is provided under several OPs: OP Environment and Energy Efficiency, which focuses on the production of 'green' electricity based on distributed energy resources and the modernisation of buildings using a combination of energy efficiency and RES; the OP Regional and Urban Development, which aims to increase EE and the use of RES in local government; and the OP Competitiveness for Central Hungary which supports energy efficiency and use of RES in business, as well as the modernisation of residential buildings in the region. Of particular note, the OP Economic Development and Innovation comprises an FI-only priority which, among other things, supports: development projects among firms to increase energy efficiency and the use of RES; promoting green electricity generation not linked to buildings; and energy modernisation of buildings through combined RES. Also of interest in Hungary, the Rural Development Programme is cited in the NEEAP. This aims to rationalise energy consumption in horticultural facilities, improve the energy efficiency of granaries, and in the animal husbandry and food-processing sectors.
- In **Latvia** and **Lithuania** the NEEAPs make reference to cofinanced schemes for improving energy efficiency in housing; in **Estonia**, reference is made to the renovation loan scheme, but not explicitly to the fact that this is cofinanced by the ERDF, underlining the difficulties in disentangling the relationship between domestic and ESIF spend.
- In **Poland**, the bulk of cofinanced support for the NEEAP comes through the national OP Infrastructure and Environment in 2007-13 and 2014-20; in addition the Regional Operational Programmes all provide support for energy efficiency in public buildings and housing, and most also support EE in SMEs.

Countries also differ in the extent to which energy efficiency strategies and RES are dealt with in tandem, with the former sometimes part of energy policy per se and the latter often linked to ministries for the environment. **Moreover, although energy efficiency and renewables are linked in the rhetoric of the low carbon economy, in practice their pursuit involves aims, targets and constraints, as well as environments that differ widely between and sometimes within Member States.** In particular:

- the quality of the building stock – commercial, public and residential and the extent to which ‘deep’ renovation is required – varies widely, with a concentration of poor quality buildings in central and eastern Europe;
- the scope to develop and harness renewables is partly dependent on the geography and topography of the region; and
- access to finance differs between different target groups (individuals, firms, public authorities) as well as within them and is influenced by the regulatory frameworks for energy and the nature and maturity of financial markets.

These in turn affect the **context for investment** in energy efficiency and renewable energies.

2.5. The role of financial instruments in energy efficiency and renewable energy investments

Meeting the Europe 2020 targets for energy efficiency and renewables requires substantial levels of spend: around EUR 100 billion annually for energy efficiency;²¹ and EUR 60-EUR 70 billion in annual capital expenditure on new RES installations (Ecofys *et al*, 2011). According to the Commission, this investment could be more than returned through annual fuel savings of EUR 175 billion to EUR 320 billion on average per year by 2050 (European Commission, 2011); the positive externalities in energy efficiency and renewables justify public intervention, but the scope for returns on investment, or cost-savings means that FIs are particularly suitable to address barriers to investment (IEEP, 2013).

There is a range of **barriers to investment** in energy efficiency and renewables. These include financial barriers, institutional and administrative barriers, and information and awareness barriers (Ecorys and ECN, 2012; Sorrell *et al*, 2011). Importantly, however, these differ widely depending on a range of factors.

Financial barriers range from a long-standing lack of access to capital in some countries, to others where financial constraints are more temporary and largely attributable to the aftermath of the economic crisis. **Institutional and administrative barriers** faced range from the fundamental – a lack of regulation and a mistrust of government – to a shortage of administrative capacity and skills in the requisite fields. **Information and awareness barriers** arise from low priority being given to energy efficiency in some countries or lack of technical capacity to exploit the resources available. **Energy efficiency projects have specific characteristics** since the return on investment is, in principle, ensured through energy *savings*, rather than an increase in *revenue*, which may be the case for some renewable energy investments. According to Bullier and Milin (2013), this largely explains a **cultural barrier** to investing in energy efficiency among private investors who are ‘trained to support the growth of the project developer’, rather than consider cost optimisation projects where technical issues play an important role in feasibility and profitability. By contrast, some investments in renewables are income-generating (where, for example, they qualify for feed-in tariffs), as opposed to cost saving, though as discussed below investments in different renewable energy sources have different risk profiles.

²¹ DG ENER: <https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency>

It is clear that barriers to investment concern both the drivers of *demand* for energy investment and the *supply* of finance. In addition, they vary by activity and segment. The following examples illustrate some of the **barriers to investment in energy efficiency**.

- *Public buildings* including national or subnational government offices, schools, universities, social housing. In this segment, energy saving investment may be complicated by public procurement processes, the potential for split incentives (with energy savings and capital investment being recorded in different parts of the public accounts and potentially allocated to different departments), as well as being affected by public expenditure constraints and rules surrounding borrowing by local authorities (EEFIG, 2015).
- *Private residential buildings* account for about two-thirds of final energy consumption in buildings. However, this segment is very diverse in terms of building type and whether property is owner-occupied or rented. Initial capital outlays for energy-saving may be high, but returns on investment are over the long-term. This may create a disincentive for home-owners where the repayment period may extend beyond the time they expect to own the property. In addition, in the rental sector there may be split incentives since savings accrue to the occupier rather than the landlord (EEFIG, 2015).
- *Deep renovation of buildings* involving energy-savings of up to 80 percent has payback times of 15-40 years at current energy prices, but is not a major technical challenge; however, there are financial obstacles to such investment, arguably made worse by the focus on measures with shorter payback times, typically generating around 30 percent savings, which tend to create a lock-in effect (Bullier and Milin, 2013).
- *Small and medium-sized enterprises* may not have implemented even basic energy efficiency measures due to lack of management time and capacity, or access to finance. Energy efficiency is rarely the top priority for energy consumers, so that the capital available for such projects is often limited and in turn affects the capacity to attract external finance (Bullier and Milin, 2013).

These market imperfections, coupled with scope for cost-savings make energy efficiency investment a suitable target for publicly-funded support in the form of FIs. That said, public funding through public banks is 'frequently determined by a mix of idiosyncratic institutional arrangements, varied information sets and personal factors, not only by public policy goals' (DIW, 2013). However, as various commentators have observed, public funds *alone* cannot finance all energy efficiency measures needed, but needs to boost private financing to close the investment gap (Deloitte, 2016; Bullier and Milin, 2013; DIW, 2013).

Renewable energy sources typically require large upfront capital investments, but uncertain financial returns over the long-term, and these in turn partly dependent on national policies on issues such as feed-in tariffs.

Among institutional investors, barriers to investment include: problems with infrastructure investment (lack of project pipelines, lack of investor understanding, regulatory barriers); the balance of risk and return; the presence of fossil fuel subsidies and unpredictable or fragmented policy support; and the lack of suitable investment vehicles – nascent and illiquid green bond markets, challenges with securitisation and credit issues (Kaminker and Stewart, 2012).

In addition, however, the risk profile of different types of RES investment varies considerably (Ecofys et al, 2011), for example:

- Wind onshore is perceived to be a comparatively low-risk, mature RES, but recent lending practices appear to have made access to finance more difficult. Moreover, research by Giebel and Breitschopf (2011) suggests that shifting feed-in tariffs towards more market based mechanisms raises financing costs and potentially leads to lower levels of investment.
- Solar is perceived to be low risk from a technological perspective, but sensitive to changes in government policies related to feed-in tariffs and taxation that increase the perceived risk for investors.
- Wind offshore is perceived as a young and comparatively risky; funds are not available on sufficient scale.
- Biomass – traditional thermal treatment is considered 'bankable', but project finance does not have a long track record.
- Concentrated solar power – access to project finance is difficult and only available for commercially proven technology.
- Geothermal energy is a capital intensive technology that can involve several years in planning and installation before energy comes on-stream, increasing the financial risk arising from policy stability in areas such as FiT a key issue (Geoelec, 2013).

There are also **market imperfections in the area of energy technologies** which can inhibit the commercialisation of products and services. This may be due to 'technology push' factors (uncertainties and knowledge divisions around risks and rewards; transition from technical to management and commercial skills; and high capital costs and long timescales) and/or 'market pull factors (economies of scale and experience; misalignment of public and private goals; incompatible public policies and understanding of the full innovation chain). Examples of technologies that are trapped in the 'valley of death' include carbon capture and sequestration plants, small modular nuclear reactors, advanced solar manufacturing facilities, engineered / enhanced geothermal, various utility-scale energy storage technologies, advanced biofuels production facilities and new manufacturing for advanced batteries (Mercure *et al*, 2016).

3. COHESION POLICY SUPPORT FOR ENERGY EFFICIENCY AND RENEWABLES

Key findings

- Cohesion policy is the largest EU source of funds for energy efficiency and renewable energy projects, rising from EUR 10.8 billion in 2007-13 to EUR 29.2 billion in 2014-20.
- Most support for energy efficiency and renewables is in the form of grants.
- In 2007-13 EUR 467 million Structural Funds was paid to financial instruments specifically for EE and RES; further sums were invested through urban development funds (UDFs) but it is not possible to identify the amounts specifically for EE and RES within UDFs.
- Of the EUR 467 million paid to EE/RES specific FIs in 2007-13, only EUR 233 million had reached final recipients by end 2015.
- In 2014-20 over EUR 3 billion (ERDF, CF) across 19 Member States are planned for FIs for low carbon economy; by end 2015 only five EE and RES FIs had had funds paid to them, all in France and Lithuania. These totalled less than EUR 200 million.

This chapter provides an overview of Cohesion policy support for energy efficiency and renewable energy in 2007-13 (Section 3.1) and 2014-20 (Section 3.2). For each period, it outlines the main areas of spend, based on data published by the European Commission notably through the Open Data Portal,²² but also based on output from recent evaluation studies.²³

3.1. Support for energy efficiency and renewable energy sources and the use of FIs in EU Cohesion policy 2007-13

This section reviews Cohesion policy support for energy efficiency and renewable energy sources, before focussing more specifically on the use of financial instruments in these policy areas.

3.1.1. Support for energy efficiency and renewable energy sources in 2007-13

The need to address Europe's intensive use of traditional energy sources through improvements in energy efficiency and renewable energies was included in the Community Strategic Guidelines (CSGs) for 2007-13, under the priority aimed at 'Making Europe and its regions more attractive places in which to invest and work'.²⁴ The guidelines were a framework for Member States and regions to use when developing their Structural Funds programmes. For the ERDF, the following policy priorities were set out in the 2007-13 regulation:²⁵

²² <https://cohesiondata.ec.europa.eu/>

²³ http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/

²⁴ Council Decision 2006/702/EC of 6 October 2006 on Community strategic guidelines on cohesion, OJEU L291 of 21 October 2006.

²⁵ Regulation (EC) No 1080/2006 of the European Parliament and of the Council of 5 July 2006 on the European Regional Development Fund and repealing Regulation (EC) No 1783/1999, OJEU L210/1 of 31 July 2006.

For the Convergence objective:²⁶

energy investments, including in improvements to trans-European networks which contribute to improving security of supply, the integration of environmental considerations, the improvement of energy efficiency and the development of renewable energies.

For the Regional Competitiveness and Employment objective:²⁷

stimulating energy efficiency and renewable energy production and the development of efficient energy management systems.

Early assessments of energy-related expenditure suggested that allocations would be around EUR 10.8 billion (about 3.1 percent of the Cohesion policy total), of which EUR 4.8 billion for renewable energy sources and EUR 4.2 billion for energy efficiency.²⁸

Table 2: Energy-related allocations under Cohesion policy 2007-13

	Allocations as at 2010	Allocations as at 2014
Renewable energy sources	EUR 4.800 billion	EUR 3.780 billion
Energy efficiency	EUR 4.200 billion	EUR 6.895 billion
TEN-E	EUR 0.674 billion	EUR 0.620 billion
Other	EUR 1.026 billion	EUR 0.698 billion
Total	EUR 10.814 billion	EUR 11.992 billion

Note: The allocations concerned are those made under the following categories of expenditure (as defined in Regulation 1083/2006, Annex IV included are 33-43; data concern EU funds only, not national cofinancing. 'Other' includes expenditure on TEN-E projects, as well as electricity, gas and petroleum.

Source: Own calculations from DG Regio SFC2007 data dated May 2010 and http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/

More recent data suggests that the sums allocated by 2014 amounted to 3.9 percent of EU Cohesion policy allocations – almost EUR 12 billion. In addition, significantly higher amounts appear to have been allocated to energy efficiency than initially anticipated (see Table 2). This may partly be a reflection of the emphasis placed by the European Economic Recovery Plan on investments in energy efficiency in buildings. This culminated in an amendment to the ERDF Regulation enabling up to four percent of national ERDF amounts to be invested in energy efficiency and renewables in existing residential buildings.²⁹

At the EU level, by 2014, around 2.3 percent of Cohesion policy allocations were for energy efficiency, and around 1.2 percent for investments in renewable energy sources (see Figure 8).

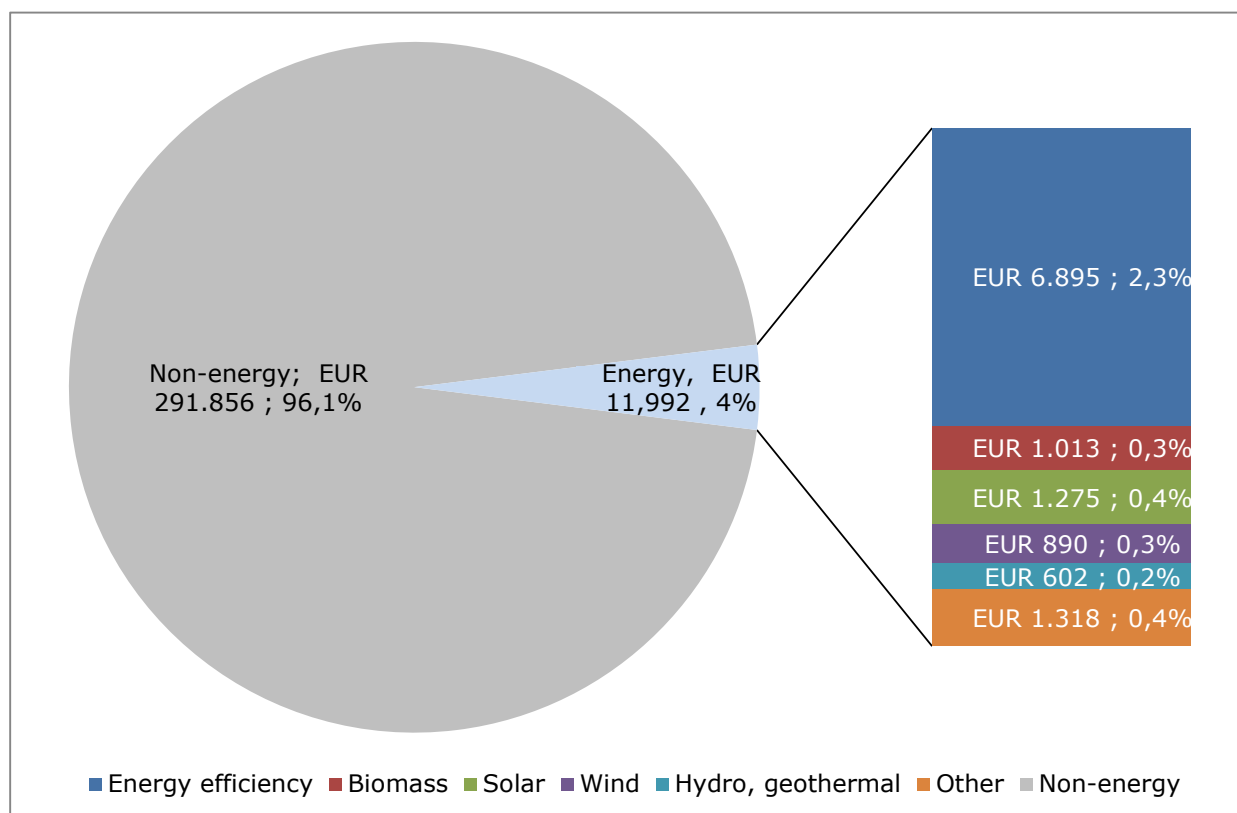
²⁶ Regulation 1080/2006, Article 4(9).

²⁷ Regulation 1080/2006, Article 5(2)(c).

²⁸ The definition of energy-related expenditure is not entirely straightforward. For example, under the R&D priority theme, there is scope for energy-related expenditure under Category 6, which supports the development of environmentally-friendly products and processes by SMEs, and which is not included in the data discussed here. Similarly, support for 'clean urban transport' under Category 52 could arguably be relevant too.

²⁹ Regulation (EC) No 397/2009 of the European Parliament and of the Council of 6 May 2009 amending Regulation (EC) No 1080/2006 on the European Regional Development Fund as regards the eligibility of energy efficiency and renewable energy investments in housing.

Figure 8: Energy-related allocations under Cohesion policy 2007-13 by 2014 (EUR million)



Note: The allocations concerned are those made under categories of expenditure 33-43 (as defined in Regulation 1083/2006, Annex IV); data concern EU funds only, not national cofinancing. 'Other' includes expenditure on TEN-E projects, as well as electricity, gas and petroleum. These data refer to allocations made by end 2014; however, the full picture on expenditure will only be known when the final closure figures become available.

Source: Own calculations from: http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/

At the national level, **the extent to which Cohesion policy is focused on energy-related policies varies** widely both in absolute terms and as a percent of overall Cohesion policy funding. This is reflected in Figure 9, which shows that:

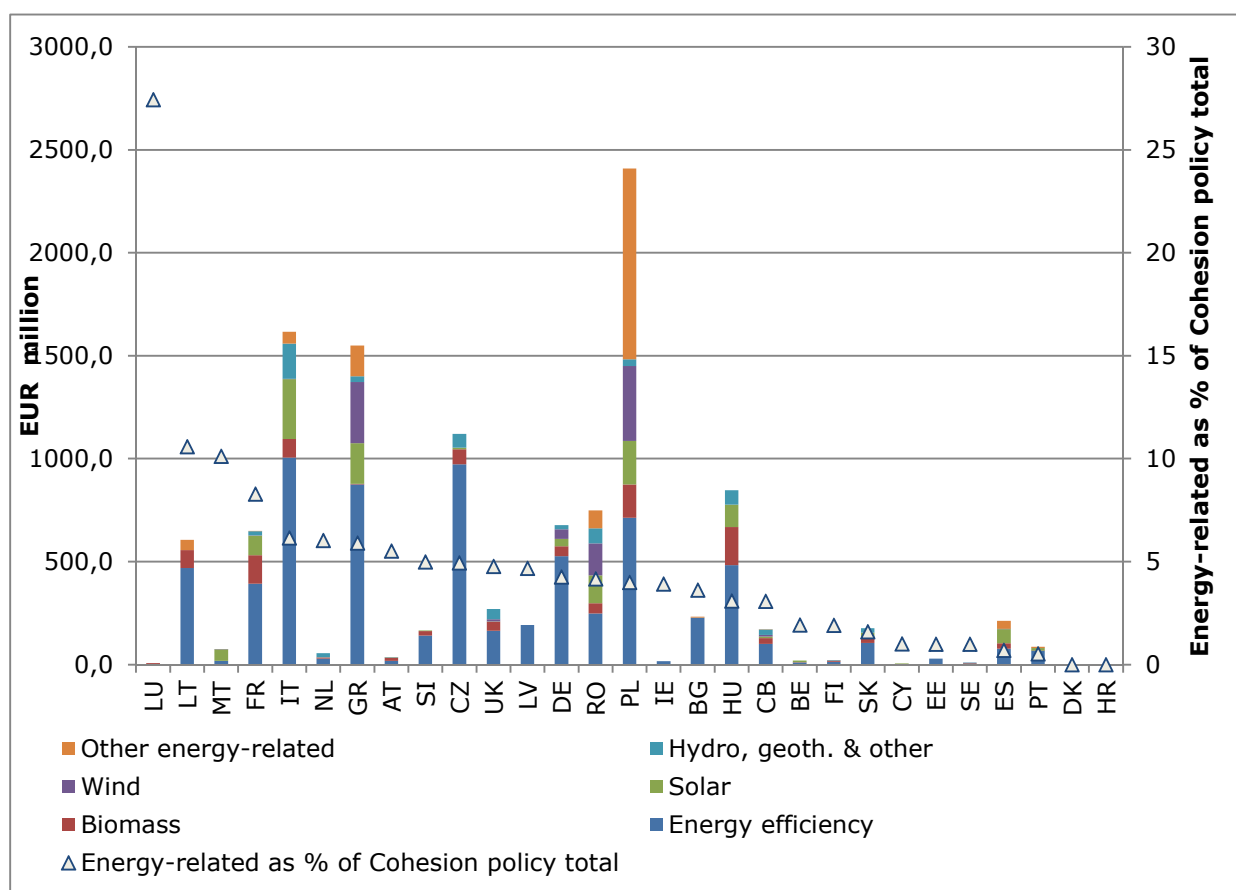
- three Member States (Luxembourg, Lithuania and Malta) **allocated more than 10 percent of total Cohesion policy funds to energy-related investments**. However, in absolute terms these allocations are rather modest.
- the sums allocated in countries with larger Cohesion policy allocations overall are much more significant – namely in Poland, Greece, Italy and the Czech Republic – where **allocations to energy-related investment exceed EUR 1 billion**.
- At the opposite end of the spectrum, Denmark and Croatia did not allocate any Cohesion policy funds to energy-related investments in 2007-13.

The **composition of expenditure on energy-related investment also varies** between countries:

- In some, **more than 75 percent of spend was on energy efficiency** – Lithuania, Slovenia, Czech Republic, Latvia, Germany, Ireland, Bulgaria, Estonia and Portugal.
- In others, **over 70 percent of energy spend was on renewables** – Luxembourg (all biomass), Malta (almost all solar), Cyprus (all solar) and Sweden (mainly biomass, but wind also significant).

- In Poland, which had the highest spend on energy-related investment, over 38 percent was accounted for by TEN-E projects or investment in other energy sources (electricity, gas or petroleum).

Figure 9: Energy-related allocations under Cohesion policy 2007-13 by 2014 (by Member State)



Note: The allocations concerned are those made under categories of expenditure 33-43 (as defined in Regulation 1083/2006, Annex IV); data concern EU funds only, not national cofinancing. 'Other' includes expenditure on TEN-E projects, as well as electricity, gas and petroleum.

Source: Own calculations from: http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/

3.1.2. Financial instruments for energy efficiency and renewable energy sources in 2007-13

Financial instruments³⁰ were provided for under Article 44 of the 2006 Structural Funds Regulation³¹ – the **General Regulation** – with some provisions in the so-called

³⁰ In 2007-13, regulatory provisions referred to 'financial engineering instruments'; for 2014-20, 'engineering' has been dropped from the terminology, though there is no change in meaning between the two periods. This study uses the newer terminology – 'financial instruments'.

³¹ Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999 (OJ L 210, 31.7.2006, p. 25), amended by: Council Regulation (EC) No 1989/2006 of 21 December 2006 OJ L 411 6 30.12.2006; Council Regulation (EC) No 1341/2008 of 18 December 2008 OJ L 348 19 24.12.2008; Council Regulation (EC) No 284/2009 of 7 April 2009 OJ L 94 10 8.4.2009; Regulation (EU) No 539/2010 of the European Parliament and of the Council of 16 June 2010 OJ L 158 1 24.6.2010; Regulation (EU) No 1310/2011 of the European Parliament and of the Council of 13 December 2011 OJ L 337 1 20.12.2011; Regulation (EU) No 1311/2011 of the European Parliament and of the Council of 13 December

Implementing Regulation.³² However, these original legislative provisions were both brief and general, and they gave little guidance on issues specific to FIs, as opposed to non-repayable support. As a result, the General and Implementing Regulations (hereafter 'Structural Funds Regulations') were supplemented both by amending Regulations and by four sets of **COCOF 'guidance notes'**³³ issued under the auspices of the Coordination Committee of the Funds.³⁴

The General Regulation indicated that OP contributions could be used for financial products such as loans, guarantees and equity in certain policy areas. More specifically, Article 44 (as amended) envisaged that:

'As part of an operational programme, the Structural Funds may finance expenditure in respect of an operation comprising contributions to support any of the following:

- a) financial engineering instruments for enterprises, primarily small and medium-sized ones, such as venture capital funds, guarantee funds and loan funds;³⁵
- b) urban development funds, that is, funds investing in public-private partnerships and other projects included in an integrated plan for sustainable urban development;³⁶
- c) funds or other incentive schemes providing loans, guarantees for repayable investments, or equivalent instruments, for energy efficiency and use of renewable energy in buildings, including in existing housing.'

The Regulation enabled these contributions to be provided through holding funds (HF),³⁷ which in turn comprised one or more specific funds (SHF) or directly through specific funds

2011 OJ L 337 5 20.12.2011; Regulation (EU) No 423/2012 of the European Parliament and of the Council of 22 May 2012 OJ L 133 1 23.5.2012; Regulation (EU) No 1297/2013 of the European Parliament and of the Council of 11 December 2013 OJ L 347 253 20.12.2013; Regulation (EU) No 1298/2013 of the European Parliament and of the Council of 11 December 2013 OJ L 347 256 20.12.2013 and by the Treaty of Accession of Croatia (2012) OJ L 112 10 24.4.2012.

³² Commission Regulation (EC) No 1828/2006 of 8 December 2006 setting out rules for the implementation of Council Regulation (EC) No 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and of Regulation (EC) No 1080/2006 of the European Parliament and of the Council on the European Regional Development Fund OJ L 317/24 30.11.2011 and Commission Implementing Regulation (EU) No 1236/2011 of 29 November 2011 amending Regulation (EC) No 1828/2006 as regards investments through financial engineering instrument OJ L 317/24 30.11.2011.

³³ Note of the Commission Services on Financial Engineering in the 2007-13 programming period, DOC COCOF/07/0018/01-EN FINAL of 16 July 2007; Guidance Note on Financial Engineering, COCOF 08/0002/03-EN of 22 December 2008; Guidance Note on financial Engineering Instruments under Article 44 of Council Regulation (EC) No 1083/2006, COCOF_10-0014-04-EN of 21 February 2011; Revised Guidance Note on Financial Engineering Instruments under Article 44 of Council Regulation (EC) No 1083/2006. Revised version COCOF_10-0014-05-EN of 8 February 2012.

³⁴ In 2007-13, COCOF was a standing committee of the European Commission attended by officials from Member States. It had management and consultative powers and regularly produced notes that provide guidelines for the implementation of the Funds (Art. 103 and 104 of (EC) Council Regulation No 1083/2006). For 2014-20, COCOF has been replaced by the Coordination Committee for European Structural and Investment Funds (COESIF) and the Group of Experts in Structural and Investment Funds (EGESIF).

³⁵ These were sometimes referred to as JEREMIE, typically, but not systematically, when the European Investment Fund was involved in their design or implementation.

³⁶ These were usually referred to as JESSICA funds.

³⁷ Known as 'funds of funds' in the Common Provisions Regulation (CPR) which applies from 2014-20 - (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

outside holding funds (NHF). These specific funds (i.e. SHF and NHF) could in turn provide one or more financial products (loans, guarantees and equity, and variants and combinations of these) to final recipients.

While it is clear that **most expenditure on energy efficiency and renewable energy sources in 2007-13 was in the form of grants**, it is not possible to identify precisely how much support for EE and RES was in the form of FIs. This is because, although Article 44(c) of the Structural Fund Regulation made explicit provision for EE and RES FIs, it is also possible for EE and RES to have been supported under Article 44(a) or 44(c), though the extent of this cannot be determined.

Article 44(a) provides for support for enterprises, especially SMEs, and FIs under this provision could be used (in whole or in part) for energy-efficiency investments in industry or for the development of new technologies involving renewables – one such example is the Low Carbon Innovation Fund in the East of England OP (UK), which is a case study in this report.

In addition, although the focus of Article 44(b) was on urban development, this could include investment in energy efficiency measures or the use of renewables, particularly in the period before Article 44 was amended explicitly to include these areas as policy targets.³⁸ This had followed on from changes to the Implementing Regulation in the wake of the financial crisis which had enabled Member States to increase energy efficiency investments in existing housing to up to four percent of ERDF allocations. Nevertheless, it is apparent that some energy-related investments took place under Article 44(b) in the context of urban development funds (ARUP, 2012).

Article 44(c) FIs were implemented in 10 Member States. The number of funds set up varies widely between countries, from 11 FIs in the UK to just one each in Estonia, Germany and Greece. Overall, some EUR 666 million in OP contributions (Structural Funds and national monies) were paid into specific funds or holding funds for the purposes of energy efficiency or renewable energy investments. Of this, EUR 467 million were Structural Funds resources. As such, **FIs represented a very small share (less than four percent) of Cohesion policy allocations to energy efficiency and renewables** which, by 2014, amounted to around EUR 12 billion for 2007-13 (see Table 2).

By the end of 2015 **only about 53 percent of total OP contributions (EUR 666 million) paid to FIs had been invested in final recipients (EUR 352 million)**; this corresponds to 45 percent of Structural Funds contributions to FIs, or around EUR 204 million. These funds are almost entirely in the form of loans.³⁹

The scale of the funds paid to FIs, the number of financial products offered and the extent to which the funds allocated were actually invested in final recipients varies very widely (see Annex 1 for full details):

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 and repealing Council Regulation (EC) No 1083/2006, OJ L347/320 of 20.12.2013.

³⁸ Regulation (EU) 539/2010 amending Regulation 1083/2006, OJEU L 158/1 of 24 June 2010.

³⁹ The data discussed here has been taken from the latest Summary report published by the Commission (2016a). This information is in turn drawn from annexes to the Annual Implementation Reports submitted by Managing Authorities. This information is often incomplete or inconsistent, so the data should be treated with caution.

- In **Germany, France** and the **Netherlands**, the **scale of OP contributions paid to financial instruments was extremely modest**. Moreover, the extent to which this funding reached final recipients appears rather limited: no information is available for France; in the Netherlands, less than half of the amounts paid to holding funds or specific funds seems to have been invested in final recipients, while the figure in Germany is less than nine percent.
- In **Spain**, seven of the eight funds involved less than EUR 2 million, but a single fund implemented in Andalucía was paid over EUR 85 million, though it had invested only EUR 31.5 million (in four projects) by end 2015.
- In **Estonia, Greece** and **Slovakia** there were **comparatively large funds for FIs**, and large numbers of recipients. In Greece, the average investment in final recipients is below EUR 2 000, reflecting the focus of the fund on housing. In Estonia the fund is fully invested, while in Slovakia one of the funds appears not to have made any investments, while the other two had invested just over half in final recipients by end 2015.
- In the **United Kingdom** there were 11 funds in total, but nine of these were within the West Midlands regional OP, presenting a somewhat fragmented picture in that region. In **Italy** there were also several funds operating within one region (Lazio), but there is only limited information overall on the extent to which funds were invested in final recipients and in what form.

Table 3: 2007-13 FIs for EE and RES under Article 44(c)

	Total OP contributions (MEUR)		Products offered	Structural Fund OP contributions (MEUR)				
	Paid to HF or NHF	Invested in final recipients		Paid to HF or NHF	Loans	Guarantees	Equity	Other
DE	5.90	0.51	4	5.90	0.51	0	0	0
DK	17.09	18.62	26	6.83	3.82	0	2.80	0
EE	66.71	66.71	639	17.74	17.74	0	0	0
ES	91.76	37.55	60	73.41	15.22	0	4.24	10.57
FR	5.76	n/a	n/a	0.35				
GR	85.15	75.83	45 918*	85.15	66.09	0	0	12.21
IT	100.97	25.67	51	45.76	2.11	0.01	0	0
NL	7.75	4.89	164	3.78	2.05	0	0	0
SK	244.71	100.19	558	208.00	85.17	0	0	0
UK	40.04	22.57	1 777	20.13	11	0	0	0
Total	665.84	352.54	49 197	467.05	203.71	0.01	7.04	22.78

Note: For some funds, information on the number of products offered and the amounts invested in final recipients is not available. This is the case for one of the two Danish funds, both French funds, four of the six Italian funds, and one of the 11 UK funds. The data available on each fund is provided in Annex I. 'Other products' refers to interest rate and guarantee fee subsidies associated and combined with ERDF cofinanced loans or guarantees in a single financial package.

*The high number in the case of Greece is due to the final recipients being individual households.

Source: European Commission, 2016a.

3.2. Support for energy efficiency and renewable energy sources and the use of FIs in EU Cohesion policy 2014-20

3.2.1. Support for energy efficiency and renewable energy sources in 2014-20

Energy efficiency and renewable energy sources **remain a priority in 2014-20**. To help address gaps in relation to Europe 2020 headline targets, the Commission recommended that Member States prioritise growth-friendly expenditure, including on energy, as well as meeting climate change objectives.⁴⁰ The Common Provisions Regulation sets out a series of thematic objectives for the ESI Funds.⁴¹ Thematic objective 4 (TO4) is 'Supporting the shift towards a low carbon economy in all sectors'. The following **investment priorities relating to thematic objective 4** were specified for the ERDF and Cohesion Fund:⁴²

- a) promoting the production and distribution of energy derived from renewable sources;
- b) promoting energy efficiency and renewable energy use in enterprises;
- c) supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector;
- d) developing and implementing smart distribution systems that operate at low and medium voltage levels;
- e) promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures;
- f) promoting research and innovation in, and adoption of, low-carbon technologies (ERDF only); and
- g) promoting the use of high-efficiency co-generation of heat and power based on useful heat demand.

A series of **targets relating to concentration of resources** are specified, including that at least 20 percent of total ERDF resources at national level must be allocated to thematic objective 4 in the more developed regions, and at least 15 percent in transition regions and 12 percent in less developed regions. Cohesion Fund resources can be used by less developed regions to achieve the minimum fund allocation to thematic objective 4, in which case the minimum percentage of funding directed to the objective increases to 15 percent (European Commission, 2014b).

In line with the emphasis on the low carbon economy, **planned expenditure on energy efficiency and renewables in the OPs is substantially higher in 2014-20 than in**

⁴⁰ Commission Staff Working Document (2012) Elements for a Common Strategic Framework 2014 to 2020 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 SWD (2012) 61 final.

⁴¹ Article 9, 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 and repealing Council Regulation (EC) No 1083/2006.

⁴² Article 5, Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006.

2007-13, both in absolute terms and as a proportion of overall spend. An overview of planned spend in the two periods suggests an increase of almost EUR 20 billion in energy-related expenditure (see Table 4). Of this, almost EUR 10 billion is accounted for by increases in energy efficiency spend, and about EUR 1 billion by increases in spend on renewables. However, direct comparisons are complicated by the presence of a more fine-grained approach to the definition of so-called 'intervention fields' in 2014-20, with the result that relevant expenditure may be underestimated for 2007-13: the intervention fields in the 2014-20 ESI Fund rules⁴³ provide a more disaggregated breakdown of spend, especially in relation to investments by SMEs or in R&D&I related to EE and RES. As a result, some EUR 8.3 billion of planned expenditure can be identified for such investments in 2014-20 **which, in 2007-13, were contained in broader expenditure categories and cannot be quantified.**

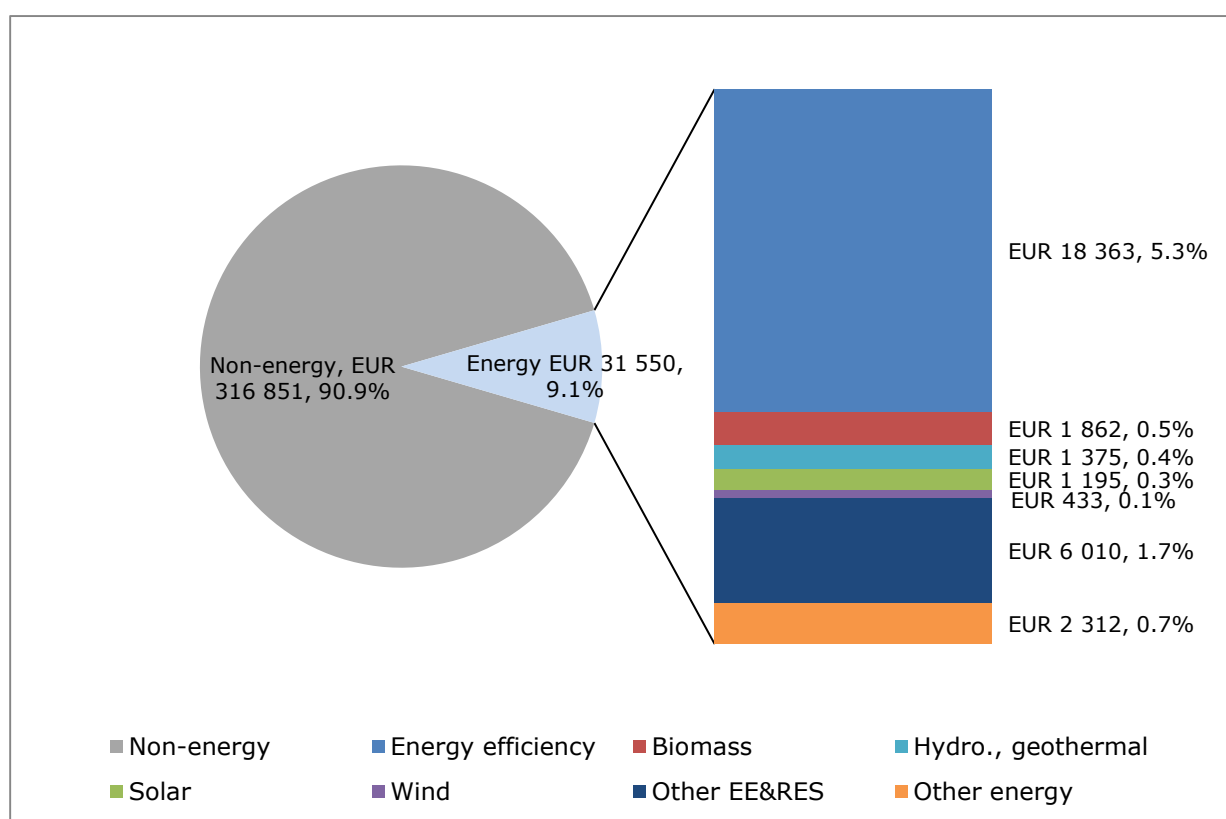
⁴³ Commission Implementing Regulation (EU) 215/2014 laying down rules for implementing Regulation (EU) No 1303/2013, with regard to methodologies for climate change support, the determination of milestones and targets in the performance framework and the nomenclature of categories of intervention for the European Structural and Investment Funds, OJEU L69/65 of 8 March 2014.

Table 4: Energy-related allocations under Cohesion policy 2007-13 and 2014-20 (EUR m)

Intervention field (2014-20 definition)	2007-13	2014-20
Energy efficiency renovation of public infrastructure		7 910
Energy efficiency renovation of existing housing stock		5 420
Intelligent Energy Distribution Systems		1 084
High efficiency co-generation and district heating		1 652
Total energy efficiency	6 895	16 066
Renewable energy: wind	890	433
Renewable energy: solar	1 275	1 195
Renewable energy: biomass	1 013	1 862
Other (including hydroelectric, geothermal & marine)	602	1 375
Total renewables	3 780	4 865
Research & innovation focusing on low carbon economy		2 113
Energy efficiency and demonstration projects in SMEs		2 744
Support for environmentally-friendly production processes & resource efficiency in SMEs		2 345
Promotion of energy efficiency in large enterprises		637
Development of enterprises specialised in low carbon economy related services		336
Productive investment in large enterprises linked to low-carbon economy		132
Total other EE & RES		8 307
Electricity (generation, storage and transmission)	200	1 277
Electricity (TEN-E)	215	105
Natural gas	497	462
Natural gas (TEN-E)	405	468
Total other energy	1 317	2 312
TOTAL	11 992	31 550

Source: Own calculations from: http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/ and <https://cohesiondata.ec.europa.eu/>

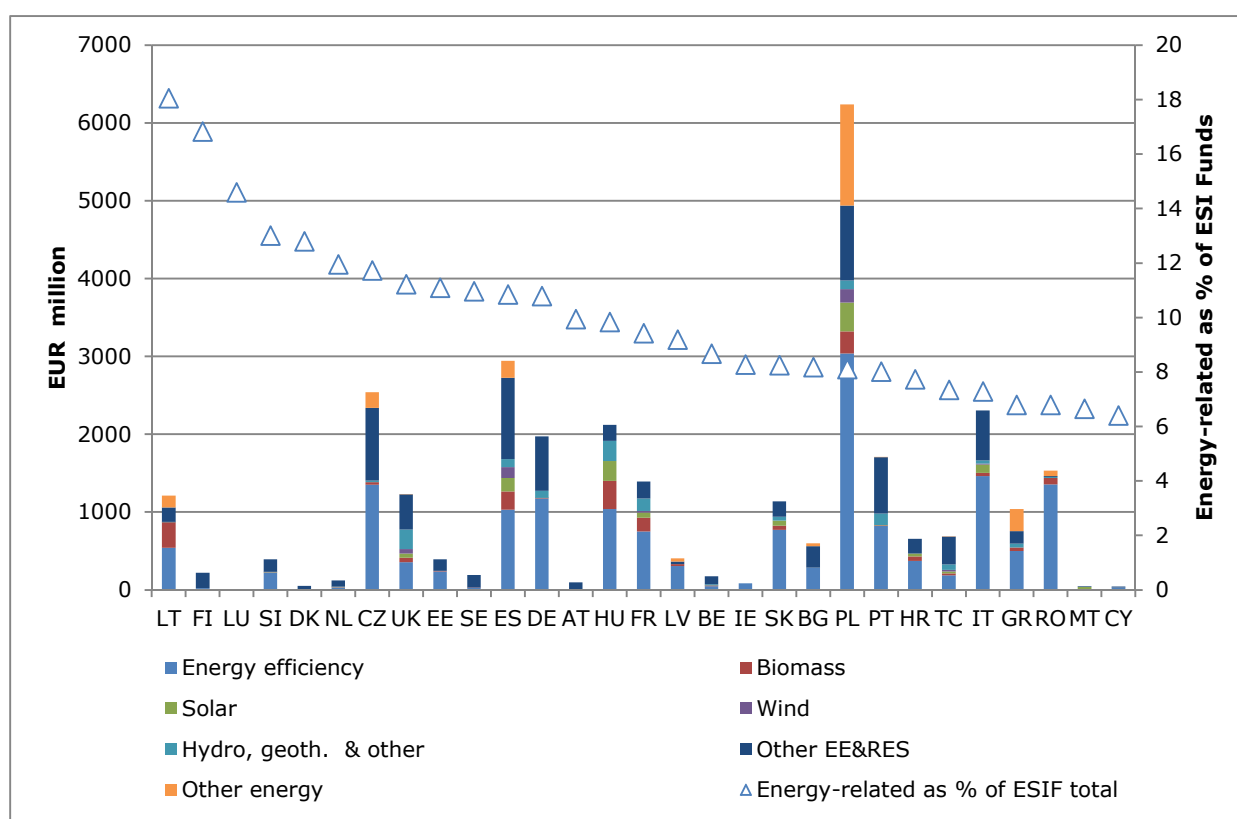
Reflecting the absolute increases in spend, the **share of planned spend on EE and RES in the overall budget has also increased** – from less than four percent in 2007-13 to over nine percent in 2014-20. As explained above, these figures should be treated with caution given changes in the categorisation of expenditure, nevertheless, it is clear that, overall, EE and RES are significantly more important areas of spend in 2014-20 than in 2007-13.

Figure 10: Energy-related allocations under ESI Funds 2014-20 (EUR million)

Source: Own calculations from: <https://cohesiondata.ec.europa.eu/>

As in 2007-13, however, there are **significant variations between countries** in terms of levels of planned spend on energy-related policy. This is illustrated in Figure 11 which shows that 13 countries plan to spend more than 10 percent of ESI Fund allocations in this area, compared with just three countries spending at this level in 2007-13. As before, the picture is somewhat distorted by the sheer scale of funds in some Member States, with Czech Republic, Spain, Hungary, Poland and Italy committing over EUR 2 billion on energy-related policies in 2014-20.

For the most part, these levels of expenditure reflect **very significant increases in spend on EE and RES between the two periods**, even setting aside 'other EE and RES' which were not categorised separately in 2007-13. This is particularly so in Portugal, Spain, Estonia, Slovakia, Ireland and Cyprus, though the *absolute* amounts are modest in the latter due to the overall size of the programme. At the opposite end of the spectrum, however, some countries anticipate *reductions* in EE and RES spend compared to 2007-13 – this is the case for Greece, Luxembourg and Malta; these were, however among the higher spenders on EE and RES in 2007-13 (as a proportion of overall Cohesion policy spend – see Figure 9). It is not clear what lies behind these reductions in spend, though in all three countries Cohesion policy allocations declined between the two periods.

Figure 11: Energy-related allocations under ESI Funds (by Member State)

Source: Own calculations from: <https://cohesiondata.ec.europa.eu/>

3.2.2. Financial instruments for energy efficiency and renewable energy sources in 2014-20

The 2014-20 regulations **extended the scope to use financial instruments** to all thematic areas. Moreover, after the launch of the Investment Plan for Europe in 2014, Member States were recommended to earmark **up to 20 percent of the allocations** for low carbon economy to FIs, though this was not a mandatory target.

All four ESI Funds are tasked with addressing thematic objective 4 (TO4). The ESF, for example, targets skills shortages in the energy-efficiency, renewable energy and sustainable transport sectors. A key priority of the EAFRD for 2014-20 is the promotion of resource efficiency and supporting a shift towards a low carbon and climate resilient economy in the agricultural, food and forestry sectors, and the EAFRD supports a number of measures relevant to energy efficiency and renewable energy, notably under so-called focus areas 5a (energy efficiency in agriculture and food-processing) and 5b (the supply and use of renewable sources of energy, of by-products, wastes and residues and of other non-food raw material, for the purposes of the bio economy).⁴⁴ There is scope to deliver any of these measures through FIs.

⁴⁴ Article 5, Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), OJEU L 347/487 of 20 December 2013.

The 2014-20 regulations introduced a number of innovations with regard to FIs. As well as the extension of FIs to other thematic objectives, new implementation options were introduced, including 'template' FIs with standard terms and conditions - so called '**off-the-shelf**' (OTS) models - aiming to facilitate the introduction of FIs.⁴⁵ Among first batch of OTS models was a renovation loan targeting residential building owners undertaking renovation projects. A further innovation was the introduction of a mandatory ex ante assessment before funding could be committed to FIs and specific guidance was prepared relating to **conducting an ex ante assessment** for FIs under thematic objective 4 (European Commission and EIB, 2014).

For 2014-20 some EUR 31.5 billion have been allocated to TO4 in the Operational Programmes. However, the extent to which Managing Authorities propose to use FIs for TO4 varies widely, and **few meet the suggested target of 20 percent of spend on low carbon economy in the form of FIs**:

- In Croatia and Lithuania, almost half of TO4 spend is proposed to be in the form of FIs; FIs account for around a quarter or more of TO4 spend in Portugal, Malta, Latvia and Sweden.
- Overall, loans are the most widely planned form of FI, but in Croatia, Lithuania and Portugal significant use of guarantees is also planned; in Belgium and Sweden, where FIs are proposed, these will take the form of equity finance.
- In nine countries the OPs do not propose the use of FIs for TO4 at all.

⁴⁵ Commission Implementing Regulation (EU) No 964/2014 of 11 September 2014 laying down rules for the application of Regulation (EU) No 1303/2013 of the European Parliament and of the Council as regards standard terms and conditions for financial instruments, OJEU No L271/16 of 12 September 2014.

Table 5: T04 (low carbon economy) by form of finance

	Share of total by form of finance %						Total (EUR m)
	Grant	Repayable grant	FI: Loan	FI: G'tee	FI: Equity / VC	FI: IRS	
AT	100.0						109.5
BE	89.3				10.7		154.8
BG	100.0						89.8
CZ	100.0						590.1
DE	93.5	0.4	5.0		1.1		2 421.7
DK	100.0						33.2
EE	100.0						247.1
ES	99.2		0.5	0.3			3 172.3
FR	87.8	1.6	5.6	1.8	3.0	0.2	1 363.6
GR	100.0						1 331.2
HR	50.8		24.8	24.4			531.8
HU	98.3		1.3	0.3		0.2	1 642.6
IE	100.0						84.5
IT	87.5	4.2	6.0	1.4	0.8	0.1	3 245.8
LT	51.3		22.2	11.9		14.6	971.3
LU	100.0						9.2
LV	75.3		24.7				480.6
MT	74.0		26.0				46.1
NL	85.0		15.0				121.3
PL	89.3	0.2	10.4	0.2			8 191.3
PT	51.2	19.5	13.6	12.2		3.6	1 262.5
RO	96.5			3.5			2 450.2
SE	76.4				23.6		164.7
SI	75.9	4.2	19.5			0.4	281.6
SK	97.0	3.0					938.9
UK	88.7		10.1		1.2		1 181.0
TC	100.0						409.0
Total	88.8	1.5	6.7	1.9	0.5	0.6	31 525.8

Note: IRS refers to interest rate subsidy. This is classified as a financial instrument in Implementing Regulation 215/2014.

Source: Own calculations from: <https://cohesiondata.ec.europa.eu/>

Within T04, some EUR 3 billion have been planned in the form of FIs in the OPs – approaching 10 percent of the total.⁴⁶ In addition, however, within the Operational Programmes, there are priority axes that cut across thematic objectives (so-called multi-TO priority axes) which may also contain FIs that are relevant for energy-efficiency and renewables. These may be priorities that address R&D&I (TO1), SME competitiveness

⁴⁶ See Annex II: 2014-20 OP plans for financial instruments for energy efficiency and renewable energy for a breakdown by country, OP and type of instrument.

(TO3) and low carbon economy (TO4) by, for example, supporting firms developing new energy-saving technologies; similarly, multi-TO priority axes focused on sustainable urban development may also support EE and RES. A review of multi-TO priorities comprising FIs suggests that a further EUR 668 million for FIs *may* also be relevant to EE and RES investments, a total of some EUR 3.7 billion (excluding national and any other cofinancing). If implemented, **this would represent a very substantial increase on 2007-13** where OP payments to FIs under Article 44(c) totalled just EUR 467 million (again excluding cofinancing) – though as noted earlier, some EE and RES FIs were implemented on the basis of Article 44(b) through Urban Development Funds; the scale of UDF channelled towards EE and RES is unknown.

Table 6: OP Indicative allocations for FIs for TO4 and relevant multi TO priorities (EUR m) 2014-20

	TO4: Low carbon economy					Multi TO priorities inc. EE & RES					Total
	Loan	G'tee	Eq. / VC	Int. subs	Total	Loan	G'tee	Eq. / VC	Int. subs	Total	TOTAL
BE			16.5		16.5	0.8	0.8	51.0	0.8	53.4	69.9
BG			0.0		0.0	115.0	34.0	2.8		151.9	151.9
CZ			0.0		0.0	99.8			9.0	108.8	108.8
DE	121.3		26.7		148.0	46.6		3.2		49.7	197.7
ES	16.6	9.0			25.6						25.6
FR	76.1	24.6	40.9	2.2	143.9	5.4	22.3	18.0	2.0	47.6	191.5
HR	131.8	130.0			261.8						261.8
HU	21.3	4.3		2.8	28.4						28.4
IT	194.5	46.9	24.5	4.0	270.0	16.4	0.9			17.2	287.2
LT	215.4	115.8		141.9	473.2		14.5			14.5	487.7
LV	118.7				118.7						118.7
MT	12.0				12.0						12.0
NL	18.2				18.2						18.2
PL	849.5	14.6			864.1	44.0			8.0	52.0	916.1
PT	171.4	153.4		45.0	369.8	34.0	13.2		14.8	62.0	431.8
RO	0.0	85.5			85.5						85.5
SE	0.0		38.8		38.8						38.8
SI	55.0			1.0	56.0						56.0
SK	0.0				0.0	111.4				111.4	111.4
UK	119.1		14.6		133.7						133.7
Total	2 120.9	584.1	162.1	197.0	3 064.1	4 73.4	85.6	75.0	34.6	6 68.6	3 732.7

Note: See Annex II for planned spend at programme level.

Source: Own calculations from: <https://cohesiondata.ec.europa.eu/>

In practice, **decisions to actually implement FIs for EE and RES will hinge on the ex ante assessment**, an obligatory precursor to introducing FIs in 2014-20. At the end of 2016 the Commission published a summary of the implementation of FIs according to the new reporting requirements for 2014-20 (European Commission, 2016c). This suggests that **the process of decision-making and implementation for FIs addressing TO4 is slow** – more so than for those under TO3 (SME competitiveness), where Managing Authorities generally have considerably more experience.

The state of play (as at end 2015) for FIs that directly target TO4, or which appear to do so within the context of multi-TO priorities, is set out in Table 7. This shows that, while ex ante assessments have been completed in relation to a number of FIs, **in many cases the process of selecting or appointing implementing bodies has not begun**. Moreover, in only nine instances have funding agreements been signed, and the report records only four cases of OP monies actually having been paid to FIs relevant to EE and RES. These are all in France and Lithuania.

In Nord-Pas de Calais and Rhone-Alpes in **France** a total of almost EUR 13 million has been paid to FIs (including national cofinancing). Of this, EUR 4.38 million is under the TRI fund in Nord-Pas de Calais which targets TO4 and comprises EUR 3.13 million ERDF and EUR 1.25 million national cofinancing. The report does not record whether any payments have been made to final recipients. The Rhone-Alpes FI is an innovation fund (FPFI) under a multi-TO priority that includes EE and RES related interventions, but the extent to which these are actually addressed through FIs is unclear from this data. OP funds of EUR 8.6 million have been paid to the FPFI, of which EUR 4.6 million ERDF. The report does not record whether any payments have been made to final recipients.

In **Lithuania** OP contributions have been paid to three funds:

- EUR 100 million (all ERDF) to the Jessica II apartment modernisation fund of funds;
- EUR 19.01 million (all ERDF) to the Energy Efficiency fund of funds;
- and EUR 33.5 million (all ERDF) to a specific fund, the fund for apartment modernisation. In practice, however, it is unclear from the presentation of report whether this is a 'free-standing' fund or whether it is a subfund of one of the two funds of funds (most obviously the Jessica II FoF), so there is a risk of double-counting here. In any event, this is the only fund for EE and RES to have made investments in final recipients by the end of 2015 – some EUR 33.87 million (all ERDF).

Table 7: Progress with implementation of FIs for EE and RES in 2014-20

BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & IMBC	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Luxembourg development	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Meusinvest	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Namurinvest	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Nivelinvest	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Sabrinvest	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region & Wapinvest	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	Subsidiary to be set up by Walloon region, Meusinvest & OBI	SF	M	31/12/14	Y				
BE	Wallonia	ERDF	SOCAMUT (to be confirmed)	SF	M	31/12/14	Y				
BG	Innovation & competitiveness	ERDF	Portfolio loss guarantees for energy-saving loans	SF	M	23/10/14	N				
CZ	Environment	CF	Energy saving	SF	4	20/05/15	N				
CZ	Prague -Growth Pole	ERDF	Not stated [ex ante to be updated in 2016]	SF	4	31/10/14	N				
CZ	Enterprise & Innovation for Competitiveness	ERDF	Energy Saving	SF	M	11/11/15	Y	n/s	31.00	0.00	
CZ	Integrated ROP	ERDF	IROP financial instrument	SF	M	03/03/15	N				
DE	Nordrhein-Westfalen	ERDF	Not stated	SF	M	22/12/14	n/s				
FR	OP Nord Pas de Calais	ERDF	Fonds d'investissement dédié à la troisième révolution industrielle	SF	4	28/09/15	Y	04/12/15	20.00	4.38	

FR	OP Bretagne	ERDF	Breizh Up	SF	M	30/04/15	Y	14/12/15	8.00	0.00	
FR	OP Rhone-Alpes	ERDF	Fonds de prêt FEDER Innovation	SF	M	03/11/14	Y	26/11/15	34.40	8.60	
HR	Competitiveness & Cohesion	ERDF	Medium-Long-term soft loans	SF	4	01/10/15	N				
HR	Competitiveness & Cohesion	ERDF	Equity for ESCOs	SF	4	01/10/15	N				
HU	Economic Development & Innovation	ERDF	Hungarian Development Bank	FoF	M	01/04/16	Y	12/05/15	2 235.24	0.00	
LT	OP for Structural Funds 2014-20	ERDF	Jessica II Apartment Modernisation	FoF	4	07/11/14	Y	27/05/15	150.00	100.00	
LT	OP for Structural Funds 2014-21	ERDF	Apartment building modernisation fund	SF	4	07/11/14	Y	27/03/15	74.00	33.50	33.87
LT	OP for Structural Funds 2014-22	ERDF	Energy efficiency fund	FoF	4	07/11/14	Y	18/02/15	79.65	19.01	
LV	Growth & Employment	ERDF	Altum DME funds	FoF	4	30/04/15	Y				
SE	National regional fund for growth and jobs	ERDF	Gröna Fonden	SF	4	06/02/15	N				
SI	OP for EU Cohesion policy	CF	Not stated	FoF	4	31/12/15	N				
SK	OP for EU Cohesion policy 2014-20	ERDF	FI for integrated infrastructure	FoF	4	05/01/15	N	29/04/15	43.68	0.00	
SK	Integrated ROP	ERDF	FI for IROP	FoF	M	04/03/15	Y	28/05/15	139.25	0.00	

Notes: (i) TO refers to Thematic Objective; where this is listed as 'M', this refers to multi thematic objective priorities which include TO4. **(ii)** SF refers to 'specific fund'; FoF refers to 'fund of funds'. **(iii)** The CZ OP for Prague and the SK OP for Cohesion policy do not mention FIs for TO4 whereas reporting on the period to end 2015 imply that such FIs are under consideration.

Source: European Commission 2016c

4. THE IMPLEMENTATION OF FINANCIAL INSTRUMENTS FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES

Key findings

- ESI Fund cofinanced FIs for EE and RES are very diverse in objectives, target recipients, scale, governance and geographical remit.
- Four broad groupings of ESIF cofinanced FIs can be identified: EE in housing; EE and RES in public places and buildings; EE and RES infrastructure investment; and innovation for EE and RES.
- Choice of financial product is closely tied to objectives, with loans predominating for investment in buildings and equity in low carbon innovation by SMEs.
- EE and RES FIs are affected by the challenges common to FIs generally, but involve further issues including engaging with new stakeholders, technical challenges and the need to increase the acceptability of repayable finance in this area.
- Key lessons from EE and RES FIs are the same as for ESIF FIs generally, but there is more need for specialist input, support for applicants and awareness-raising.
- Wide variations in domestic contexts limit the scope for transferability of good practice between jurisdictions, but drawing lessons from one OP to the next (within a programme area) is important.
- 'Off-the-shelf' instruments have not been used so far in EE and RES FIs, partly because they became available too late, but also because they did not meet identified needs.
- The legislative framework is regarded as complex, but most issues are not specific to EE and RES FIs.
- Technical assistance has generally been welcomed, but was needed when the regulations were issued.
- The overall funding landscape for EE and RES is complex and not fully understood by some Managing Authorities.

The aim of this section is essentially two-fold. First, to identify the specific characteristics of ESIF cofinanced FIs for EE and RES; and second, to address a number of questions in relation to the implementation of policy. In addition to background desk research based on the literature, this section draws on seven case study financial instruments. These address different aspects of EE and RES and cover different implementation periods. The case studies, which were agreed in advance with the European Parliament, are:

- For the 2007-13 period:
 - Estonia: Renovation Loan for Apartment Buildings;
 - Slovakia: JESSICA Initiative;
 - Spain: JESSICA FIDAE); and
 - UK (East of England): Low Carbon Innovation Fund.
- For the 2014-20 period:

- France (Auvergne-Rhône-Alpes): OSER (Opérateur de Services Energétiques Régional/ Regional Operator for Energy Services);
- Lithuania: Energy Efficiency Fund (ENEF) (2014-20); and
- Sweden: Green Fund (2014-20).

4.1. Specific characteristics of FIs for EE and RES

Support for energy efficiency and renewables addresses a **diverse range of project types operating in different contexts**, with different investment needs and susceptible to different types of intervention. The key areas where investment needs and finance gaps have been identified are set out in Figure 12. This makes clear that the policy area as a whole, as well as the financing requirements, are extremely heterogeneous.

Figure 12: Examples of EE and RES investment needs and finance gaps

Potential project types	Issues
Energy efficiency in public buildings and places	Affected by public expenditure constraints and public accounting treatment of expenditure and savings.
Energy efficiency in residential property	Accounts for most energy-saving potential in buildings, but segment is diverse; split incentives and credit risks deter private finance.
Energy efficiency in SMEs	Untapped potential, but segment is heavily reliant on banks who can regard energy efficiency as too risky or uninteresting; lack of information among SMEs may mean potential is not identified.
Supporting the emergence of new EE and RES technologies	Lack of funds to support post research phase owing to high capital requirements, risk and need for expertise in project assessment.
Accelerating the uptake of new RES technologies	Perceptions of high commercial and political risk. High transaction costs and timing uncertainties can deter private finance.
Investment in RES installations	Conditions vary by type of RES – e.g. biomass is considered ‘bankable’ but solar, though low risk technologically, is sensitive to regulatory changes in feed-in tariffs and premia.
Developing transmission and distribution grids	Insufficient access to long-term finance owing to perceptions of technological and policy risk.
Low carbon transport and infrastructure for clean transport	Regulatory issues mean economic incentives are missing for private sector finance; perceptions of high policy risk.
EE and RES in agriculture and in rural areas	Lack of information among relevant stakeholders (e.g. farmers); high transaction costs and credit risks.

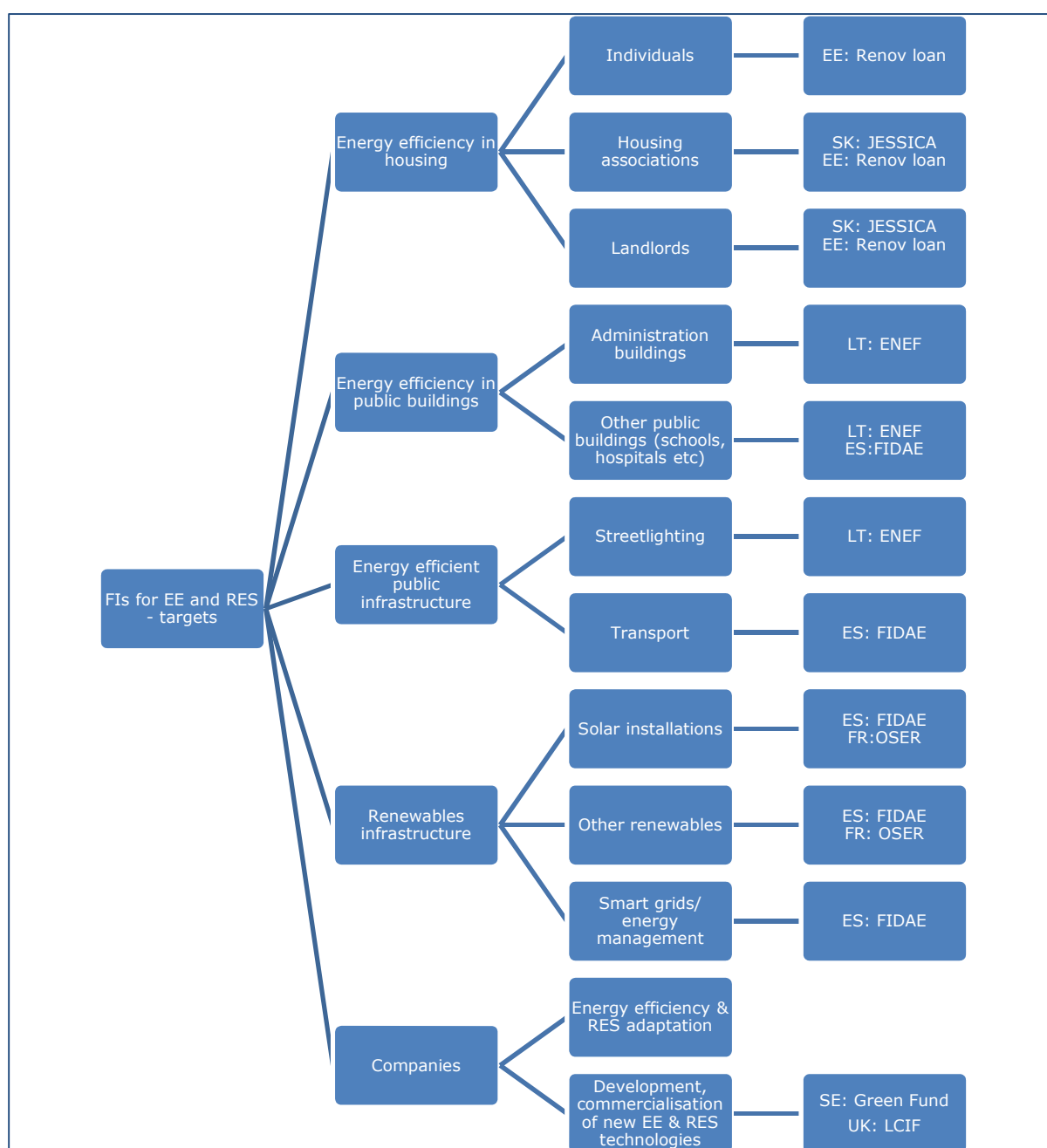
Source: Compiled from IEEP (2013); Ecofys et al (2011); BPIE (2014).

Financial instruments cofinanced through ESIF tend to be focused on one of four areas (though some instruments are broader in scope), and this is reflected in the case studies chosen (which are also summarised in Table 9). The main areas are:

- **Energy efficiency in housing.** Support under this heading includes energy efficiency renovations for individual homes or multi-apartment buildings and targets householders, landlords, housing associations or building companies (see Annex III Estonia - Renovation loans for apartment buildings; and Slovakia – JESSICA Initiative). The Estonia and Slovakia case study FIs both involve loans for housing renovation and both affected thousands of households in the Member States concerned, despite being implemented in different ways. In Estonia, loans under the Renovation Loan for Apartment Buildings were managed by two of the largest Estonian banks - Swedbank and SEB. In Slovakia, the much larger JESSICA FI was channelled through the existing State Fund for Housing Development. Typical projects under JESSICA in Slovakia involved the renovation/modernisation of apartment buildings, particularly relating to improvements in insulation and the upgrading of energy distribution systems. Such projects would be expected to result in a 35 percent saving in heating costs. The average cost was approximately EUR 156 000.
- **Energy efficiency in public buildings, spaces and infrastructure.** Projects under this heading notably take place in the context of wider urban development initiatives and can include street lighting or transport – see Annex III: Spain – JESSICA FIDAE and Annex IV: Lithuania – Energy Efficiency Fund. In Spain, JESSICA FIDAE supported integrated urban renewal projects through a range of financial products – loans, guarantees and equity – but mainly through loans. In Lithuania, loans are available from the Energy Efficiency Fund (ENEF). ENEF provides loans for the renovation of government buildings, as well as loan guarantees for street lighting modernisation projects. A typical central government-owned public buildings modernisation project might have the following characteristics:
 - Project (eligible expenditure) value: EUR 305 000
 - Project implementation period: 24 months
 - Project benefits lasting up to 20 years
 - Average size of renovated building: 1 500 sq. m
 - Achieving energy classification C.
- **Investment in EE and RES infrastructure.** Support may be given for a range of project types and technologies under this heading – see Annex III: Spain – JESSICA FIDAE. The JESSICA FIDAE FI provided long-term senior debt to energy service companies (ESCOs), public-private partnerships (PPPs), and public and private entities for around 120 projects related to EE and energy management, thermal solar energy, photovoltaic solar energy and biomass, and clean transport. A typical project involved providing support to the private sector firm Fertiberia S.A. in Castile-La Mancha to upgrade the power supply to a factory in an industrial park in Puertollano from 6.3 kV to 132kV. This also involved a new power supply contract with the electricity provider. The project resulted in annual savings of 1 898 072.65 kWh, which also represented a substantial financial saving.
- **Innovation and development of new EE and RES technologies.** Support under this heading often targets new or spin-out companies⁴⁷ seeking to demonstrate, pilot or upscale projects for commercialisation – see Annex III: UK – Low Carbon Innovation Fund; and Annex IV: Sweden – Green Fund. These FIs support companies developing

⁴⁷ Spin-out companies (or 'spinoffs') are companies created for the exploitation of products or services that are developed using knowledge or technologies generated by academic research (e.g. in universities). (<http://www.ub.edu/senesciencia/noticia/university-spin-off/>)

products or services which contribute to CO₂ reduction, through the provision of equity finance. These two FIs supported/are expected to support similar numbers of companies (30-50). In Sweden, the Green Fund will target innovative SMEs operating in the 'green tech' area, while in the East of England, the Low Carbon Innovation Fund targeted SMEs in a wide range of sectors, although two thirds of investee companies fell within definitions of 'low carbon and environmental good and services' sectors, most notably energy management and alternative fuels. The remainder came from other industries where they were able to demonstrate their low carbon impact, e.g. through adoption of emission-reducing processes or changes in behaviour on the part of their customers. An example of a company which received an equity investment from the LCIF is Trident Energy, which develops technology for the offshore renewables industry. The investment supported the development and patenting of a low cost generator that converts linear wave motion into electricity. Their PowerPod technology supplies off-grid renewable electricity to offshore infrastructure, such as wind turbines or oil and gas platforms, which reduces reliance on offshore diesel generation. PowerPod can be combined with offshore wind infrastructure to generate both wave and offshore wind energy at the same location offering significant potential cost savings in offshore electricity generation.

Figure 13: FIs for EE and RES - target groups and case studies

Source: EPRC research

There is little that unites these disparate types of intervention, apart from the fact that they are repayable instruments cofinanced from Cohesion policy funds for projects with goals related to energy efficiency or renewable energy. More specifically, FIs aimed at energy efficiency in residential properties may have many thousands of final recipients of standardised final products delivered through the retail banking sector. By contrast, investments in RES infrastructure or innovation are likely to be comparatively few, and considerably larger in financial terms, but involve bespoke expert project appraisal and tailored financial intervention. This heterogeneity is reflected in the case studies examined in this study (see Table 9). Note that the case studies include OSER in France (see Annex IV), which provides equity and quasi-equity for renewables projects in Auvergne-Rhône-

Alpes. OSER aims to support around 15 projects in three years, but a decision has not yet been reached about whether to cofinance the measure with ERDF.

In terms of the **financial products offered**, reporting on 2007-13 showed that cofinanced FIs for EE and RES were overwhelmingly in the form of loans: around 80 percent of FIs for energy efficiency and renewables were in the form of loans. Equity and guarantees were rarely used.

Table 8: ESIF FIs for EE and RES – products offered in 2007-13

Loans	49 176	294.19
Guarantees	3	0.03
Equity/venture capital	18	13.92
Other products	0	46.85
Total	49 197	354.99

Source: European Commission (2016a)

The preference for loan instruments continues in 2014-20, as previously discussed – with 6.7 percent of total planned spend on low carbon economy compared to 1.9 percent in the form of guarantees and 0.5 percent in the form of equity/venture capital (see Table 5).

Importantly, however, the **choice of financial product is closely related to the investment being targeted**. Loans, and to some extent guarantees, are most relevant for energy efficiency investments in residential property or the upgrading of public infrastructures, but equity or quasi-equity is more relevant for EE and RES innovation projects involving high levels of risk, but also potentially high returns.

The extent to which other support is provided in tandem with FIs also varies. In Estonia, Kredex provided grant support for energy audits and project development alongside the loans for renovation of apartment buildings offered by the commercial banks. This was the only example of the use of complementary grants found among the case studies. In terms of technical assistance and other support provided, the Low Carbon Innovation Fund (East of England, UK) provided intensive pre-investment support through an Investment Readiness Programme, as well as post-investment support.

Table 9: Case study FIs

MS	Title / purpose of FI	Period	EU funding source	Total Budget (EU plus other)	Instrument type/product	Target recipient	Number of recipients
EE	Renovation loans for apartment buildings	2007-13	ERDF	EUR 66.72m	Soft loan via financial intermediaries (banks). Grants also available for energy audits and for renovation work	Housing associations, local government	619 buildings, 22 676 apartments
ES	JESSICA FIDAE – energy efficiency, energy management, renewable and clean transport projects	2007-13	ERDF	EUR 123m	Soft loan via financial intermediaries (banks)	Public bodies, ESCOs, private enterprises, PPPs	c.120 projects
FR	OSER (Auvergne-Rhone Alpes) risk capital promoting development of renewable energy	2014-20	N/A	EUR 9.4m	Risk capital	Local projects (involving for example local authorities, local associations and citizens, farmers)	15 projects in 3 years (anticipated)
LT	ENEF (Energy Efficiency Fund) for public infrastructure (government buildings, street lighting)	2014-20	ERDF	EUR 79.6m	Loans and guarantees	Public institutions, ESCOs	N/A
SE	The Green Fund – risk capital to SMEs for	2014-20	ERDF	EUR 77.5m	Equity investment (co-	'Green tech' innovative SMEs	30-50 firms (anticipated)

MS	Title / purpose of FI	Period	EU funding source	Total Budget (EU plus other)	Instrument type/product	Target recipient	Number of recipients
	products and services reducing CO ₂ emissions				investment)		
SK	JESSICA – renovation of apartment buildings	2007-13	ERDF	EUR 244.7m	Loan via State Fund for Housing Development	Representatives and associations of apartment owners, municipalities, non-profit organisations, SMEs	263 projects, 1 163 households
UK	Low Carbon Innovation Fund (East of England) – co-investment in SMEs with an impact on carbon reduction	2014-20	ERDF	EUR 25.6m	Equity/convertible loans	SMEs	86 investments in 45 companies

Source: EPRC case study research – see Annexes III and IV.

4.2. Implementation issues and experiences

The **set-up and implementation of FIs generally has involved a series of well-documented challenges** in both 2007-13 and 2014-20 (Michie and Wishlade, 2011; Wishlade and Michie, 2015). These challenges are common to many ESIF FIs. Set-up periods have often been lengthy and there is a risk that the market changes during a protracted set-up period. MAs and financial intermediaries implementing ESIF FIs have faced a steep learning curve, whether they are implementing FIs for the first time, or even where they have implemented FIs previously, as the regulatory framework has changed between programming periods.

The 2014-20 Regulations underpinning the use of all FIs (not just FIs for energy efficiency and renewable energy) are much more detailed than those applicable in 2007-13. This is partly in response to Member State concern at the absence of detail and lack of clarity in the rules in the previous period.

Feedback on whether the new 2014-20 legislative framework for FIs facilitates the use of FIs in EE and RES was rather negative, and, in general, it was considered that there was still room for improvement. However, most of the criticism concerns the treatment of FIs in general, rather than being specific to FIs for energy efficiency and renewable energy. General issues identified include:

The **increase in delegated and implementing acts, and the multiplicity of guidance documents**, slows down the set-up and implementation process and **is perceived to add complexity**. More specifically:

- The **delayed availability of guidance**, which is viewed as part of the legal framework and without which MAs are reluctant to proceed, has contributed to the protracted set up process. There was a preference expressed for guidance to only be delivered once finalised. Currently, guidance becomes publicly available through channels such as EGESIF before it has been finalised, which can cause confusion and uncertainty.
- Some Managing Authorities have found **the legal framework difficult to work with and not always suited to the way the market works**. Some aspects of the CPR seem to work against market realities. For example, the CPR requires funding to be paid to final recipients. However, there are circumstances in which it might be necessary for shares to be purchased from someone else – for example a former owner or in an emergency situation where a shareholder dies, and there is a need to take on the holding. The CPR appears not to allow this.
- There is still considered to be room for **improvement in differentiating the treatment of FIs from grants**, although concrete details of how improvements could be made were not offered.
- **Specific State aid issues are considered to be problematic**. In the State aid rules, the provisions on risk finance require that follow-on finance⁴⁸ is provided for in the firm's original business plan. This is considered unrealistic, as firms are unlikely to know whether they will need follow on finance, while at the same time any firm

⁴⁸ Follow-on finance is where a firm in which an investment has already been made seeks a further round of finance.

which stated upfront that it would continue to require funding would be unlikely to attract investors.

- **The selection of fund managers and financial intermediaries has been problematic and time consuming.** The requirement to use public procurement procedures is considered to have added time and cost to the process.

There are also challenges which are common to energy efficiency / renewable energy / TO4 projects, *whatever the form of support*. The **emphasis on low carbon economy** in the 2014-20 OPs has been demanding for Managing Authorities, not just in the area of financial instruments, but even for the provision of grant support. Several Member States and regions report difficulties mobilising 'new' actors at regional and national level (i.e. actors related to the low carbon economy who may not have been involved in receiving support from the OP previously). Also, problematic is slow project mobilisation, as this field can involve projects that depend on multiple funding sources. In addition, projects may be very technical, for which applications take longer to prepare and for which specific expertise is required (Vironen, 2016).

Combining the demands of implementing FIs with the demands of energy efficiency and renewables projects has introduced specific challenges, including the significant levels of resources required to reach target groups (ECORYS, MAZARS and EPRC, 2011), with some target groups being particularly difficult to reach. For example, for a 'low carbon'-related FI for SMEs, potential recipients may perceive that the FI is only relevant to SMEs in the renewables sector. Moreover, programme monitoring committees may need to be educated on how FIs for EE and RES work, especially for equity FIs. The challenges in reaching target groups are potentially serious given the thematic concentration requirements relating to thematic objective 4, and the pressures to absorb funds in a timely fashion. Some MAs have reported that being a 'pioneer' in this field may complicate communication with the Commission e.g. when discussing appropriate measurements of progress/specific indicators for the programmes.

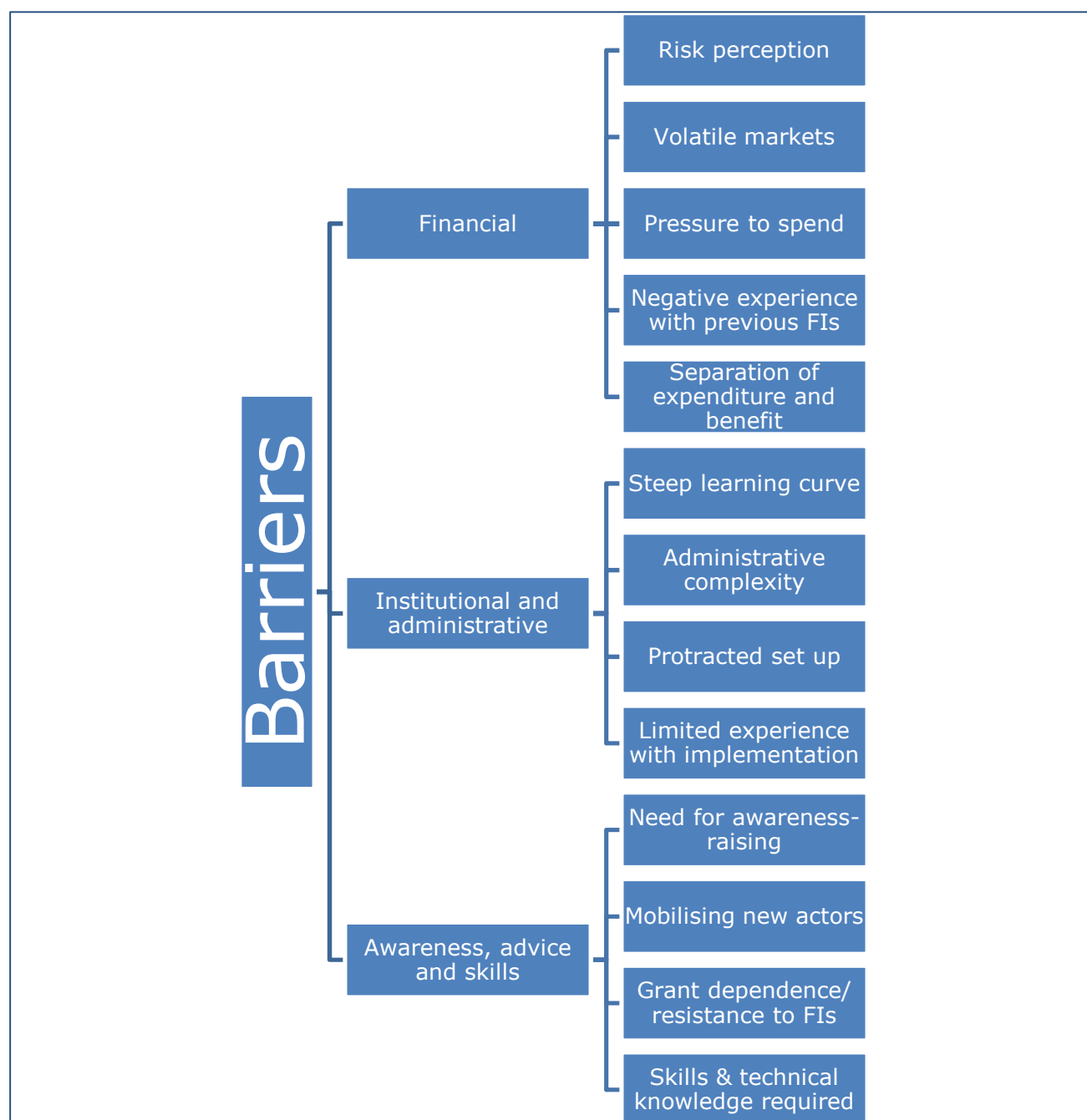
Specifically related to the energy sector, **public procurement qualification requirements for the selection of ESCO companies** are considered to be rather high (only large companies can apply and there is an identified need to reduce qualification requirements so that smaller market players can participate), while the credit limit restrictions applied to municipalities can be a serious obstacle to implementation (for example, this has been the case for street lighting modernisation projects in Lithuania).

MAs were often **reluctant to use loans for energy efficiency and renewables in public and residential buildings**, preferring grants for several reasons (Ramboll and IEEP, 2015):

- reluctance by potential applicants to engage with loans (especially in EU12 countries), due to constraints on public authorities taking on loan commitments (in the case of public buildings) and cultural reluctance to accept loan commitments (in the case of residential buildings);
- administrative complexity for Managing Authorities and limited experience among administrators in using loans or other financial instruments;
- MAs considered that FIs imposed additional demands on target recipients and in some cases a significant amount of effort was put into convincing potential recipients to use loans.

An additional challenge is the need for specialist expertise, relating to the EE and RES-related aspects of the ESIF regulations and State aid provisions (notably under the General Block Exemption Regulation (GBER)).⁴⁹ In addition, thematic expertise is required for the technical assessment of EE/RES projects/applications and experts may also be needed for energy audits and assessments.

Figure 14: Barriers to FIs for EE and RES



Source: EPRC, adapted from BPIE (2012)

⁴⁹ See Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty, OJEU L187/1 of 26 June 2014, especially Articles 38, 39, 41, 43, 46.

4.2.1. Off-the-shelf instruments

The 2014-20 regulations allow MAs to use 'model' FIs which comply with standard terms and conditions. These 'off-the-shelf' FIs provided by the Commission have been designed to be State aid compliant, and include a minimum set of governance requirements. Three standardised instruments were made available in 2014:⁵⁰

- a **portfolio risk sharing loan** intended to supply new loans to SMEs by providing financial intermediaries with funding contributions and credit risk sharing, thereby offering SMEs with more funds at preferential conditions in terms of interest rate and/or collateral reduction;
- a **capped portfolio guarantee**, providing an incentive to financial intermediaries to increase lending to SMEs by providing credit risk protection;
- a **renovation loan**, providing funding to residential building owners to prepare and implement building renovation projects.

Two further models were offered in 2016:⁵¹

- a **co-investment facility**, an equity fund managed by a financial intermediary investing in SMEs;
- an **Urban Development Fund** in the form of a loan fund to support implementation of urban development projects.

Several of the MAs interviewed, which had not operated renovation loans previously, considered using off-the-shelf instruments, but in the end none pursued this option, and this for two main reasons:

- the off-the-shelf model **came too late** to be used;
- the off-the-shelf instruments **could not meet the identified needs**.

For these same reasons, two case study countries which had implemented renovation loans in 2007-13 did not propose using OTS FIs: the MAs either already knew what they planned to implement before the off-the-shelf model was available (Estonia) or, although the use of off-the-shelf instruments was considered, the MA decided that it did not meet the particular needs of the target group (Lithuania). Lithuania needed a rather specific product, which was very well adapted to market needs and the specificity of the target group. This was a combination of FI and grant, to make the product more attractive during the transition period from subsidies to FIs.

4.2.2. Availability and assessment of technical assistance

There has been a greater emphasis on the provision of support and technical assistance for Managing Authorities implementing FIs in 2014-20. This has included launch of the *fi-compass* platform of advisory services, provided by the Commission in partnership with the European Investment Bank,⁵² and written guidance issued by the Commission.

⁵⁰ Commission Implementing Regulation (EU) No 964/2014 of 11 September 2014 laying down rules for the application of Regulation (EU) No 1303/2013 of the European Parliament and of the Council as regards standard terms and conditions for financial instruments, OJEU L271/16 of 12 September 2014.

⁵¹ Commission Implementing Regulation (EU) 2016/1157 of 11 July 2016 amending Implementing Regulation (EU) No 964/2014 as regards standard terms and conditions for financial instruments for a co-investment facility and for an urban development fund, OJEC L192/1 of 16 July 2016.

⁵² <https://www.fi-compass.eu/>

Feedback from interviewees on the existence and **quality of technical assistance has been mixed**, and depends in part on the implementation model chosen to implement FIs, and the interviewees' role in that model.

Managing Authorities generally considered the **guidance documentation helpful**, with specific mention made of the guidance on conducting ex ante assessments as being very useful. However, the **guidance is considered to have come very late in the process** of FI set-up and implementation, and would have been more useful if had it been available earlier.

'Sometimes the implementation of FI becomes impossible according to the new provisions of guidelines. The Managing Authority and fund manager has to cancel the implementation of planned FI and even risks to return funds already invested as ineligible.' (Interview with fund manager)

This is consistent with the findings of a more general study on Cohesion policy FIs which recommended that 'clearer rules and stronger methodological guidance – or clearer decision on *laissez-faire* - are needed' (European Parliament, 2016b).

Financial intermediaries have tended not to be involved in communication with the Commission or EIB, except where the EIB has been appointed as holding fund manager (e.g. JESSICA FIDAE in Spain, 2007-13). In this case, **the availability and quality of guidance from the EIB Group was rated as 'good'**. Communication and assistance between Managing Authorities and financial intermediaries was also generally reported as having been open and constructive.

4.2.3. Lessons learned from implementation and transferability of good practice

In practice, ESIF FIs for EE and RES have not hitherto been widely implemented, so there is limited experience to draw on, and hence relatively few lessons and good practice. In the course of this study, interviewees did identify lessons learned from the set up and implementation of FIs, but most of these are applicable to *all* FIs, rather than being specific to FIs for energy efficiency and renewable energy.

Managing Authorities and financial intermediaries reported that **implementing FIs entails a significant and steep learning curve**. The set-up period (of nearly two years in some cases) has taken longer than expected and was considerably more complex than anticipated. The protracted set up period means that market conditions can change during this period – this is particularly important in relation to energy-related investments where, as mentioned above, the 'investibility' of projects is sensitive to regulatory change, as well as energy prices more generally. It is therefore important to check whether circumstances have altered and to make any changes required. Some flexibility should be built in to FI plans to facilitate this.

Figure 15: Lessons learned from FI implementation

Flexibility is also seen as important during the implementation phase. Being prepared to adapt the investment strategy to better tailor it to the market and to the needs of final recipients is viewed as a success factor, and helps boost the pace of disbursements. Among the changes made in case study FIs during 2007-13 were:

- decreasing the lower level and increasing the upper level of the size of investment (Low Carbon Innovation Fund, East of England, UK). The introduction of a Small Investment Scheme enabled pipeline applications to be considered for smaller investments where their application had not progressed sufficiently. Building in flexibility in the form of finance provided is also helpful in this regard. For example the Low Carbon Innovation Fund was able to provide either equity finance or convertible loans, and smaller investments (up to GBP 75 000) tended to be provided as convertible loans.
- due to inadequate rate of disbursements, altering the investment strategy of JESSICA FIDAE in Spain, as it initially was only targeted at private enterprises. Public entities were then allowed to apply for funding, with especially favourable conditions, which boosted the rate of signatures/disbursements.

As implementation proceeded, it is important that **the interests of financial intermediaries are aligned with those of the MA**, to ensure the correct balance between risk and return, as foreseen by the MA. Also in terms of the relationship between the MA and financial intermediaries, it can be difficult to negotiate the right balance between what is seen as an excessive administrative burden (by the financial

intermediaries) and adequate project eligibility assessments, and monitoring and reporting requirements.

For equity FIs, a significant amount of work must be done both pre- and post-investment. This must be built in to the anticipated lifecycle of the fund manager's involvement with the investee company. 'Investment readiness' support pre-investment plays a valuable role. As with any equity investment, fund managers should understand the markets they are working in, and the companies in which they are investing. For co-investment equity funds, it is recommended to know the co-investors well, as they are a main source of investment opportunities and can add significant value to investee companies. The post-investment period also requires resource input from fund managers to maximise the impact of the investments.

Lessons learned specific to FIs for energy efficiency and renewable energy include:

- They require **involvement of specialists** e.g. energy auditors and fund managers with specific expertise. For equity funds, for example, assessment of low carbon impacts during due diligence is an additional task beyond normal venture capital practice and can be time-consuming. Independent experts can play a role (e.g. on investment committees) to advise on the technological and market dimensions of applications.
- In the context of urban projects, the importance of an **overarching vision to demonstrate how energy projects deliver sustainable development** for a city. Actions to reduce CO₂ emissions will often create additional benefits such as health outcomes, encouraging community cohesion and creating jobs. Recognition of these benefits is likely to improve 'buy-in' from a wider range of stakeholders, and encourage support from public or private investors (Arup, 2012).
- In these fields, applicants may be more accustomed to grant support, and therefore resistant to FIs. This requires **intensive support for applicants and also intensive awareness-raising/marketing**. In Estonia, for example, Kredex found they had to offer constant guidance and counselling to explain the benefits of the scheme, and that this was crucial to ensure uptake and the scheme's success.
- Related, it is important to use a comprehensive set of measures to address the market gap; the **combination of FIs with grants has an important role to play** in this sector. For example, in Estonia, a grant was offered alongside the renovation loan to increase uptake.
- It can be a challenge to **broaden the perception of what low carbon projects entail** – i.e. broader than investing in renewable energy companies. FIs for low carbon may address energy efficiency and resource efficiency in many different sectors, by investing in products or services which will achieve carbon impact through their use. The Low Carbon Innovation Fund (East of England, UK) struggled with this preconception in the early days of Fund operation and had to work hard to increase their visibility and awareness of their investment focus. In this regard, they considered that the diversity of their portfolio was useful to show other sectors how they could be involved in CO₂ reduction, as well as being positive for the Fund in terms of investment balance.
- **Delivery mechanisms need to be tailored to the objectives to be achieved and the nature of the final recipients.** For example, where final recipients are individual home owners, repayment risks may be higher than when lending to a municipality or housing association, which tend to have higher credit ratings. This

suggests that finance in the form of loans provided through retail banks that know the credit histories of the recipients is more suited in this case, whereas a separate legal entity that can coordinate funds from a range of sources may be more suitable in the case of support for EE and RES projects by municipalities or social housing associations (Arup, 2012).

- **Measuring FI performance is challenging**, because many OP indicators are not well suited to FIs, especially FIs investing in energy efficiency and renewable energy.
- **FIs for EE and RES are vulnerable to changes in the regulatory environment**, as in Spain where changes to the regulatory framework for RES (specifically solar energy, where new legislation in effect discouraged the use of photovoltaic energy) negatively impacted the attractiveness of the FI, discouraging some potential recipients from applying for funding.
- **There is an important role for pilot projects**. In Slovakia, for example, pilot projects for the Roma population were successfully implemented in 2010, which constituted the basis for subsequent JESSICA implementation.⁵³
- Related, there is a **significant element of 'learning by doing'**, as several interviewees emphasised that experience gained in 2007-13 had proven invaluable and would be built on during the 2014-20 period.

There have been examples of successful ESIF cofinanced FIs being used as models or 'inspiration' in other regions and Member States, for example, the Swedish regional co-investment funds in the 2007-13 period were said to have been based on the Scottish Co-Investment Fund which had been in operation since 2003. Indeed, 'case study examples' with a focus on potentially transferable good practice and lessons learned form an important and popular part of the *fi-compass* training events. However, as shown in section 4.2.1 where the lack of uptake of off-the-shelf instruments is noted, MAs have found that **FIs must be carefully tailored to take local needs and specificities into account**. FIs have been set up differently across and within Member States, even when they pursue very similar objectives. This means that **transferability of good practice between countries is difficult**. However, MAs interviewed identified potential for the transfer of good practice from one period to the next *within* Member States, with the FI set-up and management process having involved a steep learning curve. In some cases, 2007-13 experience has been viewed as a pilot, enabling know-how to be accumulated (e.g. JESSICA FIDAE in Spain).

4.3. Relationship with EU level instruments and domestic instruments

FIs for energy efficiency and renewable energy projects funded by the ESI Funds are part of a complex landscape of funding mechanisms. These include FIs provided at EU-level (funded from both public and private sources) as well as domestic FIs, offered at national,

⁵³ In Slovakia, a project on 'Regeneration of Settlements' was approved in 2007, prior to the change to the 2010 ERDF regulation permitting aid to housing for marginalised groups. The element addressing housing for marginalised groups came under the 'regeneration of settlements' priority of an OP that aimed to improve regional infrastructure in three Convergence regions. The priority addressed urban issues in 20 areas either experiencing or threatened by physical deterioration and social exclusion by implementing five targeted development strategies, one of which was housing renovation. In practice the MA encountered difficulties in meeting the regulatory requirements on funding apartments from the ERDF. A programme revision in 2010 introduced support for housing infrastructure using JESSICA (EIB, 2013).

regional and even local levels. Moreover, some 'domestic' instruments that appear in the NEEAPs and NREAPs are either cofinanced from ESIF or other EU level funds or receive funding through EIB backed initiatives.

4.3.1. EU level instruments

There are numerous sources of FIs for energy efficiency and renewable energy operating at EU-level, including the Connecting Europe Facility, Private Finance for Energy Efficiency (PF4EE), the European Fund for Strategic Investments (EFSI), the Europe Energy Efficiency Fund (EEEF), the 2020 European Fund for Energy, Climate Change and Infrastructure (the Marguerite Fund), and the Green Initiative (European Commission 2013a; European Commission, 2013b).

The **Connecting Europe Facility** supports trans-European networks and infrastructure in the transport, telecommunications and energy sectors. One of the key elements of CEF is the use of innovative FIs to provide a funding alternative to traditional grants and fill financing gaps for strategic infrastructure investments. CEF has a budget of EUR 30.44 billion for the period 2014-20, of which EUR 5.35 billion is earmarked for energy projects. Support is available to projects which have been identified by the Commission as 'projects of common interest'⁵⁴ – these may include, for example, projects 'contributing to sustainable development and protection of the environment, inter alia by the integration of energy from renewable sources into the transmission network, and by the development of smart energy networks and carbon dioxide networks'.⁵⁵ The overall contribution from the EU budget to CEF FIs has been set at EUR 2.55 billion over 2014-20. The CEF Debt Instrument was launched in 2015 jointly by the Commission and the EIB, and is implemented by the EIB. The Debt Instrument consists of a risk-sharing instrument for loans and guarantees as well as project Bonds. An Equity Instrument is under development.⁵⁶

The **Private Finance for Energy Efficiency (PF4EE)** instrument is a joint agreement between the EIB and the Commission which aims to address the limited access to adequate and affordable commercial financing for energy efficiency investments. Funded under the Commission's Programme for the Environment and Climate Action (LIFE programme), the instrument targets projects which support the implementation of NEEAPs or other Member State energy efficiency programmes. The PF4EE instrument provides portfolio-based credit risk protection through cash-collateral (Risk Sharing Facility), long-term financing from the EIB (EIB Loan for Energy Efficiency) and support services for financial intermediaries (Expert Support Facility). One PF4EE operation may be implemented per country, and operations have so far been signed in Czech Republic, Spain, France, Belgium, Italy and Portugal. The LIFE Programme committed EUR 80 million to fund the credit risk protection and expert support services. The EIB will leverage this amount, making a minimum of EUR 480 million available in long term financing.⁵⁷

Funding for energy efficiency and renewable energy projects is also available under the **European Fund for Strategic Investments (EFSI)**. EFSI forms part of the Investment Plan for Europe and aims to mobilise additional investments in areas including

⁵⁴ The European Commission has drawn up a list of 195 key energy infrastructure projects which have been identified as PCIs. The first list of PCIs was published in 2013. The list is updated every two years.

⁵⁵ Regulation (EU) No 1316/2013 of European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility

⁵⁶ [http://europeanmemoranda.cabinetoffice.gov.uk/files/2016/12/ST-13736-2016-ADD-2_\(1\).pdf](http://europeanmemoranda.cabinetoffice.gov.uk/files/2016/12/ST-13736-2016-ADD-2_(1).pdf)

⁵⁷ <http://www.eib.org/products/blending/pf4ee/index.htm>

infrastructure, education, research, innovation, renewable energy and energy efficiency. To establish EFSI, an EU guarantee of EUR 26 billion has been created, backed by a guarantee fund of EUR 8 billion from the EU budget, while the EIB has committed EUR 7.5 billion. EFSI is a market-driven instrument, which targets technically and economically viable projects without any sectoral or regional pre-allocation, in particular to address high investment needs or market failures/sub-optimal investment situations.⁵⁸ Member States, directly or via their National Promotional Banks, can contribute either through an investment platform or by directly cofinancing certain projects and activities.

Operations supported by EFSI can include both funds and projects. Approved Funds relevant to energy efficiency and renewable energy include, for example:⁵⁹

- Odewald Renewable Energy Infrastructure Fund - EUR 80 million under the equity sub-window;
- Susi Renewable Energy Fund II - EUR 66 million under the equity sub-window;
- London Energy Efficiency Cofinancing Facility - EUR 136 million under the debt sub-window.

Relevant projects which have been funded include Rentel Offshore Wind in Belgium, and a bio-product mill in Finland.⁶⁰

The EIB plays an important role in many of these initiatives and is also an important source of funding in its own right, as well as via investment through fund of funds and investment vehicles. The bank has been involved in funding energy projects since the energy crisis of the 1970s, when its lending policy was changed to favour projects specifically dealing with Europe's energy security (van der Zwet et al, 2016). In 2016, 26 percent of total EIB lending was focused on helping mitigate climate change and adapt to its impact. The Bank's energy lending focuses on energy efficiency, renewable energy, energy networks, and related research and innovation:

- In the renewables sector, this includes finance for mature renewable energy technologies, such as onshore wind farms, hydropower, geothermal and solid biomass, and also early-stage or evolving technologies such as solar, offshore wind, photovoltaic, concentrated solar power and second-generation biofuels.
- In the energy efficiency field, this includes financing of retrofitting and expansion of existing social and urban infrastructure and services, including district heating and cooling, cogeneration, rehabilitation and modernisation of buildings and improvement of industrial processes, as well as improving and upgrading the energy values of urban transport, waste and water management networks.

EIB funding in the EU for energy projects is mainly through the provision of loans (but also through options such as guarantees and mezzanine finance),⁶¹ as well as via investment through fund of funds and investment vehicles such as:

⁵⁸ EY (2016) Ad-hoc audit of the application of the Regulation 2015/1017 (the EFSI Regulation) Final Report 14 November 2016, https://ec.europa.eu/commission/sites/beta-political/files/ey-report-on-efsi_en.pdf

⁵⁹ European Commission (2016) Commission Staff Working Document: Evaluation. Accompanying the document Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) No 1316/2013 and (EU) 2015/1017 as regards the extension of the duration of the European Fund for Strategic Investments as well as the introduction of technical Enhancements for that Fund and the European Investment Advisory Hub SWD(2016) 297 final, Brussels, 14.9.2016.

⁶⁰ European Commission (2016) The investment Plan for Europe – Two Years On. https://ec.europa.eu/commission/sites/beta-political/files/2-years-on-investment-plan_en_2.pdf

- The **Europe Energy Efficiency Fund (EEEF)**, a public-private partnership with an EU contribution of around EUR 125 million funded from the European Energy Programme for Recovery, which finances key energy projects. The EEEF provides risk finance for energy efficiency, small-scale renewable energy, and clean urban transport projects (at market rates) targeting municipal, local and regional authorities and public and private entities acting on behalf of those authorities.⁶²
- The 2020 European Fund for Energy, Climate Change and Infrastructure (the **Marguerite Fund**), an equity fund with current commitments of around EUR 710 million which makes capital-intensive infrastructure investments in the development of transportation, energy, and climate change.⁶³
- The **Green Initiative**, offering EIB loans channelled through participating intermediaries (plus associated Commission grants of up to 15 percent and EUR 150 000 of the EIB loan amount) for energy efficiency projects by SMEs covering, for example, energy efficiency in residential and non-residential buildings (both single measure and multi-measure, major renovation); industry energy efficiency; solar thermal collectors; biomass boilers; geothermal heat generation; combined heat and power; and renovation of district heating systems (pipelines, generation units, substations).⁶⁴

Also relevant at EU-level is **ELENA (European Local Energy Assistance)**, a joint initiative of the Commission and the EIB with the aim of supporting the EU's climate and energy policy objectives by helping ESIF MAs prepare energy efficiency or renewable energy projects. ELENA provides grants for technical assistance focused on the implementation of energy efficiency, distributed renewable energy and urban transport projects and programmes. The grant can be used to finance costs related to feasibility and market studies, programme structuring, business plans, energy audits and financial structuring, as well as to the preparation of tendering procedures, contractual arrangements and project implementation units. The annual grant budget is c. EUR 20 million.

In the field of energy efficiency and distributed renewable energy, ELENA may cofinance investment programmes in the following areas:

- public and private buildings (including social housing), commercial and logistic properties and sites, and street and traffic lighting to support increased energy efficiency;
- integration of renewable energy sources (RES) into the built environment – e.g. solar photovoltaic (PV) on roof tops, solar thermal collectors and biomass;
- investments into renovating, extending or building new district heating/cooling networks, including networks based on combined heat and power (CHP), decentralised CHP systems;
- local infrastructure including smart grids, information and communication technology;
- infrastructure for energy efficiency, energy-efficient urban equipment and link with transport.

⁶¹ Mezzanine finance is a hybrid of debt and equity finance that gives the lender the rights to convert to an ownership or equity interest in the company in case of default, after venture capital companies and other senior lenders are paid. (www.investopedia.com/terms/m/mezzaninefinancing.asp)

⁶² <http://www.eeef.eu/home.html>

⁶³ <http://www.marguerite.com/>

⁶⁴ <http://www.eib.org/projects/priorities/climate-and-environment/green-initiative.htm>

For this study, Managing Authorities and financial intermediaries were asked about their perceptions of the relationship between the ESIF FIs they were implementing and the wider funding landscape, including at EU level. Their responses varied very widely – from ‘they are complementary’ to ‘there is no relationship’, to ‘we don’t know enough yet to say’, due to the general complexity, the varying levels of experience with other funding sources among Managing Authorities, and the fact that MAs are not necessarily the body responsible for dealing with non-ESIF funding sources.

One MA was concerned that there was overlap between EU-level FIs and ESIF FIs, although not in the energy field. Another MA works in close cooperation with the EIB on a Fund of Funds initiative for enterprise support. Several MAs were investigating future possibilities under EFSI. It is clear that interaction so far between ESIF and other EU-level Funds, especially EFSI, has been very limited,⁶⁵ and that while there may be potential for complementarities, there may also be potential for confusion and overlap. This is consistent with the recommendations of a recent study for the European Parliament which concluded that ‘a further enhancement of the effectiveness of these instruments could be achieved by avoiding overlaps between EU programmes and promoting stronger interactions between investment projects’ (European Parliament, 2017).

4.3.2. Domestic instruments

The ex ante assessment which must be carried out before an ESIF contribution can be made to FIs must assess consistency with other (existing) forms of public intervention. As discussed earlier (see 2.4 above) the domestic public sector funding landscape is complex and sometimes crowded. Among the case studies, different relationships can be found between the ESIF FIs and existing domestic instruments. There are several examples of ESIF FIs being implemented in a complementary way to domestic FIs:

- In Estonia, the holding fund for the renovation loan for apartment buildings was managed by Kredex, a financial institution which provides support to Estonian enterprises, housing associations and homeowners, including for energy efficiency activities. Alongside the renovation loan, Kredex offered loan guarantees as domestic FIs, in case banks required an additional guarantee.
- In Lithuania, VIPA (the Public Investment Development Agency) provides repayable grants which target the renovation of central government buildings. Repayable assistance is not financed from ENEF and targets buildings where renovation cannot be financed from ENEF, as the projects are not financially viable and there will not be sufficient savings to repay the loan. Two such projects have been implemented so far.
- In Slovakia, the State Fund of Housing Development provides loans for housing renovation also from its own (State budget) resources. EUR 100 million are provided annually. In addition, SlovSEFF is a sustainable energy financing facility developed by the EBRD, co-funded by the Ministry of Environment of the Slovak Republic and the Ministry of Agriculture, Food and Environment of Spain. SlovSEFF provides a credit line of up to EUR 100 million to Slovak commercial banks.
- In Spain, the IDAE also promotes energy efficiency and renewable energy initiatives outside the EU framework. JESSICA FIDAE was a pilot project, to test out how an EU cofinanced FI works in practice.

In Sweden, the Swedish Energy Agency offers grants for SMEs and advice in this field, and they are also cofinancing the Green Fund.

⁶⁵ European Parliamentary Research Service (2017) EFSI and ESI Funds: Complementary or contradiction? Briefing to the European Parliament, January 2017.

5. PERFORMANCE OF FIS FOR EE AND RES AND THEIR CONTRIBUTION TO COHESION GOALS

Key findings

- Measuring the 'success' of cofinanced FIs of all types has proven challenging for 2007-13.
- There are challenges in providing data on the performance of support for EE and RES more generally.
- It is difficult to assess the impact of ESIF programmes on carbon emissions in a region or Member State, and much more so the role played by individual FIs.
- EE and RES FIs can contribute to key objectives with important spatial effects that are positive for regional development. Addressing sectoral goals within national or regional OPs may also have contradictory effects on regional development.
- There is a tension between standardised indicators that enable comparative assessment of priorities and policies and the need to capture the specificities of the intervention.
- Common indicators may fail to capture qualitative and/or indirect benefits of EE and RES FIs.

The aim of this section is to address two questions. First, what can be considered qualitative and quantitative criteria of 'success' for FIs that support energy efficiency and renewables? Second, what evidence is available about the performance of FIs in terms of their contribution to broader development goals?

Conventional measures of 'success' for ESIF FIs include financial performance (e.g. the extent to which funds have reached the intended final recipients, leverage achieved, returns recycled) and 'physical' performance, measured using various indicators to assess outputs, results and impact (numbers of companies assisted, investments made, loans disbursed etc.). FIs for energy efficiency and renewable energy bring an additional dimension to measuring success.

Cofinanced FIs report against specified indicators and targets, which may be included in the OP, or in Funding Agreements with fund managers and financial intermediaries, and reported regularly to the MA, programme monitoring committee and the Commission (in the Annual Implementation Reports).

5.1. Financial performance of EE and RES FIs

There have been **significant issues around measuring the performance of all types of co-funded financial instruments in 2007-13**. The quality of information available has been poor (although now improving) owing in part to the fact that data collection and annual reporting became a regulatory requirement only part way through the 2007-13 period. Although successive reports have progressively improved the quality and completeness of reporting by Managing Authorities, gaps remain, particularly in relation to measuring the extent of revolving funds and the contribution made to OP goals (Wishlade and Michie, 2015).

In terms of absorption in 2007-13, looking only at the data for FIs categorised under Article 44(c), a total of EUR 703.26 million of OP contributions had been made by the end of 2015, with EUR 486.20 million from ERDF. However, only EUR 354.99 million, including EUR 233.56 million from ERDF, had reached final recipients (although this represented an increase of 60 percent on the previous year) (European Commission, 2016a). Absorption varied widely, with almost full absorption in Denmark and Estonia, while low levels or no absorption were reported in Germany, Italy and France. **There is no data on recycled returns or private sector leverage** (this data was only submitted on a voluntary basis by MAs in 2007-13).

5.2. Physical performance of support for EE and RES

In 2007-13, the Commission strongly recommended the use of common minimum core indicators in ERDF and Cohesion Fund programmes.⁶⁶ Programmes could also use their own programme-specific indicators. In addition to the main indicators for which data was gathered at programme level, including 'numbers of jobs created', further core indicators were suggested for specific thematic fields such as energy, including:⁶⁷

- Renewable energy - number of projects (defined as number of projects aimed to increase or improve the production or transportation capacity of renewable energy);⁶⁸
- Renewable energy - additional capacity of renewable energy production (MW) (defined as increase in energy production capacity (in megawatts) of facilities using renewable energy resources, built/equipped by project);
- Climate change - Reduction in greenhouse emissions (CO₂ and equivalents, kt) (defined as the gross total reduction in greenhouse gas emissions (in CO₂ equivalents, kiloton per annum) as a result of interventions financed by the Structural Funds.

Reflecting increasing concern with climate change and energy efficiency, many 2007-13 programmes included provision for the development of specific carbon evaluation systems to monitor effects with regard to Kyoto CO₂ emissions targets (e.g. Italy, France, Czech Republic, England and Wales) (Ferry M et al, 2008). There were no specific core indicators for energy efficiency although the core indicator on the reduction of GHG emissions could be indirectly linked to energy efficient investments, and only 15 Member States reported on this indicator (Ramboll and IEEP, 2015).

Difficulties in obtaining data to provide evidence of achievements of ESIF interventions for energy efficiency and renewables (including grants) in 2007-13 were noted in the ex post evaluation of Cohesion policy programmes focusing on energy efficiency in buildings (Ramboll and IEEP, 2015). Output, result and impact indicators reported on by MAs in 2007-13 were not always designed appropriately, relevant indicators were not always used, and methodologies were diverse. Targets showed differing levels of ambition and were not always adjusted despite increased funding allocations. Moreover, there was:

⁶⁶ European Commission (2009) Indicative Guidelines on Evaluation Methods: Reporting on Core Indicators for The European Regional Development Fund and the Cohesion Fund, Working Document No. 7, http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/wd7_indicators_en.pdf

⁶⁷ As outlined in Section 4.5 of Working Document No 2 http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/wd2indic_082006_en.pdf

⁶⁸ Definitions in Working Document No 7

'little correlation between the level of funding they made available and their results in terms of the two most commonly used types of indicator: greenhouse gas emissions, and energy reductions'⁶⁹.

Specifically in terms of FIs, the ex post evaluation found a need for a more explicitly targeted approach to the design of interventions.

These findings confirmed the conclusions of several ECA reports on ERDF and Cohesion Fund investments in energy efficiency and renewable energy:

- For energy efficiency investments, MAs lacked baseline data on energy savings potential in the sectors selected for investment when they were drawing up OPs, and so did not have the information to estimate to what extent a programme could contribute towards the achievement of a policy objective (ECA, 2012).
- Performance indicators for energy efficiency measures were not adequate for the proper monitoring of the programmes. MAs used different measurement methodologies and units, and so the results of the energy efficiency measures are not comparable across the EU and cannot be aggregated (ECA, 2012).
- Although for renewable energy, the audited projects delivered outputs as planned, direct measurement of economic growth or job creation was outside the audit scope. Energy production targets were achieved (or almost achieved) in only one-third of audited projects. OPs did not establish performance indicators for proper monitoring and evaluation of the cost-effectiveness of measures, which could also have facilitated assessing the contribution of the EU funds to targets (ECA, 2014).

More stringent, compulsory reporting is required in 2014-20. MAs must report against a series of pre-defined common indicators in their Annual Implementation Reports (AIRs); they must also report annually on FIs (in an annex to the AIRs). MAs must report the contribution of the FI to the achievement of the indicators of the relevant priority or measure (in 2017, 2019 and the final implementation report). This includes:

- the output indicator (code number and name) to which the financial instrument contributes;
- the target value of the output indicator; and
- the value achieved by the FI in relation to the target value of the output indicator.

This is in addition to the usual financial reporting, and specific reporting on progress in set-up, leverage, and programme resources paid back to financial instruments from investments.

Several common indicators are relevant for investments in energy efficiency/renewables (see Figure 16). The energy efficiency-related indicators are new for 2014-20:⁷⁰

- Energy Efficiency - Number of households in improved energy class - improved class must be the direct consequence of the project completion.

⁶⁹ Ramboll and IEEP (2015) Ex post evaluation of Cohesion policy programmes, focusing on the European Regional Development Fund (ERDF) and Cohesion Fund (CF), Work Package 8: Energy efficiency in public and residential buildings, Final Report to the European Commission.

⁷⁰ European Commission (2015) Guidance document on monitoring and evaluation, European Cohesion Fund, European Regional Development Fund, Concepts and Recommendations.

- Energy Efficiency - Decrease of annual primary energy consumption of public buildings. Calculations are based on the energy certificate of buildings, value will be calculated from the energy certificates issued before and after the reconstruction.
- Energy efficiency – Number of additional energy users connected to smart grids.

Figure 16: Common indicators for energy efficiency/renewables in 2014-20

	Unit	Name
Renewables	MW	Additional capacity of renewable energy production
Energy efficiency	Households	Number of households with improved energy consumption classification
	kWh/year	Decrease of annual primary energy consumption of public buildings
	Users	Number of additional energy users connected to smart grids
GHG reduction	tonnes of CO2	Estimated annual decrease of GHG

The GHG reduction indicator has been updated and is calculated for interventions directly aiming to increase renewable energy production or to decrease energy consumption through energy saving; its use is mandatory only where these indicators are relevant. Uses for other interventions with possible GHG impact are optional with methodology to be developed by the Managing Authority. However, **it is difficult to disaggregate the impact of the ESIF programmes on carbon emissions in a region or Member State (and much more so the role played by individual FIs)**, particularly in countries with large industrial structures, significant carbon emissions and relatively small programme budgets. Among the case studies, only the UK LCIF had been evaluated.

Box 1: Measuring success: The Low Carbon Innovation Fund (England, UK)

The Low Carbon Innovation Fund (LCIF) in the East of England 2007-13 ERDF OP (UK) was measured against a series of generic indicators such as jobs created and SMEs assisted. In 2016, the holding fund manager commissioned a study to retrospectively establish the carbon savings as a result of the investments made through the first cycle of the LCIF, as well as develop a methodology for carrying out carbon assessment for future investee companies. This helped show the Fund's contribution to low carbon-related outcomes. The study found that the LCIF portfolio of companies had saved 200 000 tonnes of CO2 by November 2016, and were forecast to save over 12 million tonnes by end 2020. The study found that less than two percent of carbon savings from the fund have been realised to date, because the majority of products and services sales are yet to be realised and are just forecasts, but also that the cumulative effect of the products and services in operation will be realised between the second half of 2016 and the end of 2020.

Source: Narec (2016)

As well as contributing to broad sectoral goals (e.g. climate change mitigation), EE and RES FIs can potentially **contribute to key objectives with important spatial effects**, for example, improved urban neighbourhoods, modernised housing stock, and better living conditions for residents, with concrete and tangible outcomes, and supporting economic growth within the region or Member State. These outcomes contribute to different national, regional and local strategies.

More generally, **EE and RES investments involve significant levels of employment.** For example, in Germany, retrofitting housing and public buildings for energy efficiency is estimated to have created around 900 000 jobs between 2004 and 2010 (Power and Zulauf, 2011). It is estimated the renewables sector employs over 1.1 million people, with the largest employers in the wind, solar photovoltaic and solid biomass industries (European Commission, 2017). Importantly, there is a significant spatial dimension to RES leading the OECD (2012) to argue that investment in RES presents significant opportunities for the development of rural areas, notably:

- new revenue sources for rural communities;
- new job and business opportunities;
- innovations in products, practices and policies in rural areas;
- capacity building and community empowerment;
- affordable energy.

However, those benefits will not accrue automatically, and require a complex and flexible policy framework, a long-term strategy, and a realistic appreciation of the gains from RE (OECD 2012).

On the other hand, **addressing sectoral goals within national or regional OPs may have conflicting effects in terms of regional development**, as uptake of FIs tends to be highest in the most populated areas, with highest capacity. For example, in Estonia, there were no applications for the renovation loan from the most deprived area (Ida-Virumaa), despite an entitlement to an additional 10 percent support. Under the new Green Fund in Sweden, there is also a recognition of the risk that investment will be heavily concentrated in Stockholm. In an attempt to address this issue, the fund manager will be asked by the MA to consider the regional distribution of investments across the country, though ultimately investment decisions will be driven by project quality not regional distribution.

5.3. Common indicators and policy performance

An important consideration in looking at FIs for energy efficiency and renewables is the **tension between standardised indicators that enable comparative assessment of priorities and policies and the need to capture the specificities of the intervention.** In France, the national authorities sought to standardise the approach to measuring how Operational programmes contribute to greenhouse gas reductions.

Box 2: NECATER: a tool for measuring OP contributions to GHG reductions

In France, the NECATER tool was set up in the 2007-13 period for the CPER (State-region contract). Its overall aim was to ensure carbon neutrality in investments of the CPERs and calculate potential greenhouse gas emission based on CPER funding allocations. This approach was set out in the National Strategic Reference Framework (NSRF) and was to be extended to the OPs. NECATER was ultimately to be linked to the national monitoring system PRESAGE, in place for OPs and CPERs. Project allocations were to be quantified ex ante, and could be adapted during project implementation. CO2 project assessments were to look at budget allocations by themes, including: employment by sector; extent of commuting; flux of goods; infrastructure type; contribution to urban development; and impact of regional energy and environmental policies. NECATER was to provide information on energy savings as one of the core indicators at the aggregated level.

Source: Ferry M et al (2008)

In the United Kingdom the Low Carbon Innovation Co-ordination Group (LCICG, replaced in 2016 by the Energy Innovation Board) brought together the major public sector backed organisations supporting low carbon innovation in the UK. In 2010, the National Audit Office recommended that there should be a common approach to performance reporting, to allow evaluation on a consistent basis across the public funding portfolio to support better prioritisation. In response, the LCICG developed a potential set of common metrics for monitoring support for innovation.

Box 3: Developing new metrics for measuring low carbon innovation in the UK

The LCICG proposed seven common metrics for outputs and outcomes. The group also considered including other 'green growth' indicators such as jobs created, but concluded that it would not be possible to develop and agree a robust and consistent approach to this. In addition to the seven outcome based metrics, the Group is piloted a template to capture qualitative information on the design and delivery of projects to support the sharing of good practice and lessons learned between members of the Group and to inform future activities.

The proposed metrics included:

- Capacity building
 - New patents
 - New collaboration and networks
 - Value of financial leverage
- Energy
 - Reduced unit energy costs
 - Reduced emissions
- Economic
 - Growth in gross value added (an economic ratio of output minus intermediate consumption that is considered to provide a useful comparable measure of productivity or competitiveness)
 - Growth in exports

Source: National Audit Office (2013).

Group members were said to be 'positive about the value of adopting the new metrics'.⁷¹ For example, the Engineering and Physical Sciences Research Council stated that the metrics would be very useful and more systematic than its previous qualitative method of relying on case studies. Challenges were, however, identified by the government department involved. These included:

- Incorporating them in monitoring systems could mean that full implementation would take two to three years from when a decision is taken to adopt them.
- There was a potential cost of adopting the metrics in to portfolio monitoring.
- Differentiating low carbon activities (research or business interventions) for measurement within wider programmes was expected to be challenging.

In the case study interviews, Managing Authorities reported a number of issues with using common indicators to measure FI performance (and which echo the last of these concerns):

⁷¹ National Audit Office (2013) Public funding for innovation in low carbon technologies in the UK, Briefing for the House of Commons Energy and Climate Change Select Committee, October 2013.

- In 2007-13, **some EE and RES FIs were measured against non-specific indicators.** For example, FIs for SMEs may not have been measured against their contribution to CO₂ reduction, and indicators such as 'jobs created' or 'number of investments' may not have adequately reflected their success or the quality of their investments. (As mentioned, not all FIs relevant to EE and RES may have been categorised under Article 44c in 2007-13, and therefore will have been reporting against different indicators.)
- **Simple quantitative indicators may not capture all the benefits of a measure,** which may be more qualitative and/or involve more indirect effects. For example, in Estonia, the perceived success of the FI is reflected in the fact that its implementation helped the market develop to a point where commercial banks were willing to step in – hence the FI has not been continued in 2014-20. In addition, a survey among household in renovated buildings found that most considered their living conditions to be 'good', that their energy bills had decreased and that many problems in the buildings had been resolved owing to the renovation loan investment.
- Related, **formal targets may not be the best measures of achievement.** For example, in England, the success of the pre-investment support for the Low Carbon Innovation Fund meant that potential investee companies sometimes were enabled to seek funding from the private sector instead of the LCIF. This adversely affected progress towards the Fund's targets, but ultimately was seen as a successful intervention.

5.4. Contribution of EE and RES FIs to OP goals in the 2007-13 case studies

The 2007-13 case study FIs reported against a range of indicators (see Figure 17), depending on the type of FI and the type of support provided, for example:

- In Estonia, renovation loans were given to 493 apartment buildings during the period 2009-12. The apartment buildings renovated under the scheme reduced energy consumption by 40 percent.
- In Slovakia, 1 163 loan contracts were signed under JESSICA, and 263 projects had been completed by the end of February 2017.
- In the UK, the Low Carbon Innovation Fund had completed 86 investments by January 2017, of which 41 were follow-on investments, in 45 companies. A total of 28 companies had been assisted in accessing risk capital outside the Fund. A total of 343 jobs had been created by December 2016. A study commissioned in 2016 to retrospectively establish the carbon savings as a result of the investments made through the first cycle of the Fund found that the portfolio of companies had saved 200 000 tonnes of CO₂ by November 2016, and were forecast to save over 12 million tonnes by end 2020 (Narec, 2016).

Figure 17: Indicators for EE and RES FIs in the 2007-13 case study OPs

MS	OP/ESIF Fund	FI	Contribution to OP goals
Estonia	OP for the Development of Living Environment (ERDF)	Renovation loan for apartment buildings	The main indicator used to measure FI performance was energy efficiency and how it reduced energy consumption.
Slovakia		JESSICA	Impact was determined by the following OP indicators, which contribute to energy savings and energy efficiency: <ul style="list-style-type: none"> • Decrease in the energy intensity of renovated apartment buildings (in %); • Decrease in the energy intensity of renovated apartment buildings (in kWh/m²); • Size of the renovated area (façade) of the apartment buildings(m²); • Annual energy savings through delivery of projects (GJ/year); • Number of loans provided (total loans); • Number of renovated apartment buildings (total buildings).
Spain	Ten regional ERDF OPs corresponding to several Spanish Autonomous Communities and Autonomous Cities	JESSICA FIDAE	Each OP had a slightly different approach, as each region varied in its needs and budget, and therefore in its priorities with regard to EE and renewable energy. Most OPs highlighted the need to bring about energy savings, promote EE and diversification of energy sources, both in production and geographic sourcing, and emphasise renewable energy in the energy production mix. The overarching policy challenge was alleviating Spain's foreign energy dependency. FIs played a minor role in most Spanish regions in 2007-13 and programming requirements for FIs were not as strict as in the 2014-20. This also applies to the indicators that would measure the impact of FIs. For example, for the Andalusia OP, where only one relevant indicator referred to renewable energy:

MS	OP/ESIF Fund	FI	Contribution to OP goals
			<ul style="list-style-type: none"> Energy from renewable energy with respect to the total production (percent without hydraulic energy) Reference value: 7.45% Target 2010: 15%, Target 2013: 21%
UK	East of England ERDF OP	Low Carbon Innovation Fund	<p>The Fund reported against the following indicators:</p> <ul style="list-style-type: none"> SMEs assisted (risk capital) Jobs created Jobs created (women) Jobs safeguarded Jobs safeguarded (women) Successful innovation-related initiatives in SMEs Successful environmental-related initiatives in SMEs Successful start-up businesses Leverage of private sector funding (GBPm) Leverage of public sector funding (GBPm) New businesses integrating new products, processes or services. <p>NB this FI was not categorised under Article 44(c) but rather under Article 44(a) as an FI for enterprise support.</p>

6. CONCLUSIONS AND RECOMMENDATIONS

The aim of this study has been to provide an analysis of the use of financial instruments in support of the low carbon economy, and in particular for energy efficiency and renewable energy sources, focusing on three main objectives:

- to give an overview of the role of Cohesion policy in supporting energy efficiency and renewable energy sources;
- to analyse the implementation of FIs in the field and to identify specific challenges and lessons learned;
- to analyse and assess the performance of FIs in this field, including their contribution to broader Cohesion policy goals.

Each of these was further broken down into a number of research questions in the terms of reference. The conclusions section which follows addresses each of these questions in turn. The final section then discusses the recommendations arising from this study.

6.1. Conclusions

6.1.1. The role of Cohesion policy in supporting energy efficiency and renewable energy sources

What role do the broader energy policy context or national framework conditions play?

Cohesion policy support for energy efficiency and renewables is nested within a complex energy policy framework involving different levels of government and governance. The overarching context concerns the Europe 2020 flagship initiative 'a resource efficient Europe' which has been distilled into headline targets to:

- reduce greenhouse gas emissions;
- increase the share of renewables in energy consumption; and
- generate energy savings.

These targets are implemented through a combination of mandatory requirements, such as those introduced under the Energy Efficiency and Renewable Energy Directives (EED and RED), as well as EU and domestic initiatives and their coordination.

The context in which this takes place varies widely between countries – depending on climate, the availability of renewable energy sources, the quality of the building stock, national regulatory frameworks, cultural norms, levels of administrative capacity, the characteristics of energy distribution infrastructure, and so on. Moreover, although the ultimate objectives of energy efficiency and renewable energy sources are the same, the regulatory frameworks and policy tools are largely distinct.

Member State policies to achieve the energy efficiency and renewables targets are catalogued in national energy efficiency and national renewable energy action plans (NEEAPs and NREAPs). These each comprise a range of regulatory, fiscal, financial and other measures, the composition of which varies widely between countries. The action plans form the basis for national reporting on meeting the targets, but are also the 'points of departure' for determining the nature of Cohesion policy support for energy efficiency

and renewable energy investment. The **extent to which Cohesion policy funding plays a role in the achievement of EED and RED objectives varies widely between countries**, but is also difficult to quantify. The role of Cohesion policy in NEEAPs and NREAPs is very significant in some countries, especially in central and eastern Europe where ESIF allocations are substantial, but generally negligible or non-existent in countries where Cohesion policy allocations are modest. Where ESI Funds do contribute to measures detailed in the action plans, this is mainly under the ERDF, but some countries also use the EAFRD to fund EE and RES investments.

To what extent were the ESI Funds supporting energy efficiency and renewables in the previous programming period, and to what extent was such support channelled through FIs?

Cohesion policy is the largest source of EU funds in support of energy efficiency and renewable energy investment. For 2007-13, the latest data suggests that some EUR 12 billion of Structural Funds was allocated to energy-related investments. Of this, EUR 3.8 billion was targeted at renewable energy sources and EUR 6.9 billion at energy efficiency (the remaining EUR 1.2 billion was for TEN-E and other energy-related investments). At these levels, energy efficiency and renewable energy represented under four percent of Structural Funds allocations for 2007-13. However, the relative importance varied widely between countries: Denmark and Croatia did not allocate any Structural Funds to EE or RES; while Luxembourg, Malta and Lithuania allocated more than 10 percent of the total to these policies. That said, in absolute terms, the amounts were more significant in Poland, Czech Republic, Italy and Greece, which all allocated more than EUR 1 billion, and where Structural Funds support features prominently in the NEEAPs especially.

Structural Funds support for EE and RES was **mainly in the form of grants**. There was scope to support such investment through FIs in three ways in 2007-13: first, so-called Article 44(a) FIs in the form of support for enterprises, which could include both general investment or more specific measures aimed the development of new energy-related technologies – as in the UK Low Carbon Innovation Fund covered in this study; second, Article 44(b) FIs which supported urban development plans generally, but could include measures to support energy efficiency, especially in buildings or infrastructure such as street lighting. The Spanish JESSICA FIDAE discussed in this report falls into this category; and third, Article 44(c) FIs, which target energy efficiency and renewables, but which were only provided for part way through the funding period - JESSICA Slovakia and the Estonian Renovation Loan, which are among the case study instruments in this report, fall into this category.

In practice, it is not possible to estimate the scale of FIs for EE and RES under Article 44(a) and (b) due to the absence of data. Under Article 44(c) FIs were implemented in 10 Member States, and involved Structural Funds contributions paid to holding funds or specific funds amounting to EUR 467 million – less than four percent of total Structural Funds allocations to EE and RES. Moreover, of this, only EUR 204 million had been invested in final recipients by end 2015. Importantly, however, these figures clearly underplay the scale of FI investment in EE and RES given the absence of specific information on energy-related spend for Article 44(a) and (c) FIs.⁷²

⁷² That said, Article 44(b) would be of most relevance to EE and RES investments, and by end 2015 this had involved ESIF contributions to holding funds or specific funds of EUR 1.2 billion, of which EUR 790 million had been invested in final recipients by end 2015. Assuming only some of this is relevant, FIs for EE and RES remain modest.

What choices are being made in 2014-20 by Member States and why?

Energy efficiency and renewable energy remain priorities in 2014-20 indeed more so. To help address the Europe 2020 headline targets, the Commission recommended that Member States prioritise growth-oriented expenditure, including that on energy efficiency and/or addressing climate change objectives. Reflecting this, the CPR provides for a thematic objective (TO4) to support 'the shift towards a low carbon economy in all sectors'. Targets relating to the concentration of resources are also specified – with at least 20 percent of ERDF resources to be allocated to TO4 in the more developed regions, 15 percent in the transition regions and 12 percent in the less developed regions. As a result **planned expenditure on EE and RES in 2014-20 is substantially higher** than in 2007-13. Exact comparisons are difficult due to definitional differences and changes in prices, but in nominal terms planned ESIF spend on EE and RES appears to increase from around EUR 10.7 billion in 2007-13 to EUR 29.2 billion in 2014-20. The overall share of the budget planned for EE and RES also increases, from under four percent to just over nine percent of the ESIF total.

The CPR extended the scope to use FIs to all thematic objectives, and Commission rhetoric emphasised their value for revenue-generating and cost-saving investments on grounds of sustainability, project quality and efficiency. Moreover, after the launch of the Investment Plan for Europe, Member States were recommended to earmark up to 20 percent of their allocations for low carbon economy to be spent in the form of FIs. If achieved, this would involve a very substantial increase on ESIF FIs for EE and RES compared to 2007-13.

In practice, however, analysis of OP plans suggests that in **most countries TO4 spend in the form of FIs will fall well short** of this. Across the EU28 over 90 percent of TO4 spend is planned in the form of grants or repayable grants, with very few countries reaching the 20 percent target. Where FIs are planned, these are **predominantly in the form of loans**, which account for about 6.7 percent of total ESIF FI planned spend on TO4.

6.1.2. The implementation of FIs for energy efficiency and renewables

Can specific characteristics be identified for FIs in this field?

Support for energy efficiency and renewables addresses a range of project types operating in widely different contexts. ESIF cofinanced financial instruments for energy efficiency and renewables are **very diverse in objectives, target recipients, scale, governance and geographical remit** – and seek to counter different barriers to investment – financial, institutional, awareness and culture. An initial distinction can be drawn between energy-efficiency, where the scope for FIs rests on the assumption that investment will generate costs savings, and investment in renewable energy, which has the potential to generate revenue. However, the barriers to investment vary between different project types, countries, technologies and target recipients. A further category concerns investment in new EE and RES technologies, sometimes requiring support to enable enterprises to emerge from the so-called 'valley of death'. FIs cofinanced through ESIF tend to be focused on one of four areas, namely:

- **Energy efficiency in housing**, which represents the largest opportunity for energy saving. This can be provided to individuals, housing associations or landlords and typically takes the form of loans – in the case of householders, these may be offered through retail banks on standardised terms and conditions.
- **Energy efficiency in public buildings, spaces and infrastructure**, which typically take place in a wider urban development context, perhaps through a UDF,

and usually involves loans and guarantees to municipalities and other public authorities to invest in areas such as renovation or public buildings and street lighting or transport. The bespoke nature of such projects means that the scope for standard terms and conditions is limited.

- **Investment in energy efficient or renewable energy infrastructure**, which can include support for projects such as solar installations, smart grids and energy management infrastructure. This support may be given to ESCOs, PPPs and public or private entities. Again, the scope to standardise intervention is likely to be limited, calling for specialised fund management skills.
- **Innovation and development of new EE and RES technologies**, which might target new or spin-out companies seeking to demonstrate, pilot or upscale projects for commercialisation. This kind of support is more likely to take the form of equity investment since substantial capital sums are often required, with considerable risks (and potential rewards) attached.

The case study instruments examined in this study all fall into one or more of these four areas.

Can typical barriers / lessons learned be identified in relation to financial instruments in this field?

It is difficult to identify specific barriers to the implementation of FI for energy efficiency and renewables. On the one hand, for the most part, implementation of **EE and RES FIs simply face the same challenges as do ESIF cofinanced FIs generally**. These concern issues such as the volume and complexity of the legislation, the delay and status of guidance, mismatches between the legal framework and market needs and the selection of fund managers. On the other hand, FIs for EE and RES face the **same challenges as grant-financed EE and RES projects** – some Managing Authorities have found the emphasis on low carbon economy challenging because of the need to engage with stakeholders who are new to ESIF support or because of the technical demands of some projects. This has tended to require specialist expertise and has often slowed the process of project mobilisation.

That said, there are some issues that are specific to FIs for EE and RES. These include: the resources needed to reach target groups; the expertise required (of monitoring committees and others) to understand both the complexities of FIs and the technical aspects of EE and RES investment; the reluctance of some target groups to engage with the idea of repayable support.

In terms of **lessons learned**, some specific elements can be identified, including: the need to involve specialists; the importance of an overarching vision to demonstrate how energy projects deliver sustainable development in order to improve 'buy-in'; the need for intensive awareness-raising and applicant support; the need to tailor delivery mechanisms to target recipients; recognition of the role of wider regulatory issues, such as feed-in tariffs, and their impact on the attractiveness of FIs; and the role of 'pilot projects' in preparing future policy directions.

Is it possible to transfer good examples of Cohesion policy FIs across Member States / regions and how?

In practice, ESIF FIs for EE and RES have not hitherto been widely implemented, so there is limited experience to draw on, and hence relatively few lessons and good practice. In the

course of this study, interviewees did identify lessons learned from the set up and implementation of FIs, but most of these are applicable to *all* FIs, rather than being specific to FIs for energy efficiency and renewable energy.

There have been examples of successful ESIF cofinanced FIs being used as models or 'inspiration' in other regions and Member States, for example, the Swedish regional co-investment funds in the 2007-13 period were said to have been based on the Scottish Co-Investment Fund which had been in operation since 2003. Indeed, 'case study examples' with a focus on potentially transferable good practice and lessons learned form an important and popular part of the *fi-compass* training events. However, MAs have found that **FIs must be carefully tailored to take local needs and specificities into account**. FIs have been set up differently across and within Member States, even when they pursue very similar objectives. This means that transferability of good practice between countries is difficult. That said, MAs interviewed identified potential for the transfer of good practice from one period to the next *within* Member States, with the FI set-up and management process having involved a steep learning curve. In some cases, 2007-13 experience has been viewed as a pilot, enabling know-how to be accumulated (as in JESSICA FIDAE in Spain).

Do Member States opt for tailor-made or off-the-shelf instruments, and why/why not?

The 2014-20 regulations allow MAs to use 'model' FIs which comply with standard terms and conditions. These 'off-the-shelf' FIs provided by the Commission have been designed to be State aid compliant, and include a minimum set of governance requirements. However, it currently appears that **no use has been made of 'off-the-shelf' FIs**. The reasons are two-fold: first, the OTS models were issued too late and Managing Authorities already had FI plans in hand; second, they did not meet identified needs. For these reasons, two case study countries which had implemented renovation loans in 2007-13 did not propose using OTS FIs: the MAs either already knew what they planned to implement before the off-the-shelf model was available (Estonia) or, although the use of off-the-shelf instruments was considered, the MA decided that it did not meet the particular needs of the target group (Lithuania). Lithuania needed a rather specific product, which was better suited to local market needs and the specificity of the target group. This involved a combination of FIs and grants to make the product more attractive during the transition from subsidies to repayable support.

How does the legislative framework for 2014-20 facilitate the use of FIs in energy efficiency and renewable energy?

Feedback on whether the new 2014-20 legislative framework for FIs facilitates the use of FIs in EE and RES was rather negative, and, in general, it was considered that there was still room for improvement. However, most of the criticism concerns the treatment of FIs in general, rather than being specific to FIs for energy efficiency and renewable energy. In this context, and as noted above, criticism relates to the volume and complexity of the legislation, the delay and status of guidance, mismatches between the legal framework and market needs and the selection of fund managers.

What feedback can be gathered about relevant technical assistance activities provided at the initiative of the Member States or the Commission?

There has been a greater emphasis on the provision of support and technical assistance for Managing Authorities implementing FIs in 2014-20. This has included launch of the *fi-*

compass platform of advisory services, provided by the Commission in partnership with the European Investment Bank and more written guidance by the Commission. Feedback from interviewees on the existence and quality of technical assistance has been mixed, and depends in part on the implementation model chosen to implement FIs, and the interviewees' role in that model. Managing Authorities generally considered the guidance documentation helpful, with specific mention made of the guidance on conducting ex ante assessments as being very useful. However, the guidance is considered to have come very late in the process of FI set-up and implementation, and would have been more useful if had it been available earlier.

6.1.3. The performance of FIs for EE and RES and their contribution to broader Cohesion policy goals

What can be the qualitative and quantitative criteria of 'success' for FIs that support energy efficiency and renewables?

Conventional measures of 'success' for ESIF FIs include financial performance (e.g. the extent to which funds have reached the intended final recipients, leverage achieved, returns recycled) and 'physical' performance, measured using various indicators to assess outputs, results and impact (numbers of companies assisted, investments made, loans disbursed etc.). FIs for energy efficiency and renewable energy bring an additional dimension to measuring 'success'.

Difficulties in obtaining data to provide evidence of achievements of ESIF interventions for energy efficiency and renewables (including grants) in 2007-13 were noted in the ex post evaluation of Cohesion policy programmes focusing on energy efficiency in buildings. Output, result and impact indicators reported on by MAs in 2007-13 were not always designed appropriately, relevant indicators were not always used, and methodologies were diverse. Targets showed differing levels of ambition and were not always adjusted despite increased funding allocations. These findings confirmed the conclusions of several ECA reports on ERDF and Cohesion Fund investments in energy efficiency and renewable energy. New indicators have been developed for 2014-20. However, **it is difficult to disaggregate the impact of the ESIF programmes on carbon emissions** in a region or Member State (and much more so the role played by individual FIs), particularly in countries with large industrial structures, significant carbon emissions and relatively small programme budgets.

Also important, **simple quantitative indicators may not capture all the benefits** of a measure, which may be more qualitative and/or involve more indirect effects. For example, in Estonia, the perceived success of the renovation loan is reflected in the fact that its implementation helped the market develop to a point where commercial banks were willing to step in – hence the FI has not been continued in 2014-20. In addition, a survey among household in renovated buildings found that most considered their living conditions to be 'good', that their energy bills had decreased and that many problems in the buildings had been resolved owing to the renovation loan investment.

Related, formal targets may not be the best measures of achievement. For example, in England, the success of the pre-investment support for the Low Carbon Innovation Fund meant that potential investee companies sometimes were enabled to seek funding from the private sector instead of the LCIF. This adversely affected progress towards the Fund's targets, but ultimately was seen as a successful intervention.

What evidence is available about the performance of FIs in terms of contribution to broader regional development goals?

As well as contributing to broad sectoral goals (e.g. climate change mitigation), EE and RES FIs can potentially contribute to key objectives with important spatial effects, for example, improved urban neighbourhoods, modernised housing stock, and better living conditions for residents, with concrete and tangible outcomes, and supporting economic growth within the region or Member State. These outcomes contribute to different national, regional and local strategies.

More generally, EE and RES investments involve **significant levels of employment**. For example, in Germany, retrofitting housing and public buildings for energy efficiency is estimated to have created around 900 000 jobs between 2004 and 2010 and the renewables sector is thought to employ over 1.1 million people, with the largest employers in the wind, solar photovoltaic and solid biomass industries. Importantly, there is a **significant spatial dimension** to RES leading and investment in RES may offer significant opportunities for the development of rural areas, including: new revenue sources for rural communities; new job and business opportunities; innovations in products, practices and policies in rural areas; capacity building and community empowerment; and affordable energy. However, those benefits will not accrue automatically, and require a complex and flexible policy framework, a long-term strategy, and a realistic appreciation of the gains from investment in renewable energies.

On the other hand, addressing sectoral goals within national or regional OPs may have conflicting effects in terms of regional development, as uptake of FIs tends to be highest in the most populated areas, with highest capacity, leading to the risk of a concentration of investment in more prosperous regions, especially in the case of projects involving advanced technology or well-developed business ecosystems.

6.2. Recommendations

The nature of this study does not easily lend itself to policy recommendations since the aim of the study was essentially to analyse the use of financial instruments for energy efficiency and renewables, rather than to put forward proposals as to how this might be adjusted. Nevertheless, a number of issues do arise from the work undertaken. Some of these coincide with more general issues related to the implementation of FIs under ESIF, but others are more specific. In particular, the following points can be made:

- In practice, there is little commonality between the various instruments supporting EE and RES – they vary by target recipient, product and specific goals, and are only linked by the overarching thematic objective related to low carbon economy. As such, there is limited utility in viewing these instruments as a homogenous group.
- Related, there is increasing emphasis on exchange of experience in FI implementation, and while this is always valuable, implementation of FIs for EE and RES is highly context-dependent, which may limit the transferability of lessons learned and good practice. Even among instruments that target the same specific goals – for example energy efficiency in housing – factors such as climate and patterns of home ownership, together with cultural attitudes towards debt will affect demand.
- The implementation of FIs for EE and RES need specialist support. For many MAs, venturing into quite specialised areas such as renewables, which are linked to a range of other broader regulatory issues, is highly demanding. Consideration needs

to be given to how to provide MAs with the technical expertise required to enable them to manage policies outwith the traditional areas of intervention. The set-up of funds is a lengthy and often complex process, especially for EE and RES which are technically demanding and often involve more stakeholders, so that it may be two or three years into the programming period before FIs are up and running. The demands of N+3 and programme closure means that the life of FIs is arbitrarily curtailed and a disproportionate amount of time is spent on set-up and winding down. This could be addressed by decoupling fund life from programme cycles.

- A more general point about addressing horizontal objectives through Cohesion policy and encouraging thematic concentration through earmarking of resources is that spending priorities may be distorted by these demands rather than responding to local or regional needs; this also runs the risk of diluting project quality as the emphasis is placed on spending targets rather than programme content.
- Current approaches to measuring the performance of FIs for EE and RES (and FIs more generally) are inadequate. At present, the emphasis is on collecting limited but comparable data. However, the information collected is insufficient to enable a fine-grained understanding of how and how well FIs for EE and RES work. Greater emphasis should be given to *detailed* evaluations of such measures, going beyond process issues to consider the real impact of FIs on the behaviour of project promoters and on wider EE and RES issues.

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ANNEXES

Annex I: OP Contributions paid and invested in final recipients in Article 44(c) financial instruments (EUR millions)

MS	Operational Programme	Fund	Total OP contribs paid	Total OP contribs invested in final recipients	Number of products offered	SF OP contribs paid	SF OP contribs invested in loans	SF OP contribs invested in guarantees	SF OP contribs invested in equity	SF OP contribs other
DE	Mecklenburg-V.	Klimaschutz-Darlehensfond	5.9	0.51	4	5.9	0.51			
Total			5.9	0.51	4	5.9	0.51			
DK	Innovation og Viden	Accelerace Invest	8.03	10.38	n/a	2.8	2.72		0.24	
DK	Innovation og Viden	Fonden CAT Invest Zealand	9.06	8.24	26	4.03	1.1		2.56	
Total			17.09	18.62	26	6.83	3.82		2.8	
EE	Dev of Living Environment	Renovation loan for apartment buildings	66.71	66.71	639	17.74	17.74			
Total			66.71	66.71	639	17.74	17.74			
ES	Región de Murcia	JEREMIE_DG Industria PYME ENISA Murcia	1.26	1.26	13	1	1			
ES	Asturias	JEREMIE_DG Industria PYME ENISA Asturias	0.74	0.74	5	0.59	0.59			
ES	Galicia	JEREMIE_DG Industria PYME ENISA Galicia	0.67	0.67	8	0.53	0.53			
ES	Extremadura	JEREMIE_DG Industria PYME ENISA Extremadura	0.52	0.52	3	0.42	0.42			
ES	Castilla la Mancha	JEREMIE_DG Industria PYME ENISA Castilla la Mancha	0.67	0.67	7	0.54	0.54			
ES	Canarias	JEREMIE_DG Industria PYME ENISA Canarias	0.25	0.25	5	0.21	0.21			
ES	Andalucía	JEREMIE_DG Industria PYME ENISA Andalucia	1.94	1.94	15	1.55	1.55			
ES	Andalucía	Jessica Andalucia	85.71	31.5	4	68.57	10.38		4.24	10.57

MS	Operational Programme	Fund	Total OP contribs paid	Total OP contribs invested in final recipients	Number of products offered	SF OP contribs paid	SF OP contribs invested in loans	SF OP contribs invested in guarantees	SF OP contribs invested in equity	SF OP contribs other
Total			91.76	37.55	60	73.41	15.22		4.24	10.57
FR	Limousin	Prêt d'honneur Corrèze	1.72	n/a	n/a	0.13				
FR	Limousin	Prêt d'honneur Limoges	4.04	n/a	n/a	0.22				
Total			5.76			0.35				
GR	Comp. & Enterprise	Energy-saving in existing housing	29.5	26.95	16 705	29.5	22.95			4
GR	Environment & Sust. Dev.	Energy-saving in existing housing	14.09	10.75	6 088	14.09	10.75			2.47
GR	Attica	Energy-saving in existing housing	11.2	10.16	6 374	11.2	8.63			1.53
GR	Macedonia & Thrace	Energy-saving in existing housing	24.16	22.25	13 611	24.16	18.98			3.27
GR	Thessalia-Stereia Ellada Ipiros	Energy-saving in existing housing	5.15	4.75	2 639	5.15	3.97			0.78
GR	Crete & Aegean Islands	Energy-saving in existing housing	1.05	0.97	501	1.05	0.81			0.16
Total			85.15	75.83	45 918	85.15	66.09			12.21
IT	Emilia Romagna	Fondo rotativo regionale di finanza agevolata	9.5	n/a	n/a	3.51				
IT	Lazio	Fondo di promozione dell'efficienza energetica e di energia rinnovabile	35.00	4.22	48	17.5	2.11			
IT	Lazio	SMART Energy Fund	15.00	n/a	n/a	7.5				
IT	Lazio	Fondo di garanzia a favore dei PMI interessate dai PLUS	0.10	0.03	3	0.05		0.01		
IT	Molise	Fondo energia Campobasso	20.70	n/a	n/a	7.61				
IT	Veneto	Fondo di rotazione per contenimento dei consumi	20.67	21.42	n/a	9.59				

MS	Operational Programme	Fund	Total OP contribs paid	Total OP contribs invested in final recipients	Number of products offered	SF OP contribs paid	SF OP contribs invested in loans	SF OP contribs invested in guarantees	SF OP contribs invested in equity	SF OP contribs other
		energetici								
Total			100.97	25.67	51	45.76	2.11	0.01		
NL	Noord	Interestsubsidieregeling Energiebesparing	n/a	1.74	150	n/a	0.87			
NL	West	Jessica energiefonds den Haag	4	1.72	4	2.53	0.7			
NL	West	Fonds energietransitie Utrecht	3.75	1.43	10	1.25	0.48			
Total			7.75	4.89	164	3.78	2.05			
SK	Regional OP	Jessica statny fond rozvoja byvania	164.99	88.44	494	140.24	75.18			
SK	Comp. & Economic Growth	Jessica statny fond rozvoja byvania	59	0	0	50.15	0			
SK	Bratislava	Jessica statny fond rozvoja byvania	20.72	11.75	64	17.61	9.99			
Total			244.71	100.19	558	208	85.17			
UK	London	Greener Social Housing Fund	16.2	n/a	n/a	8.1				
UK	West Midlands	Aston Reinvestment Trust	3.1	2.82	119	1.42	1.3			
UK	West Midlands	Black country reinvestment trust	7.72	7.72	229	3.61	3.61			
UK	West Midlands	Coventry and Warwickshire Small Business Loans	0.98	0.98	24	0.49	0.49			
UK	West Midlands	Coventry and Warwickshire Reinvestment Trust	1.55	1.45	85	0.72	0.67			
UK	West Midlands	Enterprise 1830 Small business loans	1.11	1.1	300	0.55	0.43			
UK	West Midlands	Marches Rural Reinvest Trust	3.16	2.93	101	1.47	1.35			
UK	West Midlands	Staffordshire and Stoke Business Loan Fund	1.31	1.31	69	0.65	0.65			

MS	Operational Programme	Fund	Total OP contribs paid	Total OP contribs invested in final recipients	Number of products offered	SF OP contribs paid	SF OP contribs invested in loans	SF OP contribs invested in guarantees	SF OP contribs invested in equity	SF OP contribs other
UK	West Midlands	The Prince's Trust	2.86	2.44	741	1.48	1.22			
UK	West Midlands	WS Business Loan Fund	0.82	0.41	34	0.41	0.41			
UK	East Midlands	Enterprise Loans East Midlands	1.23	1.41	75	1.23	0.87			
Total			40.04	22.57	1 777	20.13	11			
TOTAL			665.84	352.54	49 197	467.05	203.71	0.01	7.04	22.78

Note: The data reported to the Commission by Managing Authorities is often incomplete and sometimes contradictory; it has been replicated here, but should be treated with some caution.

Source: European Commission, 2016a.

Annex II: 2014-20 OP plans for financial instruments for energy efficiency and renewable energy (EUR million)

	TO4: Low carbon economy					Multi TO					
	Loan	Equity	Guarantee	Interest subsidy	TO4 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
BE		16.5			16.5	0.8	51.0	0.8	0.8	53.4	69.9
OP Brussels Capital Region											
Support for circular economy & EE						0.8	0.8	0.8	0.8	3.2	3.2
OP Wallonia											
Economy 2020							50.2			50.2	50.2
Transition to low carbon economy		16.5			16.5						16.5
BG						115.0	2.8	34.0		151.9	151.9
OP Innovation & Competitiveness											
Energy & resource efficiency								34.0		34.0	34.0
OP Regions in Growth											
Sustainable urban development						115.0	2.8			117.9	117.9
CZ						99.8			9.0	108.8	108.8
Enterprise and Innovation for											

	Loan	Equity	Guarantee	Interest subsidy	TO4 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
Competitiveness											
Energy management, infrastructure, EE & RES						22.0			9.0	31.0	31.0
Integrated ROP											
Improving public services & quality of living conditions						77.8				77.8	77.8
DE	121.3	26.7			148.0	46.6	3.2			49.7	197.7
OP Baden-Württemberg ERDF											
Reduction of CO2 emissions	0.0	0.0	0.0								
OP Bayern ERDF											
Climate protection	40.0				40.0						40.0
OP Berlin ERDF											
Reduction of CO2 emissions		20.0			20.0						20.0
OP Bremen ERDF											
Promotion of CO2-efficient economic & urban structures	7.5				7.5						7.5
OP Hamburg ERDF											
Reduction of CO2 emissions	0.5				0.5						0.5
OP Hessen ERDF											
Sustainable urban development							3.2			3.2	3.2
Reduction of CO2 emissions in all sectors		6.7			6.7						6.7
OP Mecklenburg-Vorpommern ERDF											
Promote reduction of CO2 emissions	20.0				20.0						20.0
OP Nordrhein-Westfalen ERDF											
Promote reduction of CO2 emissions	53.3				53.3						53.3
Sustainable urban & neighbourhood development						26.6				26.6	26.6
OP Thüringen ERDF											
Sustainable urban development						20.0				20.0	20.0

	Loan	Equity	Guarantee	Interest subsidy	TO4 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
ES	16.6		9.0		25.6						25.6
Cataluña ERDF OP											
Promote carbon reduction in all sectors	14.0		9.0		23.0						23.0
País Vasco ERDF OP											
Promote carbon reduction in all sectors	2.6				2.6						2.6
FR	76.1	40.9	24.6	2.2	143.9	5.4	18.0	22.3	2.0	47.6	191.5
Interregional OP Alsace											
Towards a low carbon economy	2.0				2.0						2.0
Interregional OP Réunion											
Energy transition & electricity independence		9.0			9.0						9.0
OP ERDF-ESF Île-de-France et Seine											
Transition to low carbon economy	16.0				16.0						16.0
ROP Aquitaine											
Environment and energy transition						3.0				3.0	3.0
ROP Auvergne											
Low carbon economy in all sectors	2.0				2.0						2.0
ROP Bourgogne											
Towards a low carbon society	1.0	1.0	1.0		3.0						3.0
ROP Bretagne											
Energy and environmental transition	2.2	7.9	4.2	2.2	16.6						16.6
ROP Centre											
Transition to a low carbon economy	1.8		0.5		2.3						2.3
ROP Champagne-Ardenne											
Supporting energy transition	8.0				8.0						8.0
ROP Corse											
Transition to low carbon economy	1.0				1.0						1.0

	Loan	Equity	Guarantee	Interest subsidy	T04 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
ROP Guadeloupe											
Transition to low carbon economy	15.0				15.0						15.0
ROP Languedoc-Roussillon											
Sustainable investment in smart growth						0.4	4.4	15.8		20.5	20.5
ROP Limousin											
Transition to low carbon economy	1.1				1.1						1.1
ROP Midi-Pyrénées et Garonne											
Contribute to energy transition			6.0		6.0						6.0
ROP Nord-Pas de Calais											
Support energy transition	15.0	21.0	11.9		47.9						47.9
ROP Picardie											
Transition to low carbon economy	10.0				10.0						10.0
ROP Poitou Charentes											
Promote environmental excellence	1.0	2.0	1.0		4.0						4.0
ROP Provence Alpes Côte d'Azur											
Energy transition & sustainable resource use						2.0		1.0	2.0	5.0	5.0
ROP Rhône Alpes											
Energy transition, transport & environment							5.0	2.5		7.5	7.5
Innovation for societal challenges							8.6	3.0		11.6	11.6
HR	131.8		130.0		261.8						261.8
Competitiveness and Cohesion OP											
Promoting Energy Efficiency and Renewable Energy Sources	131.8		130.0		261.8						261.8
HU	21.3		4.3	2.8	28.4						28.4
Competitive Central-Hungary OP											
Energy efficiency, smart energy	21.3		4.3	2.8	28.4						28.4

	Loan	Equity	Guarantee	Interest subsidy	TO4 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
use and RES											
IT	194.5	24.5	46.9	4.0	270.0	16.4		0.9		17.2	287.2
National OP Enterprises & Competitiveness											
Energy efficiency	72.1		12.7		84.8						84.8
ROP Abruzzo ERDF											
Low carbon economy				4.0	4.0						4.0
ROP Basilicata ERDF											
Energy and urban transport			4.0		4.0						4.0
ROP Calabria ERDF ESF											
Energy efficiency & sustainable transport	17.6		10.6		28.1						28.1
ROP Campania ERDF											
Sustainable urban development						14.5				14.5	14.5
ROP Emilia Romagna ERDF											
Low carbon economy	5.0				5.0						5.0
ROP Lazio ERDF											
Energy sustainability & transport	5.0				5.0						5.0
ROP Liguria ERDF											
Energy			2.0		2.0						2.0
ROP Lombardia ERDF											
Transition to low carbon economy	28.9				28.9						28.9
ROP Marche ERDF											
Transition to low carbon economy	9.8	3.5	6.3		19.6						19.6
ROP Piemonte ERDF											
Sustainable energy & quality of life	3.4		3.4		6.8						6.8
ROP Sardegna ERDF											
Sustainable energy & quality of life	11.3				11.3						11.3
ROP Sicilia ERDF											
Sustainable energy & quality of life	30.0				30.0						30.0
ROP Toscana ERDF											
Transition to low carbon economy	8.0		8.0		16.0						16.0

	Loan	Equity	Guarantee	Interest subsidy	T04 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
Urban						0.9		0.9		1.7	1.7
ROP Umbria ERDF											
Sustainable energy	3.5				3.5						3.5
Sustainable urban development						1.0				1.0	1.0
ROP Veneto ERDF											
Energy sustainability and quality of environment		21.0			21.0						21.0
LT	215.4		115.8	141.9	473.2			14.5		14.5	487.7
OP Structural Funds Investments											
EE & renewable energy production	215.4		115.8	141.9	473.2						473.2
Sustainable use of resources & adaptation to climate change								14.5		14.5	14.5
LV	118.7				118.7						118.7
Growth and Employment											
Transition to low carbon economy	118.7				118.7						118.7
MT	12.0				12.0						12.0
Fostering a competitive & sustainable economy											
Shifting towards a low-carbon economy	12.0				12.0						12.0
NL	18.2				18.2						18.2
OP West Netherlands ERDF											
Towards a low-carbon economy	18.2				18.2						18.2
PL	849.5		14.6		864.1	44.0			8.0	52.0	916.1
OP Infrastructure & Environment											
Reducing emissions	571.3				571.3						571.3
ROP Dolnośląskie											

	Loan	Equity	Guarantee	Interest subsidy	T04 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
Environment and resources						18.0				18.0	18.0
Low carbon economy	50.8				50.8						50.8
ROP Podlaskie											
Low carbon economy											
ROP Pomorskie											
Energy	40.8				40.8						40.8
ROP Śląskie											
EE, renewables & low carbon	20.0		13.0		33.0						33.0
ROP Kujawsko-Pomorskie											
EE & low carbon economy	70.8				70.8						70.8
ROP Lubelskie											
EE & low carbon economy	27.2				27.2						27.2
ROP Łódzkie											
Low carbon economy	22.0				22.0						22.0
ROP Małopolskie											
Regional energy policy						20.0			8.0	28.0	28.0
ROP Mazowieckie											
Transition to low carbon economy	29.5				29.5						29.5
ROP Opolskie											
Low carbon economy	17.0		1.6		18.6						18.6
ROP Podkarpackie											
Pure energy						6.0				6.0	6.0
PT	171.4		153.4	45.0	369.8	34.0		13.2	14.8	62.0	431.8
ROP Alentejo											
Energy efficiency & transport	11.6		1.6	2.3	15.5						15.5
Sustainable urban development						24.0		3.2	4.8	32.0	32.0
ROP Algarve											
Sustainable & efficient resource use	1.5		1.3	1.3	4.0						4.0
ROP Azores											
Low carbon economy	2.8		2.8	2.8	8.5						8.5
ROP Centro											

	Loan	Equity	Guarantee	Interest subsidy	TO4 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
Sustainable resources	13.7		14.7	13.7	42.0						42.0
ROP Lisboa											
Sustainable urban development						10.0		10.0	10.0	30.0	30.0
Transition to low carbon economy	6.4		6.4	6.4	19.2						19.2
ROP Madeira											
Low carbon economy	2.0		2.0	2.6	6.6						6.6
ROP Norte											
Low carbon economy	18.4		14.7	15.9	49.0						49.0
OP Sustainability & Resource Use Efficiency											
Transition to low carbon economy	115.0		110.0		225.0						225.0
RO			85.5		85.5						85.5
Regional OP											
Shift to low carbon economy			85.5		85.5						85.5
SE		38.8			38.8						38.8
National regional fund OP for investments in growth & jobs											
Shift to low carbon economy		38.8			38.8						38.8
SI	55.0			1.0	56.0						56.0
OP EU Cohesion Policy											
Sustainable use & production of energy & smart grids	55.0			1.0	56.0						56.0
SK						111.4				111.4	111.4
Integrated Regional OP											
Improving the quality of life in regions						111.4				111.4	111.4
UK	119.1	14.6			133.7						133.7
United Kingdom - ERDF											

	Loan	Equity	Guarantee	Interest subsidy	T04 Total	Loan	Equity	Guarantee	Interest subsidy	Multi TO Total	TOTAL
England											
Shift to a low carbon economy	107.0				107.0						107.0
United Kingdom - ERDF											
Scotland											
Shift to a low carbon economy	12.1	14.6			26.7						26.7
TOTAL	2 120.9	162.1	584.1	197.0	3 064.1	473.4	75.0	85.6	34.6	6 68.6	3 732.7

Source: Own calculations from: <https://cohesiondata.ec.europa.eu/>

Annex III: Case studies for FIs implemented in 2007-13

Key findings

- In Estonia, the **renovation loan scheme** was considered to have had a positive impact, helping to remove market barriers and successfully combining loans with grants and technical support. However, the fund manager took the view that, at almost two years, the set-up of the FI was too time-consuming. The experience highlighted the importance of having a strong understanding of the regulatory framework.
- The renovation projects supported under the **JESSICA Initiative in Slovakia** were shown to improve the energy efficiency of buildings and deliver long-term reductions in heat consumption in buildings and this experience is encouraging continued use of FIs to improve energy efficiency in buildings in the 2014-20 programming period.
- The implementation of **JESSICA FIDAE in Spain** was timely and addressed a market failure in the eligible regions. The financial terms offered under the scheme proved attractive for private sector beneficiaries and this engagement with the private sector proved key to the success of the scheme. However, while final recipients stated that the administrative burden was relatively light, financial intermediaries identified the numerous regulatory requirements.
- For the **UK Low Carbon Innovation Fund**, maintaining flexibility when implementing the FI, for example by altering the size of investments, helped to increase the number of successful applicants. Having a small fund allowed the fund manager to provide bespoke investment products and was considered to be extremely valuable. However, their experience showed that equity FIs for EE and REs can be very resource-intensive and that the assessment of low carbon impacts during due diligence can be time-consuming.

This Annex includes the case studies from the 2007-13 period. These are:

- Estonia (Renovation loans for apartment buildings);
- Slovakia (JESSICA);
- Spain (JESSICA FIDAE); and
- UK (Low Carbon Innovation Fund in the East of England OP).

The Spain and UK case study FIs were supported through regional OPs, whereas the Estonian renovation loans for apartment buildings was funded under a national OP. JESSICA Slovakia received funding from both national and regional OPs.

The FIs in these case studies have different classifications: the UK Low Carbon Innovation Fund reported under Article 44(a) - FIs for enterprises; JESSICA FIDAE was reported as Article 44(b) - an urban development fund; and the Slovak JESSICA and Estonia renovation loan as Article 44(c) - FIs for energy efficiency and renewable energy in buildings.

The case studies are structured as follows:

- Title;
- Lessons learned;
- Summary;
- Policy objectives;

- Governance/administrative structures;
- Relevant feasibility studies/ ex ante assessments;
- Type of financial product offered;
- Terms and conditions;
- State aid;
- Target recipients;
- Selection and award criteria;
- Sample project/investment;
- Financial characteristics and other indicators of scale;
- Modifications during the lifetime of the instrument;
- Contribution to OP goals;
- Evaluation results;
- Application process and publicity;
- Current status;
- References.

1. ESTONIA - Renovation loans for apartment buildings (2007-13)

Lessons learned

- The renovation loan scheme was considered to be well planned and implemented. However, the fund manager took the view that the preparation stage was too time-consuming. This took almost two years, a period during which the market situation could have potentially changed.
- Familiarity with EU regulations is needed when preparing schemes of this type.
- The renovation loan scheme helped to remove market barriers and contributed to changing the mind-set of apartment associations, offering them an alternative approach to funding renovation work.
- Clear rules and guidelines are essential to making the support attractive to potential recipients.
- Guidance and counselling from KredEx proved to be crucial in explaining the benefits of the scheme to final recipients.
- A key element in the success of the scheme was the combination of loans with grants and technical support. It is essential to combine forms of support to address the market gap.

Summary

The Renovation loan scheme operated from 2009 to the end of 2007-13 programming period, under Estonia national OP for Development of the Living Environment, providing soft loans to 493 apartment buildings totalling EUR 49 million (supported through the ERDF), combined with grants and technical support. This FI was reported by the MA in 2007-13 as an FI offering support for energy efficiency/renewables (Article 44(c)).

Policy objectives

The Renovation loans for apartment buildings scheme offered loans to refit apartment blocks built before 1993, using flexible repayment periods and low interest rates to encourage renovation work to reduce energy consumption in buildings. In addition to loans, the scheme also offered assistance with conducting energy audits and, from 2010, provided grants alongside the loan. The scheme targeted building associations or local government, if the building was owned by a city or local municipality.

Governance / administrative structures

The Ministry of Financial Affairs acts as MA for all OPs in Estonia, with the Ministry for Economic Affairs and Communications responsible for implementing the ERDF Development of the Living Environment OP, which supported the renovation loan scheme.

The scheme itself operates as a fund of funds, with the state-owned Estonian Credit and Export Guarantee Fund (KredEx), a public financial institution, appointed to act as fund of funds manager. KredEx aims to improve living conditions by offering loan guarantees for the purchases of homes in addition to providing loans, guarantees and grants for solutions aimed at improving energy efficiency. KredEx has supported projects which improved housing conditions for over 65,000 people.

Under the renovation loan scheme, KredEx offered grant support to cover up to 35 percent of the total renovation work costs with another 50 percent covered by the renovation loan. The loans were managed by two of the largest commercial banks in Estonia - Swedbank and SEB.

Relevant feasibility studies

Between 2003 and 2007, a total of 200 million Estonian kroon (EEK) (EUR 12.8 million) was allocated from public funds to support building renovations. In this period, KredEx supported the renovation of 3 190 buildings and following this previous success, the decision was taken to use ERDF to develop a new low-interest loan scheme with the loan repaid from the savings made through lower energy bills.

Accordingly, an evaluation was conducted in 2009, which found that the renovation loan budget should be increased by EEK 250 million Estonian kroon (EUR 16 million) to widen the scope for apartment renovations and encourage more applicants.

Type of financial product offered

Apartment building associations and local government were able to apply for renovation loans from two major commercial banks, which could be used to cover up to 50 percent of the renovation costs. In addition to this loan, KredEx provided a grant which would cover up to 50 percent of the costs to conduct a technical evaluation of the building (conducting such an energy audit was a precondition of taking part in the scheme). From 2010 onwards, projects were able to apply for an additional grant which could cover up to 35 percent of costs, with the renovation loan scheme potentially covering up to 85 percent of the total project cost.

Terms and conditions

The minimum loan amount was EEK 100 000 (EUR 6 400) with no upper loan ceiling. Applicants had to be able to cover 15 percent of the total costs of the renovation. The repayment period was up to 20 years with interest rates fixed just below five percent for 10 years. As already mentioned, to be eligible for a loan, buildings were required to have an energy audit carried out, which would specify the amount of renovation work required.

For buildings up to 2 000 m², the renovation must aim to achieve at least a 20 percent improvement in energy efficiency and for buildings over 2 000 m², a minimum 30 percent improvement.

State aid

The renovation loan scheme was financed from ERDF and the domestic funding. It is conducted on a co-investment basis, with investments made on 'pari-passu',⁷³ market terms and therefore does not constitute State aid.

⁷³ 'An investment is considered pari passu when it is made under the same terms and conditions by public and private investors, where both categories of operators intervene simultaneously and where the intervention of the private investor is of real economic significance.' Communication from the Commission — Guidelines on State aid to promote risk finance investments
[http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014XC0122\(04\)](http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014XC0122(04))

Target Recipients

For the renovation loan scheme, apartment building associations and local government were the target recipients. At least 80 percent of the inhabitants of apartment buildings had to be physical persons in order to apply for the loan.

Selection and award criteria

Projects were assessed on a first-come-first-served basis. There were no geographical limits with renovated apartment buildings located all over Estonia but had to be built before 1993, had conducted an energy audit and be deemed able to make monthly loan repayments.

Eligible costs under the renovation loan scheme included the following:

- renovation or exchange of apartment buildings' facade, roof, windows and exterior doors;
- insulation of basements and rooftops;
- replacement, reconstruction or modification of heating systems;
- replacement or reconstruction of ventilation systems;
- installation of new devices, which use and produce renewable energy (excluding heat pumps in district heating areas);
- renovation of common rooms, but only if deemed necessary to improve overall energy efficiency.

Non-eligible projects costs were listed in the 2007-13 Structural Assistance Act.

Sample project/investment

Typical projects were apartment buildings built between 1950 and 1990, at a time when the construction standards and the quality of materials were often considerably lower. As such, buildings have insufficient insulation and inefficient heating systems. Compared to Finland for example, the energy consumption of similar buildings was two to three times greater.

In 2006, KredEx launched a competition titled '*Make your apartment building more energy efficient*'. The overall objective of this project was to challenge building associations to improve the energy efficiency of their buildings and find the apartment that could improve its energy efficiency the most. The winner of the competition was an apartment building that underwent a complete renovation and received financial support from the Baltic Energy Efficiency Network for Building Stock scheme. Total support provided was EEK 1 017 million Estonian kroon (approximately EUR 65 000).

Financial characteristics and other indicators of scale

During 2009-13 the average loan sums were:

- 2009 – EUR 71 356
- 2010 – EUR 84 078
- 2011 – EUR 102 869

- 2012 – EUR 128 637
- 2013 – EUR 173 391.

Between 2009 and 2013, the budget of the renovation loan scheme was EUR 49 million, with all of this distributed through 493 loans. This EUR 49 million was made up of EUR 17 million ERDF and EUR 32 million national funding, through state loans provided from the Council of Europe Development Bank and existing KredEx funds.

Modifications during the lifetime of the financial instrument

As stated previously, when the FI was launched in 2009, KredEx provided no grant support, with this option being added in 2010 to encourage greater uptake of the renovation loan scheme.

Contribution to OP goals

In 2007-13, FIs were used within the framework of Cohesion Policy Funds, providing both SME support and a renovation loan for apartment buildings.

The renovation loan scheme was implemented under the OP for the Development of Living Environment. The main indicator used to measure FI performance was energy efficiency and how it reduced energy consumption. On average, the apartment buildings renovated under the scheme reduced their energy consumption by 40 percent.

Evaluation results

In 2011, research company Saar Poll was commissioned to conduct a phone survey with 500 respondents. From this sample, it was found that 27 percent of apartment buildings were renovated or due to be renovated using the KredEx renovation loan scheme. In addition, there was an evaluation conducted between 2010 and 2014, which showed that there was a total of 663 renovated apartment buildings. Collectively, these buildings saved EUR 4.5 million per year due to lower energy consumption.

The majority of the loans were given in Harjumaa and Tartumaa, two of the most densely-populated areas in Estonia. By 2013 the amount of buildings that had been completely renovated increased to 62, with the remaining 599 partially refurbished.

An evaluation conducted by Tallinn University of Technology showed that people living in renovated apartment buildings evaluated their living conditions as 'good' and most of the people did not find noise of the new energy saving devices to be an issue. Moreover, many people stated that their energy bills had decreased and many existing problems in the buildings were solved through the work carried out under the renovation loan scheme.

On the regulatory framework, KredEx officials stated that the current regulations lacked flexibility. They drew attention to the mandatory requirement to conduct ex ante assessments stating that if the market situation should change, KredEx would need to conduct a new ex ante assessment which would usually take at least a year and thereby prevent a quick response to market failures.

Application process and publicity

When the renovation scheme was launched in 2009, there were two information days held to provide details of the loan and application process. In 2011 there was a campaign

launched titled 'We believe that renovation loan is executable for any building union', which aimed to demonstrate that the average loan payment per month is equal to the money saved from reduced bills.

Current status

Over 600 buildings were renovated during 2007-13, but there is still significant unfulfilled demand for renovation work. The reconstruction (grant) support for apartment buildings continues to be offered in 2014-20, providing grants of between 15-40 percent of the total cost of renovation works. There is a total of EUR 102 million allocated from ESIF, which should cover the renovation of approximately 1 000 apartment buildings. The ex ante assessment for FIs in 2014-20 found that the renovation loan FI is no longer needed, as commercial banks will now offer low interest rate loans. There are now more financing options than before, and in the new period only soft support with grants and advice will be offered.

An evaluation conducted by the Estonian government found that there is a clear need to raise awareness of the importance for making energy efficiency improvements and that it is necessary to inform residents of apartment buildings and specialists in the field about the availability of financial support. Accordingly, there are a number of related initiatives in Estonia, such as the production of guidelines for sustainable development of living environments, support for restoration works and efforts to maintain the cultural and environmental value of buildings.

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2. SLOVAKIA - JESSICA Initiative (2007–13)

Lessons learned

- The success of the JESSICA Initiative in Slovakia is encouraging continued use of FIs to improve energy efficiency in buildings in the 2014-20 programming period.
- The renovation projects supported under the JESSICA Initiative in Slovakia were shown to improve the energy efficiency of buildings and deliver long-term reductions in heat consumption.
- The JESSICA Initiative has contributed to the improvement of the physical condition of existing housing stock and contributed to the overall development of urban areas in Slovakia.

Summary

The JESSICA Initiative in Slovakia operated between 2013 and 2016, offering soft loans up to a maximum of EUR 200 000 to support the renovation of residential buildings, improving the overall quality of housing infrastructure and reducing building energy consumption. The FI was implemented by Slovak State Fund for the Housing Development, managing a total budget of EUR 244.7 million, supported through three ERDF OPs - two national OPs and the OP for the Bratislava region. It was reported by the MA as an FI for energy efficiency/renewables (Article 44(c)).

Policy objectives

The JESSICA Initiative in Slovakia was implemented through three operational programmes:

- the Regional Operational Programme (ROP) 2007-13 (The ROP was amended to include the JESSICA Initiative in 2011);
- the Operational Programme for the Bratislava region (The Bratislava region OP was amended to include the JESSICA Initiative in 2011);
- the Operational Programme Competitiveness and Economic Growth (The Competitiveness and Economic Growth OP was amended to include the JESSICA Initiative in 2015).

The total allocation of the JESSICA Initiative in Slovakia for the 2007-13 programming period was EUR 244.7 million, made up of EUR 207.9 million ERDF and the remaining EUR 36 million provided by final recipients themselves.

The implementation of the JESSICA Initiative was carried out in three phases:

- JESSICA I was launched as a pilot project in 2013 with an initial allocation of EUR 11.5 million.
- Following the success of JESSICA I, and with the MAs of the Regional OP and the OP for the Bratislava Region experiencing difficulty in disbursing funds, additional finance totalling EUR 103.5 million was reallocated to the JESSICA Initiative, under JESSICA II.
- JESSICA III – with the end of the programming period approaching, unspent funds total from the ROP, the OP for the Bratislava Region and the Competitiveness and

Economic Growth OP, totalling EUR 130 million were reallocated to the JESSICA Initiative in 2015.

The JESSICA Initiative was open to applications until October 2016.

The overall objective of the JESSICA Initiative was to support the development of housing infrastructure and to reduce the energy consumption of residential buildings (apartment blocks) in Slovakia.

Governance / administrative structures

The Ministry of Finance of the Slovak Republic is responsible for the overall coordination of FIs in Slovakia. As the JESSICA Initiative receives contributions from three OPs, each MA has a role in its implementation. The MA for the ROP and the Bratislava Region OP is the Ministry of Agriculture and Rural Development, with the Ministry of Economy responsible for the Competitiveness and Economic Growth OP.

The JESSICA Initiative was implemented by the Slovak State Fund for Housing Development, which signed funding agreements with the three contributing MAs. The State Fund for Housing Development received a grant, as a direct financial contribution by way of a donation to a financial institution. The funding agreement was not considered a public service contract under public procurement law and so the State Fund for Housing Development could be directly selected. This appointment received approval from both the European Commission and the Public Procurement Office of the Slovak Republic.

Relevant feasibility studies/ ex ante assessments

In June 2010 an evaluation was published, examining the feasibility of a financial instrument to support the renovation of apartment blocks. The main purpose of the study was to assess the potential for a JESSICA FI in Slovakia and to consider possible implementation options. The evaluation made the following recommendations:

- An FI should be financed from the ROP and the OP for the Bratislava Region, with potential additional allocations from the OP Environment and the Competitiveness and Economic Growth OP.
- The FI should make use of existing ERDF allocations to housing infrastructure under the ROP and the OP for Bratislava region.
- A JESSICA FI using a fund of funds model should be implemented to encourage the involvement of private investors, enabling a leverage of private finance, a transfer of expertise and support a broader range of urban development projects.
- If a fund of funds model is pursued, the EIB should be considered for fund manager.

Type of financial product offered

Soft loans for the renovation of apartment buildings to improve energy efficiency.

Terms and conditions

The maximum loan ceiling was EUR 200 000 with no minimum amount.

In 2013 (in accordance with Act No. 607/2003 on the State Fund for Housing Development) the terms and conditions were the following:

- interest-free;
- repayment of the loan over 15 years;
- the loan can cover up to 80 percent of the eligible costs.

However, due to changes in national legislation and amendments to the investment strategy, the loan terms were amended in January 2014 to the following:

- an interest rate of 1 percent;
- repayment of the loan over 20 years;
- the loan can cover up to 75 percent of eligible costs of renovation;
- the remaining 25 percent must be provided by the final recipient from their own funds.

In addition to these amended terms:

- the final recipient must be located in Slovakia;
- the project must be completed within 24 months from the signature of the loan agreement;
- the projects must demonstrate how they help to meet Europe 2020 objectives, namely the reduction of CO₂ emissions by 20 percent, enhancing energy efficiency use by 20 percent and achieving 20 percent use of renewable energy sources.

State aid

Under the *de minimis Regulation*⁷⁴ public funding to a single recipient of up to EUR 200 000 over a three year fiscal period is considered to have only a negligible impact on competition, and as such does not require notification. The maximum loan amount under the JESSICA Initiative in Slovakia is EUR 200 000 and it is designed to fall within the scope of *de minimis*.

Target recipients

The main target recipients are the following:

- owners of apartments and apartment buildings/building managers;
- associations of apartments owners and landlords;
- cities, municipalities, city districts, self-governing regions;
- non-profit organizations providing housing services;
- other corporate entities (e.g. SMEs) located in Slovakia, which have been established for at least five years prior to applying.

Selection and award criteria

The following activities were considered eligible expenditure:

- renovation or replacement of elevators;

⁷⁴ State aid: Commission adopts new *de minimis* Regulation, exempting aid notification below €200,000 http://europa.eu/rapid/press-release_IP-06-1765_en.htm?locale=en

- replacement of gas distribution, electricity, heating, water supply or sewage systems;
- creation of facilities for disabled persons;
- renovation of the building façades, including insulation (to improve energy efficiency);
- combinations of the above-mentioned activities.

Annual calls for applications were issued and projects were assessed on the basis of first-come-first-served.

Sample project/investment

A typical project is the renovation/modernisation of an apartment building, particularly improvements in insulation and the upgrading of energy distribution systems. Such project would be expected to result in a 35 percent saving in heating costs. The average cost of such a project is approximately EUR 156 000.

Financial characteristics and other indicators of scale

The total budget for the JESSICA Initiative in Slovakia was EUR 244.7 million, of which EUR 207.9 million is ERDF with the remaining EUR 36 million coming from final recipients themselves. The JESSICA Initiative received no domestic cofinancing.

In total, 1 163 loan contracts have been signed, allocating the entire EUR 244.7 million. As of the end of February 2017, 263 projects have been completed.

Modifications during the lifetime of the financial instrument

As mentioned earlier, the implementation of JESSICA Initiative in Slovakia was carried out in three phases, with the scheme modified at each stage:

- JESSICA I: the funding agreement between the Ministry of Agriculture and Rural Development and the State Fund for Housing Development was signed in April 2013. This initial allocation for JESSICA I amounted to EUR 11.5 million.
- JESSICA II: the original funding agreement was amended in March 2015, allocating an additional EUR 103.4 million.
- JESSICA III: further amendments to the funding agreement were signed in December 2015, with the JESSICA Initiative now supported through the Competitiveness and Economic Growth OP and allocated an additional EUR 130 million.

Contribution to OP goals

The impact of the JESSICA Initiative is determined by the following OP indicators, which contribute to energy savings and energy efficiency:

- Decrease in the energy intensity of renovated apartment buildings (in %);
- Decrease in the energy intensity of renovated apartment buildings (in kWh/m²);
- Size of the renovated area (façade) of the apartment buildings(m²);
- Annual energy savings through delivery of projects (GJ/year);

- Number of loans provided (total loans);
- Number of renovated apartment buildings (total buildings).

Evaluation results

No specific evaluation has been carried out for the JESSICA Initiative. However, the perceived success of this FI resulted in further plans to implement a similar FI in 2014-20. Accordingly, an ex ante assessment for FIs has been conducted, which has recommended continued use of FIs in Slovakia, including in the area of energy efficiency.

Application process and publicity

Applications are made on the official website of the State Fund for Housing Development. The application process consists of the following steps:

- the applicant submits a written request through the municipal or district office (dependent of the location of the applicant) and the application form is registered in the electronic system;
- if the applications meets the eligibility criteria, it is submitted for appraisal by the State Fund for the Housing Development;
- State Fund for the Housing Development together with Ministry of Transport and Construction (as founder of State Fund of Housing Development) assesses the application within 110 calendar days;
- if approved, the loan agreement is signed and the entire amount is transferred to the applicant's account. The project must then be completed within 24 months from the signing the contract.

The performance of the project in meeting the energy efficiency targets is monitored by the Slovak Innovation and Energy Agency, in cooperation with the State Fund for Housing Development. The agency monitors and processes the required data on the energy performance of the buildings for five years after the project closure.

Current status

Significant elements of the projects supported under the JESSICA Initiative are still being implemented.

As mentioned earlier, the ex ante assessment for FIs in the 2014-20 programming period recommends the continuation of FIs. The Ministry of Finance, as the body responsible for FI implementation in Slovakia (through Slovak Investment Holdings) is proposing six FIs, including one targeting energy efficiency improvements in housing stock, and are (at the time of writing) preparing the procurement process. The Ministry of Finance, as the body responsible for FI implementation in Slovakia (through Slovak Investment Holdings), is preparing the public procurement process for this fund and it is expected that the State Fund for Housing Development will bid to be fund manager of the FI, which will have a budget of EUR 140 million.

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- Investment strategy (third revision) for energy efficiency through renovation of housing stocks, State Fund of Housing Development, 2015
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- Summary of the JESSICA implementation (statistics and figures), State Fund of Housing Development, February 2017
- Revision No. 6 of the Regional operational programme, Ministry of Agriculture and Rural Development of the Slovak Republic, March 2016
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- Website of the State Fund of Housing Development, www.sfrb.sk

2. SPAIN - JESSICA FIDAE (2007-13)

Lessons learned

- The implementation of JESSICA FIDAE was timely and addressed a market failure in the eligible regions. There is generally sub-optimal investment in EE and renewable energy projects in Spain and JESSICA FIDAE encouraged the involvement of the banking sector to finance EE and renewable energy.
- The financial terms of JESSICA FIDAE were the main attraction for private sector recipients, who could obtain finance with the generous interest rates and long repayment periods which are necessary to generate returns from EE and renewable energy projects.
- Selecting three financial intermediaries to act as UDF managers introduced competition in the scheme.
- Adapting the investment strategy to offer advantageous financial conditions to public sector clients increased the number of deals made.
- Using the expertise of the UDF managers and their networks ensured implementation proceeded at a suitable pace and attracted a healthy number of applicants. Collaboration with financial intermediaries was described as 'professional' by the recipients interviewed.
- While final recipients stated that the administrative burden was relatively light, financial intermediaries identified the numerous regulatory requirements as one of the main shortcomings of JESSICA FIDAE.
- Changes in the regulatory framework for renewable energy (specifically for isolated solar energy) negatively impacted the attractiveness of the FI, discouraging some potential recipients from applying for funding.

Summary

The JESSICA Holding Fund for Investments in Energy Efficiency and Renewable Energies (JESSICA FIDAE) was implemented in Spain at the sub-national level starting in 2011 under the broader EU-wide JESSICA initiative. It was supported through 10 regional ERDF OPs with an initial allocation of EUR 123 million, with the EIB appointed as Fund of funds manager. It was reported by the MA as an FI for urban development (Article 44(b)).

Policy objectives

JESSICA supported integrated and sustainable urban-renewal projects through a range of financial products, including equity investments, loans and guarantees. As with other FIs, the key objectives of JESSICA FIDAE were to:

- make ESIF support more efficient and effective by using repayable FIs to create a stronger incentive for successful project implementation;
- mobilise additional financial resources for Public Private Partnerships (PPPs) and other urban development projects with a focus on sustainability / recyclability; and
- use the financial and managerial expertise of international financial institutions such as the EIB.

Geographical coverage of JESSICA FIDAE



Source: Red2Red Consultants, Madrid

JESSICA FIDAE was implemented by the Institute for Diversification and Energy Savings (IDAE) as appointed by the MA of the ERDF (DG European Funds, Ministry of Finance), to finance EE and renewable energy projects in the area of sustainable urban development.

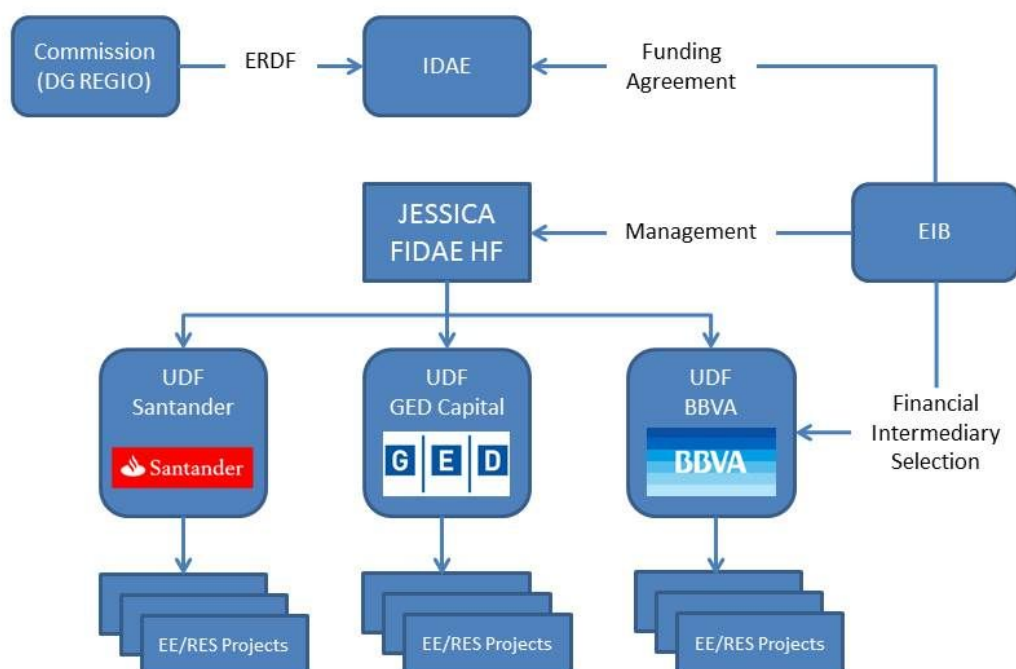
Governance / administrative structures

JESSICA FIDAE was structured as a Fund of funds and managed by the EIB, with financial resources to be channelled to final recipients through several UDFs, managed by selected financial intermediaries.

A funding agreement was signed between the EIB and IDAE. IDAE was designated as intermediate body by the ERDF MA, the Ministry of Finance. The Funding Agreement appointed the EIB as Fund of funds manager and established the main governance provisions and investment strategy.

A total of three financial intermediaries were appointed in a competitive process: Santander, BBVA and GED Capital. In each case, an Operational Agreement was signed between the EIB and the financial intermediaries, which outlined the conditions governing the management of the UDFs.

Structure of JESSICA FIDAE



Source: Red2Red Consultants, Madrid

The table below provides a brief description of the selected financial intermediaries.

Financial Intermediary	Description
Santander	Santander was founded in 1857 and is currently traded on the Madrid Stock Exchange (IBEX 35). It has close to 200 000 employees and over 120 million customers, both in Europe and elsewhere. Its main business line is retail banking, which contributes approximately 70 percent of its net profit.
BBVA	BBVA was established as the result of the merger between Banco Bilbao Vizcaya and Argentaria in 1999, and is currently the second largest banking group traded in the IBEX 35 with close to 140 000 employees. BBVA is primarily a retail bank but is also active in insurance and asset management. BBVA has undergone significant international expansion with merger and acquisition activity mainly in North America, Latin America and Turkey, giving rise to a large group of local subsidiaries.
GED Capital	GED Capital was founded in 1996 as an independent private equity firm, targeting medium-sized firms mainly in South West Europe (Spain and Portugal) but also South East Europe. GED Capital provides capital to private equity, infrastructure and real estate deals. Currently, GED Capital is managing assets worth EUR 800 million.

The choice of IDAE as the intermediate body for JESSICA FIDAE was straightforward, as it is the main national institution active in the field of EE and renewable energy. However, as the vast majority of IDEA's experience was with grant funding rather than FIs, the EIB was appointed fund of funds manager, enabling IDAE to mitigate potential operational and administrative risk.

Organising a competitive selection process to appoint several financial intermediaries to manage UDFs not only ensured that the appointed entities satisfied the due diligence process but also introduced competition between UDF managers.

As neither IDAE nor the EIB have a branch office network, the main advantage of selecting local financial institutions ensured JESSICA FIDAE received publicity in each area. Financial intermediaries carried out credit and eligibility assessments for applicants, ensuring project financing was secured and monitored the progress of projects.⁷⁵

Relevant feasibility studies/ ex ante assessments

There were no published market assessments or evaluation studies conducted specifically for JESSICA FIDAE. The EIB has a public database of JESSICA evaluation studies, sorted by Member State. Most of the documents listed for Spain refer to JESSICA FIs implemented in other regions and have no relationship with JESSICA FIDAE.

However, an analytical study was commissioned by the EIB and published in 2008 which outlines possible legal structures that could act as UDF managers and may have played a role in the preparation phase of JESSICA FIDAE.⁷⁶

Type of financial product offered

JESSICA FIDAE was intended to provide exclusively long-term senior debt to its final recipients. There were provisions for compatibility and incompatibility with other forms of support:

- JESSICA FIDAE funding was *incompatible* with other support (whether FIs, repayable grants or grants) from other ESIFs other than ERDF, i.e. ESF, EAFRD, EMFF and CF, or stemming from other OPs.
- JESSICA FIDAE was *compatible* with ERDF support from the same OP. The potential recipient had to complete a form regarding double-financing, to declare each form of support, either requested or already granted. Once the loan was approved, the form had to be kept up to date throughout the entire loan period.

Terms and conditions

JESSICA FIDAE covered up to a maximum of 70 percent of the project financing needs for private sector recipients and up to 100 percent for public sector recipients. For the private sector, a minimum of 30 percent of the project costs had to be provided by external funding, either by the recipient through own funds or by the financial intermediaries, generally in low risk projects. The general financing conditions are outlined below.

⁷⁵ In some cases, some tasks of the eligibility analysis were outsourced to external service providers.

⁷⁶ For two of the UDF managers the legal articulation was relatively straightforward. In the case of the third UDF manager (GED Capital), implementation was carried out making use of a special-purpose vehicle which had its own legal personality.

General financial conditions	
Duration:	Up to 15 years.
Grace period: ⁷⁷	Up to 3 years.
Principal:	No minimum or maximum amount. Set according to the project and recipient risk and profitability profile.
Interest:	<ul style="list-style-type: none"> JESSICA FIDAE tranche: Floating interest rate was determined according to credit scoring and tenor (between Euribor + 100 basic points and Euribor + 500 basis points). Projects carried out by public entities with no economic activity were interest free. Cofinancing tranche: Market conditions, as in similar projects.
Guarantees:	Collateralisation requirements decided on deal-by-deal basis.
Deadline:	Initially 31.10.2015 but later extended until 31.06.2016.

State aid

Any potential State aid in JESSICA FIDAE support was determined on a deal-by-deal basis. The UDF managers checked each deal as to whether financing was granted in market terms, based on the methodology established by Commission Communication 2008/C14/02.⁷⁸ In the event that financing was not granted on market terms, support designed not to involve State aid by using the *de minimis* Regulation.

Target recipients

Beneficiaries of JESSICA FIDAE funding could be:

- Public entities;
- ESCOs;⁷⁹
- Private enterprises; or
- PPPs.

In practice, public entities could choose between requesting funding directly or receiving funding through a private enterprise, including joint ventures.

Selection and award criteria

The selection criteria were the following:

- Projects must be located in one of the eight eligible Spanish Autonomous Communities (Andalusia, Canaries Islands, Castile and Leon, Castile-La Mancha, Comunidad Valenciana, Extremadura, Galicia and Region of Murcia) or the two eligible Autonomous Cities (Ceuta and Melilla).

⁷⁷ The grace period enables loan repayments to be scheduled such that they are not due for a time after the signature of the agreement, in this case up to three years.

⁷⁸ Communication from the Commission on the revision of the method for setting the reference and discount rates: [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008XC0119\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008XC0119(01)&from=EN)

⁷⁹ ESCOs are understood by the JESSICA FIDAE eligibility guidelines as a company with own legal personality that provides energy services and takes on a certain economic risk, by providing its services in turn of a compensation linked to improvements in energy efficiency.

- Projects must be included in one of the following economic sectors:
 - 1 Construction;
 - 2 Industry;
 - 3 Transport; or
 - 4 Public service infrastructure related to energy provision.
- In addition, projects must be part of one of the following Priority Themes:
 - 1 Projects related to EE and energy management;
 - 2 Projects related to thermal solar energy, photovoltaic solar energy and biomass; or
 - 3 Projects related to clean transport, which contribute to EE and the use of renewable energy.
- More generally, projects must:
 1. Guarantee an acceptable rate of return;
 2. Be included in an Integrated Plan for Sustainable Urban Development or contribute to their objectives; and
 3. Be underway at the time of funding.
- Eligible expenditure must be directly related to the utilisation of renewable energy or improvements in EE. There is no detailed list of eligible expenditure but JESSICA FIDAE could provide funding for e.g. construction (rehabilitation of buildings, civil engineering, etc.) or for the purchase of equipment (industrial machinery, devices such as solar panels, heating / cooling equipment, etc.).

The rejection rate is not publicly disclosed.

Sample project/investment

The tables below provide descriptions of three EE / RES projects, with different types of final recipient:

Project title	Substation in 'H' configuration with two transformers and double underground power supply line
Recipient / Type:	Fertiberia S.A. / Private
Location (municipality / Region):	Puertollano / Castile-La Mancha
Description:	Fertiberia operates a factory in an industrial park in Puertollano, which is currently fed by a power supply of 63 kV. The project consists in upgrading the power supply to 132kV. This will also involve a new power supply contract with the electricity provider.
Project results:	The project is associated to annual savings of 1 898 072.65 kWh, which also represents a substantial financial saving.

Project title	Electric buses for the centre of Cordoba
Recipient / Type:	Autobuses de Córdoba, S.A.M. (AUCORSA). / Semi-public
Location (municipality / Region):	Cordoba / Andalusia
Description:	Acquisition of three electric minibuses for passenger transport in the centre of Cordoba. These buses are especially designed to be used in historical parts of cities (being suited to narrow streets) or environmentally sensitive areas. The performance of the acquired vehicles in these areas is equivalent to any other bus powered by an internal combustion engine.
Project results:	The project will bring about energy savings of 22 tonnes of oil equivalent and a reduction of CO ₂ emissions of 94 tonnes in a period of five years.

Project title	Optimisation of street lighting in Cenes de la Vega
Recipient / Type:	Municipality of Cenes de la Vega / Public
Location (municipality / Region):	Cenes de la Vega / Andalusia
Description:	<p>The project financed by JESSICA FIDAE consists of the optimisation of street lighting in Cenes de la Vega, where the following actions were carried out:</p> <ul style="list-style-type: none"> - Substitution of light bulbs; and - Automated street lighting system. <p>The improvements to the street lighting physical infrastructure and system enable the municipality to better monitor and manage the intensity of street lights and are associated to a higher level of overall energy efficiency.</p>
Project results:	Due to this project, annual energy savings to the tune of 340 432.98 kWh are estimated. This will also result in a reduction in CO ₂ emissions. Moreover, a significant reduction of light pollution is expected.

Financial characteristics and other indicators of scale

JESSICA FIDAE budget was approximately EUR 123 million, made up of ERDF contributions from 10 Ops,⁸⁰ mainly from Southern and Central Autonomous Communities⁸¹ and Autonomous Cities⁸² of Spain and national cofinancing. The level of cofinance differed dependent on the classification of the regions contributing to the FI. Certain regions under

⁸⁰ These regions are classified different under Cohesion Policy which added an additional layer of complexity.

⁸¹ These correspond to NUTS 2 regions.

⁸² Spanish enclaves on the African continent.

this scheme were classified as 'Convergence' and could therefore benefit from a higher proportion of ERDF support, requiring less in national cofinance. The table below outlines the financial characteristics of JESSICA FIDAE.

Expenditure per operation (EUR)		
EU (1)	Average	578 199.33
	Total	67 071 122.02
National (2)	Average	175 849.88
	Total	20 398 585.89
Total public (1) + (2)	Total	87 645 557.78
Private ⁸³ (3)	Average	69 976.99
	Total	8 117 330.51
Expenditure from all sources (1) + (2) + (3)	Total	95 587 038.42

Average project and loan volume (EUR)			
Projects		Loans	
Total	95 587 038.42	Total	87 469 707.9
Average operation	824 026.19	Average loan	754 049.2

Returns from projects are managed by the UDFs and eventually reimbursed to the EIB and not publicly disclosed. There are no exits as the financial product offered only comprises long-term debt and no capital investments.

Modifications during the lifetime of the financial instrument

The terms and conditions were subject to a slight change, with the closing date for applications being extended until June 2016.

Due to an inadequate rate of disbursements, the investment strategy was amended as it was initially only targeting private enterprises. Later, public entities could also apply for funding, which boosted the rate of disbursements. This was due to the especially favourable conditions offered to public entities.

Another two events affected the performance of JESSICA FIDAE, which could not be directly mitigated by any change in investment strategy, target groups or terms and conditions:

1. *Municipal elections*: The result of the municipal elections slowed down JESSICA FIDAE implementation, presumably due to two factors:
 - i. *Time needed to form coalition governments*: Following the 2015 municipal elections, a period of negotiation started, which eventually resulted in new governments. This may explain delays as new governments might not have had the same priorities in terms of EE and renewable energy projects.

⁸³ Data presented here is based on the assumption that every private operation had a JESSICA FIDAE coverage of 70 percent. In reality, in some operations there was higher leverage, either through the recipient's own funds or due to funding from the financial intermediaries, in the case of particularly attractive EE & renewable energy projects.

- ii. *Changes in governments*: A second characteristic of the 2015 municipal elections has been considerable political turmoil and a shift to the left, compared to the 2011 elections. Shifts of the governments have probably resulted in obstacles or at least uncertainty in terms of EE and renewable energy project implementation, especially with large-scale municipal projects.
2. *New regulatory framework for solar power*: On July 13 the Royal Decree Law 9/2013 of 12 July was published. This piece of legislation generally aims to improve the Spanish electricity grid as well as addressing failures with structural tariffs, in which the actual costs associated to the regulated activities and the functioning of the electricity grid exceed the income levied by the Administration and paid by Spanish consumers.

The most significant measure regarding the JESSICA FIDAE is the special toll (*peaje de respaldo*), which establishes the regulation of the administrative, technical and economic conditions of photovoltaic self-supply. This toll, in practice, discourages such users that have their own systems of photovoltaic self-supply, and forces them to pay to access specific guaranteed levels of energy supply, in case the self-supplied energy does not cover their needs. The user is forced to declare that he is using a self-supply system.

Therefore, it can be concluded that this new legislation in effect discourages the use of photovoltaic energy and as a result affected the attractiveness of JESSICA FIDAE.

Contribution to OP goals

JESSICA FIDAE was funded by ten OPs corresponding to several Spanish Autonomous Communities and Autonomous Cities. Each OP had a slightly different approach, as each region varies in its needs and budget, and therefore in its priorities with regards to EE and renewable energy.

Nonetheless, most OPs highlighted the need to bring about energy savings, promote EE and diversification of energy sources and emphasise renewable energy in the energy production mix. This is to address the overarching policy objective to reduce Spain's foreign energy dependency.

In the 2007-13 programming period, FIs played a minor role in most Spanish regions and programming requirements for FIs were not as strict as in the 2014-20 programming period. This also applies to the indicators that would measure the impact of FIs. The table below outlines the case of Andalusia, where only one relevant indicator in the OP referred to renewable energy.

Strategic Indicator	Reference value	2010	2013
Energy from renewable energy with respect to the total production (percent without hydraulic energy)	7.45 %	15 %	21 %

For the Andalucía ERDF OP, the ex post evaluation was commissioned in 2016 and at the time of writing was still in progress. Nevertheless, as FIs were not a major priority in the 2007-13 programming period, the content related to FIs is not expected to be especially detailed.

Evaluation results

AS JESSICA FIDAE only recently closed its call for applications, no specific evaluation of the programme has been published or is known to be in progress. As operations go through their lifecycles, an evaluation - either by an independent evaluator or by the EIB evaluation department - is expected.

An external auditor has been entrusted with the task of conducting on-site monitoring/auditing of the UDFs. The reports and their findings are of confidential nature and only intended to be for the EIB's internal use.

Application process and publicity

Applications are processed by the UDF managers, which check each EE and renewable energy project for technical, legal and financial feasibility.

Publicity was carried out jointly by IDAE and the UDF managers, through dedicated websites and stakeholder events. However, UDF managers had to take on all deal origination tasks.

Current status

JESSICA FIDAE was closed to applications in July 2016.

It is unknown if JESSICA FIDAE will be repeated or if it will inspire other FIs for EE and renewable energy under the 2014-20 regulatory framework. According to official reports, this decision has yet to be taken.

Some regional authorities have considered implementing FIs for EE and renewable energy under TO4 in their ex ante assessment but so far, no FIs of that type have been implemented in Spain. In other cases, ex ante assessments for FIs for sustainable investments in city areas have been conducted, which could potentially include investments in EE and renewable energy projects, despite these not being the central element of the investment strategy.

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Information on projects – IDEA website:

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4. UK - Low Carbon Innovation Fund (East of England) 2007-13

Lessons learned

- There is a need to maintain flexibility when implementing the FI, such as altering the minimum and maximum investment sizes to increase the number of successful applicants.
- Targeted marketing played an important role in ensuring uptake.
- The introduction in 2013 of an investment readiness programme proved to be important - the impact of the support companies given pre-investment was found to be very valuable.
- Equity FIs for EE and REs are very resource-intensive both pre- and post-investment.
- The practicalities of continuing to monitor the growth of companies after they have been divested from can be problematic from a data-gathering point of view.
- The assessment of low carbon impacts during due diligence has been an additional task beyond normal venture capital practice and time-consuming on occasion.
- Having a small fund allowed freedom to provide bespoke investment products for each individual case and was considered to be extremely valuable.
- Independent members of the investment committee played a valuable role in advising on the technological and market dimensions of propositions.

Summary

The Low Carbon Innovation Fund (LCIF) is a venture capital fund providing equity finance for SMEs based wholly or partially in the East of England (UK). Note that this FI was reported by the MA in 2007-13 as an FI offering support for enterprises (i.e. under Article 44(a)), rather than as an FI for energy efficiency/renewables (Article 44(c)).

The Low Carbon Innovation Fund was commissioned under the ERDF OP for the East of England (UK) 2007-13. The OP as a whole had an overarching theme of 'low carbon economic growth'. Although the East of England has a strong research base – both in terms of universities (including Cambridge) and corporate R&D – this strength was not being translated into large numbers of innovative and high-growth businesses. The budget of the LCIF (which constitutes over 20 percent of the budget of the OP) increased incrementally over the period to EUR 25.63 million (GBP 20.5 million).

Policy objectives

LCIF co-invests alongside private sector investors to provide finance to early and growth stage businesses in a variety of sectors to enable them to develop. The SME must have an impact on carbon reduction by: providing products that are more resource/energy efficient; providing products or services that reduce carbon emissions for customers; or reducing carbon emissions through improvements to operational activities.

Governance/administrative structures

The LCIF is structured as a Holding Fund, with one specific fund. The Holding Fund is managed by the Innovation Funding team of the Adapt Low Carbon Group, a department within the University of East Anglia (UEA). The university is the Fund Operator and has

overall responsibility. Adapt is the first point of contact for companies and investors, managing and assisting companies through the application and due diligence process. They work closely with companies in the investment portfolio and also manage all reporting to the MA. The Innovation Funding team works with the Investment Committee (a panel of UEA representatives, the fund manager and independent experts) who set the investment strategy and authorise decisions to invest on a case by case basis. The fund manager is an energy and environment investment specialist (Turquoise International). Turquoise International carries out the assessment of applicant companies, due diligence, deal negotiation and legal completion of deals approved by the Investment Committee.

The Small Investment Scheme (SIS) launched in 2013 is managed in-house within the Adapt Low Carbon Group, with supervision by the fund manager for compliance purposes. Adapt also manages the Investment Readiness Programme, which is comprised of one to one guidance with companies. This was mainly necessary for the SIS companies who were at an earlier stage.

Relevant feasibility studies/ ex ante assessments

EEDA (the East of England Development Agency), the Intermediate Body managing the East of England ERDF programme in 2007-13, developed the project specification for LCIF in July 2007, followed by detailed terms of reference and an invitation to tender for a study in September 2007. The study was externally contracted via invitation to tender. The specification of the study included: assessment of access to finance provision; market failure and scope for intervention; type and size of fund; match funding; delivery options; investment readiness support; and lessons learned from the 2000-06 programmes.

The report completed in March 2008 concluded that there was a genuine shortage of early-stage venture capital funding, and recommended that c. GBP 8 million of ERDF be used to cornerstone a venture capital fund in the region. The fund, to be operated by professional fund managers, should have the following characteristics:

- total fund size in the range GBP 20-30 million (the balance coming from private sources);
- the balance of the fund being raised by the fund managers before investment starts;
- offering preferentially high returns to the private investors;
- making early-stage investments, typically in the low GBP 100 000s but ideally with the ability to make smaller initial investments (potentially GBP 50 000+);
- usually co-investing alongside other VC funds;
- investing in early-stage companies in the low-carbon field, using a comprehensive definition of low carbon (e.g. including means of reducing existing uses of carbon as well as developing alternative energy sources).

After publication of the report, significant changes occurred in global economic markets, and the authors were invited to refresh the report to explore whether the initial recommendations remained valid. The revised report (December 2008) recommended consideration be given to a co-investment fund, due to the risk involved in fund-raising as originally envisaged (via a cofinancing model).

Type of financial product offered

LCIF is a co-investment fund providing equity to SMEs. The fund makes equity investments (straight equity deals or convertible loan arrangements) using public and private investment funds on a 40:60 percent ratio. LCIF takes ordinary shares in most cases. LCIF invests *pari passu* with the other investors and would consider preference shares if appropriate. The form of finance is decided on a case by case basis. Convertible loans are more often used under the Small Investment Scheme.

The Holding Fund manager has dedicated resources to support potential investees in developing their Business Plans and growth strategies. An Investment Readiness Programme (IRP) was introduced in 2013, which prepares businesses to access the fund.

Terms and conditions

The minimum investment from LCIF is GBP 25 000 and the maximum GBP 1 million. The value of equity taken by LCIF in a company is dependent on the value of the company, the level of investment injected into the company and the level of risk. This is negotiated as part of the Investment Agreement. The fund is always invested alongside private sector co-investment (e.g. from Business Angels, High Net Worth Individuals, other Funds or trade investors). LCIF can invest up to 50 percent of the funding sought by an SME, and no more than 50 percent of the investment round can be from public funds.

LCIF are active investors and contribute to board discussions to help the company grow. The minimum involvement required by LCIF is board observer rights. The fund will request a board position (non-executive director) if deemed appropriate. Follow on funding is possible.

The original investment range for the LCIF was between GBP 50 000 - GBP 500 000. In 2013, a new Small Investment Scheme was introduced which lowered the minimum investment size, as the original investment range was found to be restrictive in attracting co-investors for investment propositions from smaller, very early stage companies seeking smaller levels of investment that carry higher risk of failure. The Holding Fund manager made the case that LCIF should expand into this market. A lower minimum threshold of GBP 25 000 was introduced to be more attractive to this new market. The change enabled applications to be considered for smaller investments, which had a particular issue in the creative industries sector due to a lack of match funding for such small investments (DCLG, 2015). At the same time, the maximum investment size of LCIF was increased from GBP 750 000 to GBP 1 million to enable applications to be considered for larger investments.

State aid

ERDF is invested on a co-investment basis, *pari passu*, so there is no State aid.

Target recipients

The fund can invest in SMEs, including start-ups, early stage or more established SMEs from a wide range of sectors.

Selection and award criteria

SMEs must be wholly or partially based within the East of England region or re-locating to the region. A wide range of sectors is eligible.

The economic impact of the investment must be felt within the region. The company must have an impact on carbon reduction by:

- providing products that are more resource/energy efficient;
- providing products or services that reduce carbon emissions for customers;
- reducing carbon emissions through improvements to operational activities.

Two thirds of investee companies fall within definitions of 'low carbon and environmental good and services' sectors, most notably energy management and alternative fuels. The remainder come from other industries where they have been able to demonstrate their low carbon impact, e.g. through adoption of emission-reducing processes or changes in behaviour on the part of their customers (Educe and futureneering, 2015).

Sample project/investment

According to the final project evaluation, investments relate 'primarily to products and systems that enable lifetime cost savings and lower carbon emissions by end users'. Examples include: optimising the effectiveness of LED lighting installations; improving vehicle fuel efficiency without fundamental engine redesign; reducing the energy used for air conditioning in buildings; and reducing waste, maintenance and testing costs. The monies have contributed to activities such as the costs of tooling up, recruitment of technical and marketing/ sales staff, and early entry into international markets' (Educe and futureneering, 2015).

An example of a company which has received an equity investment from the LCIF is Trident Energy, which develops technology for the offshore renewables industry. They have developed and patented a low cost generator that turns linear wave motion into electricity. Their PowerPod technology supplies off-grid renewable electricity to offshore infrastructure, such as wind turbines or oil and gas platforms. This reduces reliance upon offshore diesel generation. PowerPod can also be combined with offshore wind infrastructure to generate both wave and offshore wind energy at the same location offering significant potential cost savings in offshore electricity generation.⁸⁴

Financial characteristics and other indicators of scale

The budget allocated to the LCIF from the ERDF OP has increased incrementally over the programme period:

- The initial allocation was EUR 10 million (GBP 8 million).
- In 2011, ERDF capitalisation of the fund was increased to EUR 14.47 million (GBP 12.5 million) to provide resources to support the creative industry sectors following the termination of the Digital Content Investment Fund.⁸⁵ (These funds were not ring-fenced for the creative sector.)
- In 2012, ERDF capitalisation of the fund was increased again to EUR 25.63 million (GBP 20.5 million) to provide additional resources for follow-on investments and smaller and larger scale deals.

⁸⁴ www.tridentenergy.co.uk

⁸⁵ In October 2010, an update to the evidence base for a successor to an existing digital content fund recommended that the best way forward was to add the funds to the Low Carbon Investment Fund (2012 AIR).

By January 2017, GBP 69 million has been invested, GBP 20.48 from ERDF and co-investment of GBP 48.9 million. Two exits from investments have realised GBP 2.3 million in returns to the Fund.

Modifications during the lifetime of the financial instrument

Modifications during the lifetime of the fund include:

- incremental budget increases in 2011 and 2012;
- inclusion of the creative sector in 2011;
- the investment range was broadened in 2013, by lowering the minimum investment size and increasing the maximum;
- marketing and publicity was relaunched in 2013 after the interim evaluation, to publicise the new investment range and increase uptake;
- in 2014, monitoring was increased to ensure LCIF was on track to meet targets, and changes were made to how outputs were counted to optimise the chances to targets being met.

The financial and economic crisis had two main impacts on the LCIF. First, when the fund was conceived, there was a network of business support agencies in operation in England (Business Link) which was subsequently abolished as part of the Government's austerity programme. This agency would have fed the LCIF opportunities/potential applicants. There has been no replacement mechanism, thus no referral mechanism. LCIF had to build its own referral mechanisms, during the very early lifecycle of the fund. There was a slow start due to the lack of a referral mechanism. Second, the access to finance environment changed, and there was a massive general drop in funding available to early stage SMEs, including from banks, other VC investors and business angels. Once applications were received from companies to the LCIF, it was harder to find the co-investment needed than it would have been before 2008.

Contribution to OP goals

By January 2017, 86 investments had been completed (of which 41 were follow-ons) in 45 companies. A total of 28 companies have been assisted in accessing risk capital (LCIF investment not required).

The 2014 AIR reported low achievement of targets relating to the number/type of SMEs receiving risk capital, but stated that measures put in place in 2013 were proving successful in bringing forward outputs and results at a greater pace. This included increasing the maximum investment value from GBP 750 000 to GBP 1 million and securing agreement that companies supported by LCIF (with more than 12 hours of consultancy support) which did not go on to receive investment from the fund as a result, could still be counted as an output achieved. Delays were also reported in achieving outputs because job creation tends to take place approximately 6-12 months after investment (DCLG, 2015). The MA meets with the LCIF team monthly, either in person or via teleconference, to assess progress against the targets and drive delivery to ensure the fund is delivering the targets.

LCIF achievement of targets as at December 2016

Target	Cumulative achievement to December 2016	Profiled target to Q4 2016	% achievement of profiled targets to Q4 2016	Profiled target over project	% achievement of overall project
SMEs assisted (risk capital)	73	70	104	70	104
Jobs created	343	428	80	617	56
Jobs created (women)	69.83	171	41	246	28
Jobs safeguarded	192.04	115	167	115	167
Jobs safeguarded (women)	42.09	46	92	46	92
Successful innovation-related initiatives in SMEs	124	29	427	29	427
Successful environmental-related initiatives in SMEs	67	19	352	19	352
Successful start-up businesses	6	6	100	6	100
Leverage of private sector funding (GBPm)	48.9	30.2	162	30.2	162
Leverage of public sector funding (GBPm)	1.37	0.6	228	0.6	228
New businesses integrating new products, processes or services	15	14	107	14	107

Source: Adapted from Delivery progress report 09/018 Low Carbon Innovation Fund (LCIF), MCIS Claim 63, 6 January 2017.

In 2016, Adapt commissioned a study to retrospectively establish the carbon savings as a result of the investments made through the first cycle of the LCIF, as well as develop a methodology for carrying out carbon assessment for future investee companies. The study found that the LCIF portfolio of companies had saved 200 000 tonnes of CO₂ by November 2016, and were forecast to save over 12 million tonnes by end 2020 (Narec, 2016). The study found that less than two percent of carbon savings from the fund have been realised to date, because most products and services sales are yet to be realised and are just forecasts, but also that the cumulative effect of the products and services in operation will be realised between the second half of 2016 and the end of 2020.

Evaluation results

An interim evaluation carried out in October 2013 by Educe identified a 'very substantial shortfall in progress towards the ERDF target for numbers of SMEs assisted, with likely consequences for achievement of the jobs created target', and recommended intensive

promotional activity to maximise the flow of good quality applications (through targeted marketing, face to face contact and online presence).⁸⁶

The interim evaluation recommended:

- monitoring the effectiveness of promotional activities, website use, etc., to sharpen marketing and communication activities;
- continuing the drive to raise awareness of, and applications to, the Small Investment Scheme;
- monitoring progress closely against LCIF targets, using the recently introduced profiling;
- including projections for job creation as part of regular monitoring;
- undertaking a short and sharp evaluation of SIS in June 2014 to review its progress and prospects to make the most of delivery in the remaining life of the fund.

An evaluation of the Small Investments Scheme was subsequently carried out and the information gathered helped to inform monthly targets set by the MA.

A final evaluation was carried out in 2015, by Educe and futureneering Ltd. Findings included:

- The LCIF has performed well in creating a substantial investment portfolio which promotes low carbon innovation meeting a variety of consumer and business needs.
- The fund has been well-managed, reflected in positive feedback from investees and stakeholders and in its investment track record.
- Private sector leverage is strong, exceeding the match funding requirement and out-performing other ERDF co-funded FIs. Investments are expected to return all funds invested and potentially more for recycling through a Legacy Fund.
- Two-thirds of the investee companies fall within definition of 'low carbon and environmental goods and services' sectors, notably energy management and alternative fuels. The remainder come from other industries where they have been able to demonstrate their low carbon impact.
- Implementation experience has supported the original rationale for setting up the fund, with the majority of investees considering that they would not have been able to raise their original funding round without LCIF.
- Investments incorporate genuine innovation and relate primarily to products and systems that enable lifetime cost savings and lower carbon emissions by end users.
- The fund has become established as a brand, especially within the clean tech sector and amongst potential co-investors in the region.

Application process and publicity

Application is made online to the Holding Fund manager/Fund Operator via an online form. The process is then:

⁸⁶ Department of Communities and Local Government (2014) East of England European Regional Development Fund Competitiveness Programme 2007-13 Annual Implementation Report 2013, Version 1.6 (October 2014).

- Eligibility check;
- Requests for additional information;
- Further evaluation and due diligence;
- Investment Committee appraisal;
- Approval – or further information;
- Legal documents agreed;
- Company receives private co-investment;
- Transfer of LCIF funds;
- Ongoing contact with investee company.

Marketing and publicity was relaunched after the interim evaluation, to publicise the new investment range and increase uptake. LCIF commissioned an independent marketing agency to conduct a full overhaul of all promotional aspects of the fund, to include a complete re-branding, a new website, exhibition and printed materials, promotional videos and a high profile re-launch event in June 2012 to give further exposure of the fund to potential investees and investors. An advertising campaign was designed to attract new applicants to the fund by showcasing successful investee companies. This campaign included advertisements in the magazines *New Scientist* and *Develop* (a creative industry title) as well as on the websites of these publications and posters in the trains from Norwich and Cambridge to London. A public relations company was also procured to work on the publicity for the lower end of the investment threshold for three months, leading to articles being published in a number of publications.

The advertising campaign brought forward a good number of applications to both the main and small funds, including interest from outside the region, with companies being prepared to move to the region to take advantage of the potential investment.

Current status

The first phase of investment was completed in December 2015. Exits are profiled until 2019, with just under half of the expected financial returns expected before the end of 2017, mainly through trade sales or capital repayments (Educe and futureneering Ltd., 2015). The proceeds from the exit phase of Cycle One will be used to capitalise Cycle Two, which is anticipated will operate from early-mid 2017. Cycle Two will be managed on a month by month basis as it does not have the same size of lump sum as previously.

Discussions on a potential successor scheme have been ongoing, but have been frustrated by the new ESIF governance model in England, which is no longer based on regional ERDF OPs. Instead, there is one national ERDF OP, with involvement at local level from Local Enterprise Partnerships (LEPs), which have notional ESIF allocations. Any future FI must to obtain buy-in from a number of LEPs, which has been hindered by the LCIF being different from the norm in terms of FIs. Also, the preparation of 2014-20 FIs in England has been delayed. While 'Block 1' ex ante assessments have been carried out, these do not give much attention to the potential for FIs for low carbon.

References

- Educe and futureneering Ltd. (2015) Low Carbon Innovation Fund: Final Evaluation, Report to the University of East Anglia.
- Department of Communities and Local Government (2015) East of England European Regional Development Fund Competitiveness Programme 2007-13 Annual Implementation Report 2014, Version 3.0 (October 2015).
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- Department of Communities and Local Government (2012) East of England European Regional Development Fund Competitiveness Programme 2007-13 Annual Implementation Report 2011, Version 12.10.12.
- Narec (2016) Summary Report – Low Carbon Innovation Fund Impact Assessments, Report to Adapt Low Carbon Group, University of East Anglia, November 2016.
- Website of Low Carbon Innovation Fund: <https://www.lowcarbonfund.co.uk/home>

Annex IV: Case studies for FIs implemented in 2014-20

Key findings

- Early indications under the **OSER in Auvergne-Rhone-Alpes, France** suggest that there is considerable potential for energy transition projects in the region, but a need for funding to be coordinated. Because of limited experience, the fund has mainly focused on low-risk investments so far. Demand to date has mostly come from projects at the seed/development stage (e.g. emerging markets, new actors). Projects at the construction phase are less likely to need support from OSER.
- The **Energy Efficiency Fund in Lithuania** is now operational and expected to be effective. However, the early stages of implementation are proving to be time-consuming, partly due to this being a new instrument with no previous experience and no successful examples of similar project implementation. Also, public procurement procedures are lengthy and complex.
- Although the **Swedish Green Fund** is yet to become fully operational, on the basis of the ex ante assessment and past experience, policymakers consider that co-investment equity FIs can successfully mobilise private sector resources; however, it remains difficult to attract private capital at the seed stage. Also, this experience has shown that there may be regional development implications in the use of these instruments, as venture capital investors tend to be attracted to regions where there are higher concentrations of high growth firms.

This Annex includes the case studies for FIs for EE and RES implemented in 2014-20. These are:

- France (OSER - Opérateur de Services Energétiques Régional);
- Lithuania (Energy Efficiency Fund);
- Sweden (the Green Fund).

Two of these FIs were funded under national OPs (Lithuania and Sweden), while in France the FI is supported under the Rhone-Alpes regional OP.

It is worth noting that these FIs are in the early stages of implementation with the Swedish Green Fund not yet operational and the Lithuania Energy Efficiency Fund operational but yet to sign any loan or guarantee agreements. Only the OSER in Auvergne-Rhône-Alpes has conducted any investments. As such the focus of these case studies is on the early issues and experiences in each Member state/region.

The case studies are structured as follows:

- Title;
- Lessons learned box;
- Summary;
- Policy objectives;
- Governance/administrative structures;
- Previous experience with FIs;
- Results of ex ante assessment;
- Type of financial product offered;

- Terms and conditions;
- State aid;
- Target recipients;
- Selection and award criteria;
- Sample project/investment;
- Financial characteristics and other indicators of scale;
- Modifications during the lifetime of the instrument;
- Contribution to OP goals;
- Application process and publicity;
- Current status;
- References

1. FRANCE - OSER - Opérateur de Services Energétiques Régional (2014-20)

Lessons learned

- There is considerable potential for energy transition projects in the region, but a need for coordinated funding.
- The fund has mainly concentrated on low-risk investments so far, but greater experience could lead the fund to engage in riskier activities.
- In terms of energy transition, there is both a shortage of available funding and a lack of projects which are investment-ready. The three strands of support from OSER (financial/technical/political) aim to aid the development of suitable projects.
- This is of most interest to projects at the seed/development stage (e.g. emerging markets, new actors). Projects at the construction phase are less likely to need support from OSER.

Summary

The OSER fund aims to promote renewables development in the Auvergne-Rhone-Alpes region in France. OSER provides third-party financing for the thermic renovation of public buildings and risk capital to promote renewables production. Support is provided in the form of equity or quasi-equity. The budget of the fund is EUR 9.4 million. Recapitalisation of the fund is expected in late 2017/early 2018; a contribution from the Rhone-Alpes ERDF OP is expected for the new round of funding.

Policy objectives

The OSER fund is an initiative of the Auvergne-Rhone-Alpes Region, with support from the national institutional investor *Caisse des Dépôts et Consignations* (CDC).⁸⁷ The fund aims to promote renewables development in Auvergne-Rhone-Alpes, where assets (natural resources) are underexploited because of market gaps. The objective was also to regroup and coordinate all the actors involved in the local energy ecosystem.

OSER contributes to the following strategies:

- National: Multi-annual programming for Energy (*Programmation pluriannuelle de l'Energie, PPE*) 2016-22, which has the following objectives:
 - 70 percent increase in power renewable energy production capacities
 - 50 percent increase in heating production.
- Rhone-Alpes: 2014-20 Regional Framework for Climate, Air and Energy (*Schéma Régional Climat-Air-Energie, SRCAE*) aims at reducing energy consumption by 21 percent, increasing the share of renewables in the Rhone-Alpes energy mix to 30 percent, and reducing greenhouse emissions by 30 percent, which involves the development of renewables production capacities, including specific objectives for each renewable source.
- Auvergne: 2014-20 Regional Framework for Climate, Air and Energy (*Schéma Régional Climat-Air-Energie, SRCAE*) aims at reducing energy consumption,

⁸⁷ The *Caisse des Dépôts et Consignations* (CDC) is a French public sector financial institution/long-term investor.

increasing the share of renewables in the Auvergne energy mix to 30 percent, and reducing greenhouse emissions by 15 percent, which involves the development of renewables production capacities.

A contribution to OSER of EUR 5 million *is being considered* under the Rhone-Alpes ERDF OP 2014-20. However, no decision has yet been taken and instrument described here is to date a domestic one.

Governance / administrative structures

The OSER Risk Capital Fund is a partnership between the Region, the CDC, three commercial banks and five actors in the renewables sector (covering production, distribution and financing).

The board is chaired by one of the commercial banks and is made up of a majority of private actors. The Region and the CDC designed the fund and launched a call for expressions of interest addressed to actors specialised in investments, banking, the energy sector, and local actors to recruit co-investors. All respondents eventually invested in the fund, except for two national actors in the energy sector.

Previous experience with FIs

Not applicable.

Results of ex ante assessment

The ex ante assessment for the Rhone-Alpes 2014-20 ERDF OP covered all FI options, and identified the following needs:

- equity and quasi-equity FI for the construction stage of renewables production projects under direct management (recommendation was a strengthening of OSER);
- FIs to bail out debt if losses occur during implementation of the construction phase of renewables production projects (recommendation was a strengthening of OSER);
- third-party financing or guarantee to support thermic renovation of private buildings;
- guarantee on loans for the construction phase of methanation projects;
- direct management or application to existing fund (e.g. for SMEs) recommended.

The ex ante assessment for the Rhone-Alpes ERDF OP underlined that although there are financing opportunities in the sector of renewables production, there is a lack of coordination (there is no formal coordination of regional actors, except within the Board of the OSER Fund).

A similar ex ante assessment covered FI options for the Auvergne 2014-2020 ERDF OP, and made the following recommendations:

- investing EUR 1 million of EAFRD and EUR 3 million ERDF into energy efficiency;
- EUR 1 million EAFRD for individual agricultural methanation projects in the form of a guarantee (under direct management).

Type of financial product offered

The OSER fund has two vehicles:

- third-party financing for the thermic renovation of public buildings (using non-ESIF European Funds (to be confirmed));
- the provision of risk capital to promote renewables production; equity investment in project vehicles. Support is provided in the form of equity or quasi-equity (current account operations i.e. advances).

As well as financial support, OSER provides technical support and is also considered to provide political legitimacy. It is possible to use OSER to co-fund projects also supported by ERDF grants from the ERDF OPs, although this has not yet happened.

Terms and conditions

OSER provides long-term investments (15-20 years) and participates as a minority investor (40 percent maximum). There is a balance between the different forms of intervention (maximum 50 percent in the form of advance to current account). OSER contributions can be in the range of EUR 100 000 - EUR 1.25 million. Project size is in the range of EUR 1 million - EUR 50 million. Investment is possible at the construction phase (i.e. when the project has already started). The Fund invests in 'low-risk' projects.

State aid

There is no State aid at the final recipient level. Investment is made on a *pari passu* basis. The fund adapted its governance model to fall under the *pari passu* definition: although the Region is the majority shareholder, most board seats are occupied by private actors (including the chair). At the fund level, it is a notified scheme, falling under the scheme for regional capital-investment instruments supported by public funds, notified under the risk capital guidelines for 2006-13.⁸⁸

Target recipients

Target recipients are local projects (involving, for example, local authorities, local associations, citizens and farmers). The fund targets emerging sectors: methanation units; wind farms; photovoltaic generators; small hydro-electric power plants; geothermal plants; and biomass platforms.

Selection and award criteria

Selection criteria include:

- projects must be strongly rooted in the locality (a 'bottom-up' approach): involving at least one local actor (business, local authority, citizen associations, farmers, etc.);
- projects must offer a high long-term rate of returns of 5-10 percent (economic model of the FI based on dividends, not realised gains on share sales);

⁸⁸ CASE SA.24394 Régime cadre d'interventions publiques en capital-investissement régional, http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_24394

- project size is between EUR 1 million and EUR 100 million (with a leverage effect expected of 1-10).

Sample project/investment - OSER-funded projects (January 2017)



Source: <http://enr-oser.fr/prod/wp-content/uploads/2017/02/Carto-Projets-ENR.pdf>

Funded projects include the Eolien windfarm in Pays de Romans (Drôme), a windfarm of 20 turbines, involving a total investment of EUR 60 million, with a nine percent participation by OSER.

Financial characteristics and other indicators of scale

Ten projects have so far received support (as of March 2017). The budget of the fund is EUR 9.4 million (as of 15 March 2017), made up as follows:

- the Region: EUR 5 million;
- the CDC: EUR 1.8 million;
- three commercial banks: EUR 1.9 million;
- five actors in the renewables sector: EUR 670 000.

The aim is to support 15 projects in three years (with contributions of between EUR 100 000 and EUR 1 million).

Modifications during the lifetime of the financial instrument

The following changes have been made:

- Changes to territorial coverage of the fund: The geographical scope of the fund was originally Rhône-Alpes, but it also had a few projects in Auvergne before the regional merger in 2016;⁸⁹ some eligible actors/projects operate both in Rhône-Alpes and Auvergne; and Auvergne already had eligible projects in preparation. The merger may provide new opportunities (e.g. new investors – see below).
- Changes to partnership: the fund entered into a new alliance with SPEAR (a cooperative bank involved in united crowdfunding), which funds similar projects through debt instruments.
- Recapitalisation of OSER is likely due to strong political support, which may imply new targets and potentially new investors.
 - The initial budget has been almost entirely used. Recapitalisation is potentially planned at the end of 2017/beginning of 2018 through tendering. This may include funding from the Rhône-Alpes ERDF OP of EUR 5 million, which is anticipated to have a strong leverage effect on private contributions.
 - As a result of increased experience and expertise, the fund may expand its targets to riskier projects, including the seed/development phase of similar projects or riskier projects (e.g. circular economy, such as heat production from industrial equipment).
 - Two national actors in the energy sector are expected to invest in OSER. They initially dropped out because of EU regulation, which restricted investments in vehicles receiving funding from large firms; future regulatory change may lead to their involvement.
 - New investors from Auvergne are expected, as a result of the regional merger.

Contribution to OP goals

Not applicable.

Application procedure and publicity

Application made by contacting the Investment Team (Director of Investments and Projects or Expert for Investments).

The selection process is as follows (taking 6-8 weeks):

- The Pre-selection Committee (three members of the board – in charge of daily management) appraises and issues an opinion on applications.
- The Investment Committee (12 members appointed by the shareholders) takes a formal decision based on a complementary appraisal of pre-selected projects (technical, economic, financial) by the Investment Team.
- The board of directors (shareholders, including four elected officials) votes on investment decisions.

The fund is advertised to local actors through the networks of the fund investors.

⁸⁹ As a result of the reform of the regional government map in France which took effect from 1 January 2016, Rhone-Alpes and Auvergne merged into one single administrative region (Auvergne-Rhone-Alpes).

Current status

The fund was set up in December 2013, and has been operational since April 2014. The first investments were made in 2015.

Recapitalisation of the fund is expected in late 2017/early 2018; a contribution from the Rhône-Alpes ERDF OP is expected for the new round of funding. (A contribution from the Auvergne EAFRD OP was abandoned, and a contribution from the Auvergne ERDF OP is not planned, as the regional merger made OSER accessible to Auvergne too late after the start of OP implementation.)

References

- ADEME Rhone-Alpes; Ex ante assessment of ERDF FIs 2014-2020 (E&Y): http://rhone-alpes.ademe.fr/sites/default/files/files/partenariats_reseaux/reseaux/13e-rencontre/presentation-fonds-investissement-oser.pdf
- OSER website: <http://enr-oser.fr/>

2. LITHUANIA: Energy Efficiency Fund 2014-20

Lessons learned

- Both FIs under the Energy Efficiency Fund 2014-20 are considered to have been well-planned and are expected to be effective.
- The first stages of FI implementation are proving to be complex and time-consuming. This is due to the ENEF being a new instrument targeting specific and complex projects, with no previous experience and no successful examples of similar project implementation.
- The associated public procurement procedures are lengthy and complex – there were no sample public procurement documents (e.g. for selection of an ESCO) and no sample agreements and as a result everything had to be prepared.
- Credit limits restricting how much municipalities can borrow is proving to be a significant obstacle to the implementation of street lighting modernisation projects, and it is recommended that national legislation should be changed accordingly.

Summary

The Energy Efficiency Fund (ENEF) is a Fund of funds model with two FIs: one providing loans for the renovation of central government buildings and another offering loan guarantees for projects modernising street lighting. The total ERDF allocation for the ENEF is EUR 79.6 million with no national cofinancing and this is funded through the national OP for EU Structural Funds Investments 2014-2020. Ex ante assessments for energy efficiency and public investment were completed in 2014. The ENEF was created in February 2015, with funding agreements signed in May 2015 and is now operational with applications being reviewed.

Policy objectives

The overall objective of the ENEF is to improve the energy efficiency of public infrastructure through investments in the modernisation of central government buildings and street lighting. The ENEF aims to do this through two FIs:

- loans for the renovation of central government buildings; and
- loan guarantees for street lighting modernisation projects.

The objective of these FIs is to both encourage improvements in energy efficiency and to promote the development of Energy Service Companies (ESCOs),⁹⁰ which is a currently fledgling sector in Lithuania. The ENEF aims to leverage private investment and utilise the expertise of commercial companies, enabling ERDF funding to have a greater and longer-lasting impact.

Governance / administrative structures

The ENEF was established through cooperation between the Lithuanian Ministry of Finance, the Ministry of Energy and the Public Investment Development Agency (VIPA), which was

⁹⁰ Energy Service Companies are private, commercial entities, usually operating as construction, utilities or energy companies or consortiums

appointed as ENEF fund manager. VIPA is a fully state-owned financial institution, involved in the implementation and administration of FIs for investment in public infrastructure.

The ENEF operates as a Fund of funds, containing two FIs: a loan fund to support the renovation of public buildings; and loan guarantees for street lighting modernisation projects.

Previous experience with FIs

Lithuania used FIs to promote energy efficiency measures in the 2007-13 programming period, with a JESSICA Holding Fund established in 2009 and allocated EUR 227 million for the modernisation of multi-apartment buildings. The EIB acted as Fund of funds manager for JESSICA in Lithuania and was responsible for the development of loans to finance the renovation of multi-apartment buildings, the selection of financial intermediaries and for managing the overall implementation of the JESSICA fund. A JESSICA II fund is being implemented in the 2014-20 programming period, with similar objectives.

In 2014 the Government of Lithuania established and adopted a programme for the improvement of energy efficiency in state-owned buildings. The programme aims to renovate public buildings (with a total area of 700 000 m²) and to achieve 60 GWh savings. The ENEF is part of this programme, specifically targeting the renovation of central government buildings.

In 2007-13, there was no support for street lighting modernisation projects.

Results of ex ante assessment

As part of preparations for the 2014-20 programming period, a number of ex ante assessments were carried out. The Ministry of Finance and the EIB commissioned a study (conducted by PwC during 2013-2014) which assessed the need to continue the JESSICA Holding Fund into 2014-20 and sought to identify other potential sectors where FIs could be used, including projects for the modernisation of public buildings and street lighting modernisation projects.

To complement this study, the Ministry of Finance conducted public infrastructure and energy efficiency ex ante assessments in 2014. The energy efficiency ex ante assessment targeted energy efficiency in buildings (multi-apartment blocks and public buildings) and street lighting as follows:

- modernisation of multi-apartment buildings;
- modernisation of central government buildings;
- street lighting modernisation; and
- modernisation of public buildings owned by municipalities.

This ex ante assessment assessed various financial models and financing conditions, the existing financing gap, appropriate types of FI and the potential for the leverage of private finance.⁹¹ Considering all these factors, the assessment recommended that the sector was suitable for support through FIs.

⁹¹ Energy efficiency ex ante evaluation report. Ministry of Finance, September 2015 (consolidated report)

When assessing public buildings and street lighting, the evaluation revealed two public infrastructure problems: low energy efficiency levels in central government public buildings, and the unsatisfactory condition of street lighting systems. The assessment measured the financing gap as EUR 169.7 million for the renovation of central government buildings and EUR 100.8 million for street lighting modernisation.

As energy efficiency projects usually generate cost savings, loans and loan guarantees were recommended instead of grants. The ENEF was established to meet the measured investment gap by using two FIs: loans for the renovation of central government-owned public buildings implemented using ESCOs (EUR 65.1 million) and guarantees for street lighting modernisation (EUR 14.5 million).

Type of financial product offered

The ENEF offers two financial products:

- (soft) loans for the renovation of central government-owned public buildings (EUR 65.1 million);
- guarantees for street lighting modernisation (EUR 14.5 million).

Terms and conditions

The terms and conditions for the soft loans for the renovation of central government buildings are as follows:

- no minimum/maximum project value;
- the loan can cover up to 100 percent of eligible expenditure when the borrower is the owner/building manager of the central government building and up to 80 percent of eligible expenditure when the borrower is an ESCO (the ESCO must contribute a minimum of 20 percent of the project cost from their own funds);
- maximum loan period – 20 years;
- fixed 2 percent annual interest;
- loans can be repaid in two different ways, either as fixed monthly payments or as an annuity.

The terms and conditions for the guarantees for street lighting modernisation projects are as follows:

- no minimum/maximum project value;
- the guarantee can cover 50 to 80 percent of the project costs (depending on the structure of the project's financing);
- guarantee covers only eligible expenditure;
- guarantee amount can be revised during project implementation;
- maximum guarantee period – 20 years;
- the guarantee fee is dependent on the level of risk⁹² (0.3 percent -1.15 percent);
- it is a first loss guarantee with immediate payment in the event of default.

⁹² Reviewed by the Ministry of Finance every year

State aid

Investments made under the ENEF do not involve State aid as all projects contribute to the improvement of public infrastructure. Although commercial enterprises may be involved in the delivery of a project, the public sector is the final recipient of any project outputs, which are non-economic in nature, and do not involve State aid.

Target recipients

For loans to renovate central government-owned public buildings, recipients can be state budgetary institutions (i.e. those financed solely by the state) or public institutions. State-owned enterprises are not eligible applicants. Recipient state budgetary institutions are only able to implement the project through an ESCO, as national legislation prohibits them from borrowing. When the recipients are public institutions, they can implement the project themselves or through a selected ESCO company.

For loan guarantees, municipalities or municipal companies implementing street lighting modernisation projects are eligible for guarantees. Municipalities can implement street lighting modernisation projects themselves or through an ESCO.

Selection and award criteria

The eligibility criteria for the soft loans for renovation of central government-owned public buildings are as follows:

- no set project size/value;
- projects must comply with the provisions of the National Energy Independence Strategy and the Programme for Improvement of Energy Efficiency in Public Buildings: the energy classification of a building that is subject to the renovation must be D or lower⁹³; after the renovation a building shall be used for at least 10 years and funds for maintaining, heating and/or cooling of the building shall be allocated for at least 10 years; the renovation must achieve a C energy performance certificate;
- renovated central government-owned public buildings must be managed by state budgetary or public institutions (state enterprises are not eligible applicants);
- 51 percent of a building must be managed and used by the state;
- the renovation must achieve energy savings of at least 30 percent;
- the project implementation period must be 24 months from the signature of the credit agreement but may be extended by 12 months or more if there is sufficient justification;
- eligible expenditure is incurred as of 1 January 2014;
- loans can only be used for eligible expenditure, which includes: preparation of technical documentation, modernisation of heating and hot water systems, ventilation, lighting, building insulation (roof, walls, windows, doors, etc.) and boiler systems;

⁹³ Under the Energy Performance Directive (2010/31/EU), all EU countries have established independent systems for the awarding of energy performance certificates (EPCs). An EPC gives a property an energy efficiency rating from A (most efficient) to G (least efficient). <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0031&from=EN>

- if the project is implemented through an ESCO, the ESCO shall be operating within an EU member state.

The eligibility criteria for the guarantees for street lighting modernisation projects are as follows:

- no required project size/value;
- the street lighting modernisation project must be implemented within a city in Lithuania;
- after the implementation of the project, energy savings must be at least 40 percent;
- the economic payback of the project is up to 20 years;
- the project implementation period must be no more than 36 months from the signature of the guarantee agreement;
- eligibility period: 1 January 2014– 31 December 2023;
- the guarantee only covers eligible expenditure, which includes: all costs pertaining to the modernisation of the city street lighting system, costs incurred in order to increase the effectiveness of energy consumption of the city street lighting system, e.g. replacement of lights, upgrading and/or installation of a smart/advanced lighting management and control system and the reconstruction or installation of distribution and power cabinets.

Sample project/investment

A typical project modernising a central government-owned public building would be as follows:

- Project (eligible expenditure) value: EUR 305 000;
- Project implementation period: 24 months;
- Project benefits lasting up to 20 years;
- Average size of renovated building: 1 500 m²;
- Achieving an energy performance certificate of C or lower.

A typical street lighting modernisation project would be as follows:

- Project (eligible expenditure) value: EUR 1 000 000;
- Project implementation period: 24 months;
- Project benefits lasting up to 20 years;
- Average street lighting points modernised: 611 street lighting pillars and 1 885 light units refurbished.

Financial characteristics and other indicators of scale

The ENEF's budget is EUR 79.6 million. The ENEF is financed exclusively from the ERDF, with no national contribution.

Private sector contributions are possible provided the project is implemented through an ESCO (the ESCO must contribute a minimum of 20 percent of the project's value from their own funds).

At this stage, there are no projects which have signed loan or guarantee agreements. A number of applications are being evaluated for both types of project.

Modifications during the lifetime of the financial instrument

The main modification to the ENEF has been the decision to no longer award grants in combination with loans. Initially, projects for the renovation of public buildings could apply for a grant of up to 20 percent of the total project cost. This could be used to cover any technical support required in the preparation of necessary documentation (investment plans, energy efficiency audit and energy certificates) or to cover the repayment of loan interest, provided the project meets set energy efficiency targets. However, combining the forms of support and the additional reporting this involved proved to be a significant administrative burden and VIPA opted to only offer the loan. In lieu of a grant, VIPA is currently considering the possibility to offer interest-free loans to attract applicants but no decision has been made at this stage.

There have been no changes to the budget or administrative structure of the ENEF to date.

Contribution to OP goals

The ENEF falls under the priority 'Increasing energy efficiency in public infrastructure' in the national OP for EU Structural Funds Investments 2014-2020. It is measured by the indicators set out in the table below.

Monitoring Indicator	Unit	Interim value by 31 December 2018	Final value by 31 December 2023
Final energy consumption in service and household sectors	Thousand TNE	1 948	1 680
Cities in which costs of energy use for city lighting have decreased	Number	1	3
Total annual decrease of greenhouse gas emissions reduction	Tonnes CO ₂ equivalent	1 700	10 400
Annual decrease of primary energy consumption in public buildings	kWh/per year	3 700 000	32 258 065

Application process and publicity

Applications to the ENEF are submitted via an online form and are evaluated on a first-come-first-served basis. The application evaluation process is as follow:

- Administrative compliance check. At this stage the applicant can be asked to correct the application and/or submit missing information. The applicant would have 30 calendar days to provide the requested information. All applications that meet the administrative requirements would proceed to the eligibility check.
- Eligibility check. This stage is made up of two steps. First, the eligibility of the applicant to receive the loan and second, the eligibility of project to be financed. During the eligibility check the applicant can be asked to submit missing information or documents. The applicant would have 60 calendar days to provide the requested information. All eligible applications then proceed to the project risk assessment.

- Project risk assessment - overall project risk level is assessed and the main project risks are identified.

Applications are evaluated within 150 calendar days (including time waiting for the submission of additional documents or information).

For applicants to the loan FI, the process begins with the building owner/manager preparing the building's energy audit report and submitting it to VIPA. VIPA then evaluates the energy audit report and confirms it meets the requirements that the building energy efficiency is class D or worse). The applicant prepares the project, completes the application form and together with supporting documents (investment project, plan for building use, etc.) submits this to VIPA. VIPA then assesses the application with their Loan and Guarantee Committee taking the final decision to finance the project. If the applicant opts to implement the project through an ESCO (chosen through public procurement) then they sign a service contract with the selected ESCO. VIPA then signs a credit contract with the ESCO and the ESCO receives the loan from the VIPA (from ENEF fund), implements the project and repays the loan to VIPA from the energy savings it makes.

Should the applicant implement the project themselves directly (i.e. not through an ESCO), the applicant signs the contract with VIPA and receives the loan. The applicant then implements the project (the selection of the contractor to carry out the renovation must be through public procurement) and repays the loan to VIPA from the energy savings it makes.

For loan guarantees, the process begins with the applicant preparing the project, completing the guarantee application form and submitting it to VIPA. VIPA then evaluates the application with their Loan and Guarantee Committee taking the final decision to support the project. The applicant chooses a lender (through public procurement) - bank, credit union, other financing institution or ESCO and signs the credit agreement with the lender. The lender then contacts VIPA requesting the guarantee. The guarantee agreement is signed between the three parties – the lender, VIPA and applicant. VIPA then ring-fences the guaranteed amount in the ENEF fund. In the event of default, VIPA pays the lender the outstanding debt of the applicant (as due under the credit agreement).

The publicity activities required under the ENEF are detailed in the funding agreements. These include publishing information on VIPA's website outlining the funding available, its terms and conditions and monthly and weekly reports on applications received. Also, a number of events must be organised to publicise the availability of funding to target groups and information should be published in the media.

Current status

The ENEF was established in February 2015 and is currently operational. The funding agreements were approved in May 2015, and both FI were opened for applications.

The agreement establishing the ENEF is valid until 2023, and it can be extended by eight years. It is expected that the ENEF will operate at least until 2030, re-investing the revolved funds into projects with a similar focus.

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3. SWEDEN - The Green Fund (2014-20)

Lessons learned

- Co-investment equity FIs can successfully mobilise private sector resources, although it remains difficult to attract private capital at the seed stage, and equity funds have made low returns on investment.
- There are potential regional development implications of use of these instruments, as venture capital investors tend to be attracted to regions where there are higher concentrations of high growth firms.

Summary

The Green Fund is a co-investment equity FI introduced for the 2014-20 period which will invest in innovative Swedish SMEs involved in developing or providing products and services that reduce CO₂ emissions. The Green Fund is financed by ALMI (SEK 162.5 million – EUR 19.4 million); the Swedish Energy Agency *Energimyndigheten* (SEK 162.5 million – EUR 19.4 million); and ERDF (SEK 325 million – EUR 38.7 million), from the ERDF OP 'Investment for Jobs and Growth' 2014-20. This gives a total fund value of SEK 650 million (EUR 77.5 million), which is intended to be matched by private resources on a co-investment basis. The FI is managed by ALMI Invest. No investments have yet been made.

Policy objectives

The aim of the Green Fund is to provide risk capital to invest in innovative SMEs involved in developing or providing products and services that reduce CO₂ emissions.

The rationale for the fund is the need to address barriers to investment such as the scale of the capital required, the length of commercialisation processes and the risks arising from regulatory issues, all of which tend to impede access to finance from traditional sources.

Governance / administrative structures

ALMI Invest was appointed as fund manager following a tender process.

Previous experience with FIs

Cohesion policy was not used to fund energy efficiency or renewable energy FIs in Sweden in 2007-13. However, the ex ante assessment conducted for 2014-20 identified several lessons from the use of cofinanced FIs for enterprise support in Sweden in 2007-13:

- the co-investment model has mobilised private investment sources, including from business angels and is considered to have had a positive effect on the regional structure of private investment;
- the rules surrounding the operation of the funds (requirements for investment assessment, monitoring, drawing up of agreements) are attractive to new business angels and individuals with limited experience in executing investments;
- it is difficult to attract private capital at the seed stage;
- investment in seed stage firms requires more work in portfolio companies;
- the 3 percent limit on management fees introduced in the regulations for the 2014-20 period is perceived to be a challenge;

- horizontal criteria for the selection and management of investments are not always respected;
- equity funds have made low returns on investment;
- venture capital investors tend to be attracted to regions where there are greater concentrations of high growth firms.

As seen below, reflecting the experience with a co-investment fund, the ex ante assessment recommends the use of a specific co-investment for SMEs to develop business ideas for CO₂ emission reduction.

Results of ex ante assessment

An ex ante assessment for covering a range of options for FIs under the 2014-20 ERDF programme was completed in 2015 (Tillväxtverket, 2015).

The analysis concluded that there was a lack of early stage private equity funding and that such sources had declined significantly since 2008. In response, the ex ante assessment proposed three initiatives:

- regional venture capital funds within each of the eight ERDF OPs;
- a national fund aimed at increasing the diversity and dynamics of the early stage venture capital market by establishing new venture capital teams;
- a national fund aimed at supporting the shift to low carbon in all sectors (the Green Fund which is the focus of this description).

Market conditions for investments in energy-related technologies

The ex ante assessment noted that, historically, Sweden has had a good climate for innovation in general and that the combination of tax incentives, grant and other support measures have contributed positively to this. In addition, cooperation between local government, research institutions and industry has resulted in a leading role for Swedish R&D in many areas. However, there is a general lack of venture capital for early-stage development and the commercialisation of R&D results. Moreover, in renewable energy and energy efficiency technologies, there are specific barriers to accessing finance. These include:

- The scale of the capital required due to the length of the commercialisation process.
- Informational issues arising from difficulties in verifying the technical aspects of proposed investment or assessing the ultimate consumer / customer gains arising from the product or service being developed.
- The lack of technical expertise among investors and the difficulty in assessing risk.
- The length of the investment horizon – typically three to seven years in the traditional private venture capital model, which is about half the length of the commercialisation period required in the energy technology sector.
- The returns on such investments are no higher than those for other sectors, while the risks are greater. As such, historically low profitability, and few exits which have been profitable, have made it more difficult to attract venture capital.
- There is more 'regulatory risk' in this market segment than others – for example, the profitability of an investment can be affected by government decisions on CO₂ emission tax levels.

- This segment is associated with highly capital-intensive projects, resulting in investment requirements that exceed the resources which private equity investors are willing or able to commit.
- The costs of 'scaling up' capital intensive investment is high compared with, for example, the mature IT sector where investment is more attractive owing to lower scaling up costs and shorter lead times.

The ex ante assessment also noted that the total amount of venture capital investment in environmental technology firms has decreased in recent years and expansion capital is virtually absent. The seed capital phase has largely been abandoned by private venture capitalists (which have increasingly favoured later stage investment) and taken on by public equity investors and business angels. However, the combined effects of the shift to later stage investments by the private venture capital market and the risk aversion in this market segment (for the reasons outlined above) have resulted in a reduction of 80 percent in equity investment in environmental technologies between 2008 and 2012 (from SEK 700 million to SEK 135 million – around EUR 83.4 million to EUR 16.1 million).⁹⁴ At the same time, the share of environmental technology investment in the total fell from 15-20 percent in 2008-2020 to 7-8 percent by 2012.

Swedish public venture capital organisations are not in a position to fill this gap. There is insufficient sectoral expertise and their existing mandates in terms of risk, investment scale and duration preclude their involvement at the stage required. Taken together, therefore, the ex ante assessment concludes that a finance gap exists which neither the private or public sector can currently fill.

Ex ante recommendations for FIs for energy-related investment

At the seed capital stage funding for energy technologies is in the form of direct support under government schemes, or indirectly through incubator units or university holding companies. The Swedish Energy Agency considers that this functions relatively well, though supply of public funds is likely to be outstripped by demand.

For the next stage of funding requirements, access to capital is more problematic. In phases which include scaling-up, commercialisation and exporting, firms still have negative cash flows but the need for working capital increases. Public sources cannot fund these costs, business angels often lack the resources to invest and entrepreneurs cannot access funds on the scale required. The ex ante assessment therefore recommends a fund to make initial investment in start-ups and to target the phase between that where research and demonstration support can be given and the point at which private venture capital players can take over or a firm could be listed. It also recommends the possibility of follow-on funding in the expansion phase.

Reflecting this, the ex ante assessment recommended that the fund could be mandated to invest relatively large amounts. The target value for an average investment (including ERDF and national cofinancing, but excluding private finance) is estimated at SEK 12-20 million (around EUR 1.4-EUR 2.4 million). This in turn implies a portfolio of 30-50 firms.

The capital requirements of investee firms would differ based on their business model, the technology in question and the exit strategy. However, the ex ante assessment

⁹⁴ The exchange rate being used for this instrument in Commission reporting is EUR 1=SEK 8.39.

recommends that total financing, including private contributions, should not exceed the EUR 15 million ceiling set out in the General Block Exemption Regulation.

The ex ante assessment recommends that, in principle, the fund should operate on a *pari passu* basis, but that there could be scope for favouring private investors through asymmetric profit sharing.

At the time of writing it is not clear whether the proposed fund has been fully operationalised – it was anticipated by the fund manager Almi Invest that the fund would be staffed and ready to invest in the first quarter of 2017 - so it is unclear whether all of the recommendations of the ex ante assessment are being implemented.

Type of financial product offered

Support will take the form of equity investment through a co-investment fund.

Terms and conditions

The target value for an average investment (including ERDF and national cofinancing, but excluding private finance) is estimated at SEK 12-20 million (around EUR 1.4-EUR 2.4 million).

State aid

The measure is compliant with the GBER.

Target recipients

The target group are innovative SMEs operating in the 'green tech' area. The aim of the Green Fund is to increase the supply of venture capital in the early phases to target SMEs with high growth potential that are developing goods and services which will lead to reduced carbon emissions.

The investment phase targeted is that between where research and demonstration support can be given and the point at which private venture capital players can take over or a firm could be listed. There is also the possibility of follow-on funding in the expansion phase.

Selection and award criteria

No information available yet.

Sample project/investment

No information available yet.

Financial characteristics and other indicators of scale

The Green Fund is financed by ALMI (SEK 162.5 million – EUR 19.4 million); the Swedish Energy Agency *Energimyndigheten* (SEK 162.5 million – EUR 19.4 million); and ERDF (SEK 325 million – EUR 38.7 million). This gives a total fund value of SEK 650 million (EUR 77.5 million), which is intended to be matched by private resources on a co-investment basis.

The investment period will run to end 2023.

At the time of writing, no investments had been made as the fund was scheduled to become operational in the first half of 2017.

Modifications during the lifetime of the financial instrument

The financial instrument has not yet become operational.

Contribution to OP goals

No information available yet.

Application process and publicity

No information available yet; however, the fund is said to becoming quite widely known even in advance of becoming operational.

Current status

The investment period will run to end 2023.

The Green Fund is expected to be staffed and operational in the first half of 2017.

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