IQ-Net

Improving the quality of Structural Funds management

TRANSITION TO A LOW-CARBON EUROPE: THE SUPPORTING ROLE OF COHESION POLICY

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PREFACE

The IQ-Net Network promotes exchange of experience on the management and implementation of Structural Funds programmes among managing authorities and intermediate bodies. The network is managed by the European Policies Research Centre Delft under the direction of Professor John Bachtler and Heidi Vironen. The research for this report was undertaken by EPRC in preparation for the 46th IQ-Net Conference held in Helsinki-Uusimaa, Finland on 12-14 June 2019. The report was written by Heidi Vironen, Irene McMaster and Wilbert den Hoed.

The report is the product of desk research and fieldwork visits during Spring 2019 to national and regional authorities in EU Member States (notably partners in the IQ-Net Consortium). The field research team comprised:

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Disclaimer

It should be noted that the content and conclusions of this paper do not necessarily represent the views of individual members of the IQ-Net Consortium.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

CF	Cohesion Fund
CP	Cohesion Policy
EAC	Ex-ante conditionality
EAFRD	European Agricultural Fund for Rural Development
EE	Energy Efficiency
EIC	Enterprise and Innovations for Competitiveness (Czech Republic)
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investment Funds
EU	European Union
IB	Intermediate Body
IFRRU	Financial Instrument for Urban Rehabilitation and Revitalisation (Portugal)
IP	Investment Priority
IROP	Integrated Regional Operational Programme (Czech Republic)
ITI	Integrated Territorial Instrument
KENAK	Energy Efficiency of Buildings regulation (Greece)
KPC	IB Kommunalkredit Public Consulting GmbH (Austria)
MA	Managing Authority
MS	Member State
NSRF	National Strategic Reference Framework
OP	Operational Programme
OP E	Operational Programme Environment (Czech Republic)
OP EIC	Operational Programme Enterprise & Innovations for Competitiveness (Czech Republic)
ÖROK	The Austrian Conference on Spatial Planning
PA	Partnership Agreement
PO	Policy Objective
QCA	Quadro Comunitário de Apoio (Portugal)
R&D&I	Research & Development & Innovation
R&I	Research and Innovation
RES	Renewable Energy Sources
ROP	Regional Operational Programme
RTD	Research and Technological Development
S3	Smart Specialisation Strategies
SME	Small and medium sized enterprises
SUD	Sustainable Urban Development
TO	Thematic Objective

COUNTRY/PROGRAMME ABBREVIATIONS

Country	Abbreviation
Austria	AT
Belgium (Vlaanderen)	BE(Vla)
Croatia	HR
Czech Republic	CZ
Denmark	DK
Finland	FI
France	FR
France (Burgundy OP)	FR(Bur)
Germany	DE
Germany (Nordrhein-Westfalen)	DE(NRW)
Greece	EL
Netherlands (West)	NL(W)
Poland	PL
Poland (Pomorskie)	PL(Pom)
Poland (Warmińsko-Mazurskie)	PL(W-M)
Portugal	PT
Slovenia	SI
Spain	ES
Spain (Bizkaia, País Vasco)	ES(Biz), ES(PV)
Sweden	SE
United Kingdom	UK
United Kingdom (England)	UK(Eng)
United Kingdom (Scotland)	UK(Sco)
United Kingdom (Wales)	UK(Wal)

EXECUTIVE SUMMARY

Transitioning to a low-carbon economy has become an increasingly important long-term development goal as part of European and global commitments to respond to climate change. EU policies, including Cohesion policy, provide a foundation and stimulus to low-carbon investments. The impact on the ground depends on the sum and coordination of national and regional policies and actions. The structures and capacities as well as the level of coordination in the regions can have a major impact on the number and quality of low-carbon projects. The relevance of Cohesion policy programmes is also very much dependent on the overall funding allocated to the low-carbon theme.

Drawing on the experience that IQ-Net programmes have gained in the implementation of low-carbon projects, it is valuable to draw lessons to support the efforts in the 2014-20 programme period, maximise results and impact, and plan for the future.

IQ-Net countries and regions have generally been willing to adopt the low-carbon theme into their programmes, and recognise the importance of ESIF (especially ERDF and CF) support for the low-carbon economy. Despite the fact that many of them have existing experience in implementing low-carbon projects (either in the context of domestic frameworks or in previous Cohesion policy programmes), **specific challenges that complicated especially the early stages of the programme period** are reported. These challenges include: a lack of capacities and expertise (thematic skills, time and setting up the administrative structures); difficulties and delays meeting the ex ante conditionalities; and various factors affecting demand, project selection and the awarding of resources to low-carbon projects.

Progress on implementing TO4 has generally seen an upward trend. Many programmes report significant improvements especially in the latter parts of the programme period. Areas of activity showing early results are diverse and include: buildings undergoing thermal modernisation; reduction of primary energy consumption by buildings; associated reduction of greenhouse gas emissions; increase of energy production from renewable sources; increase of the length of the heating network; tackling energy poverty; and increase in the use of low-carbon transport solutions.

The inclusion of the low-carbon theme in Cohesion policy leads to additional observations. The extent of **Cohesion policy impact varies**, **especially in relation to 'hard' outputs and results**. However, the **'soft' impacts and influence emerge as an important dimension** of the policy's role in a number of ways:

- **Visibility**. Low-carbon projects are very visible and positive for the image of ERDF and the organisations involved.

- **Priority**. Cohesion policy programmes are offering a clear signal that the transition to a low-carbon society is something to prioritise.

- **Leverage**. ERDF may give a 'nudge'/leverage to domestic policies where progress has been slow.

- **Coordination & coherence**. The requirement to align interventions with national and EU strategies embeds an element of coordination. However, the sheer scale, diversity and interrelatedness of the topic also demands innovative ways of working, joint action and synergies.

- **Experimentation/innovation/engagement**. The explorative/experimental nature of some of the supported projects adds value and a basis that 'mainstream' domestic instruments could follow-up on if they prove successful.

- **Knock on benefits.** Low-carbon interventions are associated with numerous knock on-benefits including driving technological innovation and leading to cost saving for individuals.

Numerous lessons can be carried forward and applied in the 2021-27 period:

- **Objectives should be ambitious, but realistic**, and take into account regional differences and the specific areas of added value for Cohesion policy

- A **timely start to implementation** can be facilitated by early programme approval, relevant structures being in place and procedures being approved.

- **Building demand** is an important consideration, providing more support for project generation as well as strengthening information and communication activities. In particular, efforts can include attracting stakeholders that are not already engaged in the issue.

- Some programme authorities have called for **more flexibility** on determining what concrete activities are, or are not, allowed. There is a need to combine 'soft' and 'hard' policy measures, and **productive synergies** with other interventions, and low-carbon can potentially be better linked to the key smart specialisation themes.

- **Building implementation capacity** is important, especially in terms of thematic skills and capabilities both in the implementation bodies and at the beneficiary level.

- Programme authorities have called for more **simplification** efforts to facilitate administrative procedures in implementation bodies and at the beneficiary level. Simplification measures could have a positive effect on the understanding of the cost of investment by potential beneficiaries. At the same time, it would reduce the administrative costs of the entities responsible for the implementation of ESIF.

1 INTRODUCTION

Mitigation and adaption of the effects of climate change are increasingly recognised to be both critical and urgent global policy objectives. The EU's nationally determined contribution under the Paris Agreement is to reduce greenhouse gas emissions by at least 40 percent by 2030 compared to 1990, under its wider 2030 climate and energy framework. A key obligation, not just for countries but also for regions, cities, local authorities, the private sector and civil society is to reduce emissions involving the transition to a low-carbon economy.

Cohesion policy (especially ERDF and CF) has already supported the transition to a low-carbon economy in 2007-13 by investing in areas such as renewable energy, energy efficiency, clean urban transport and cycle paths. There has been a significant increase in commitment in 2014-20, not least as a result of the earmarking of funding for low-carbon (20 percent in more developed regions, 15 percent in transition regions, and 12 percent in less-developed regions).

This report examines the opportunities and challenges for Cohesion policy programmes managing and implementing interventions supporting the transition to a low-carbon economy. How has the theme been addressed in the Programmes and to what effect? What evidence is there for added value? What lessons can be learned for the future?

As evaluations and mid-term reviews are undertaken, with a view to delivering results and in order to inform future programming decisions, this is a useful point to take stock of experience and examine how Programmes have worked to support transition to a low carbon economy:

- How was the theme addressed in the programming process?
- How is it reflected in projects?
- How are contributions monitored and evaluated?
- What have been the challenges and added value of working with this theme?
- What lessons can be drawn for the future?

2 LOW-CARBON EUROPE

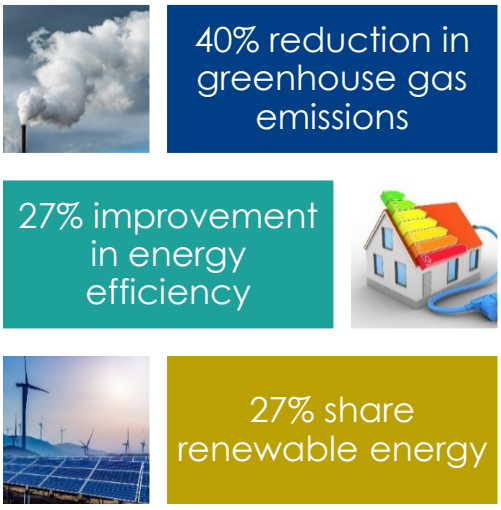
Reducing greenhouse gas emissions (including carbon dioxide) is at the heart of international, national, regional and local responses to climate change, and transitioning to a low-carbon economy has become an increasingly widely held long-term development goal.

Box 1: Definition of low-carbon economy[1]

> ***Low-carbon economy*** *is a concept of economy defined as one that is 80 percent less carbon intensive than our present one and based on low energy consumption, low pollution and low emissions. The fundamental aim is to achieve high energy efficiency, to use clean/renewable energy and to pursue green GDP via technological innovation.*

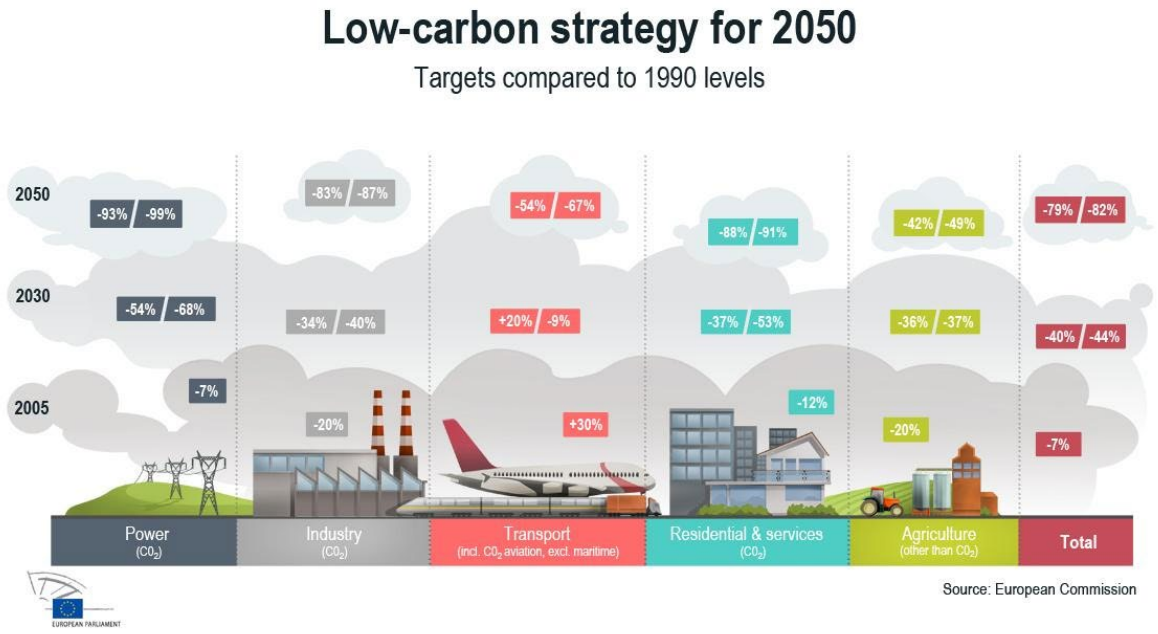
The urgency of a greener, low-carbon society is underlined by the 2016 Paris Agreement and the inclusion of 'Climate Action' among the UN Sustainable Development Goals. For the EU, it is a strategic priority which has led to the introduction of specific legal frameworks and various climate and energy targets to build a low-carbon and climate resilient Europe.[2] Specific climate strategies and targets include the 2020 Climate and Energy Package which targets a 20 percent reduction in greenhouse gas emission, 20 percent increase in energy efficiency and a 20 percent share of energy from renewable resources. The 2030 Climate and Energy Framework (see Figure 1) and the 2050 Long-term Climate-neutral Strategy (see Figure 2) set further, stricter, targets (reducing carbon emissions by 85-90 percent) that strive for a transformation to a climate-neutral Europe in the coming decades.[3]

Figure 1: EU's climate targets for 2030[4]



Source: author illustration based on https://ec.europa.eu/clima/policies/strategies/2030_en.

Figure 2: Climate-neutral strategy for 2050



Source:
http://www.europarl.europa.eu/resources/library/images/20120203PHT37214/20120203PHT37214_original.jpg.

In response to these various targets and reflecting the cross-sectoral nature of the challenge, the EU mainstreamed climate action into the budget covering all EU policies over 2014-20 representing 20 percent of the MFF (€206 billion). The EU is broadly on track with the 20 percent target, although the European Court of Auditors has noted that there is risk of falling short of meeting the target if more efforts are not made to tackle climate change. They recognise the work done under ERDF and CF in particular, but warn that under ESF, agriculture and rural development, and fisheries, the progress towards climate action has been more limited.[5] Climate-related spending under the 2014-20 budget is forecast to account for 18.8 percent (€200 billion) of the EU operational spending commitments.[6] The more ambitious goals for the post-2020 period, however, have led to a stronger commitment of EU funds to climate action. Over the 2021-27 programme period, the Commission proposes to increase the climate change target from 20 to 25 percent of EU expenditure in the 2021-27 MFF (€320 billion).[7] This implies an annual extra commitment of circa €16 billion (a total of €114 billion over the 2021-27 programme period), but remains substantially less than the investment needed to meet the EU's overall climate targets for 2030, estimated at c. €170-€180 billion per annum and requiring public and private investment.[8] However, various actors are advocating an increase to the proposed 25 percent target, with the European Parliament advocating an increase to 30.[9]

Policy action to support the transition to a low-carbon economy is central in meeting these targets and must balance:

(i) transitioning to a system that is cleaner, smarter, more efficient, reflective of the environmental costs of greenhouse gas emissions and pursuing economic growth with reduced emissions; and

(ii) opportunities in, e.g. the expansion of business and research activities in low-carbon technologies and creation of new green jobs and the challenges of the time, cost, and the attitudinal changes required to transform economies reliant on fossil-fuel based energy systems and consumption.

An extensive policy and analytical literature[10] debates the best ways to address these issues, including through carbon tax, the promotion of renewables, investment in energy efficiency, regulations for recycling, support for low-carbon innovation, and information programmes to support behavioural change. At the same time, the prevention or minimisation of environmental damage to water, air, soil and eco-systems, and the production of technologies and services that minimise environmental risk, pollution and resource use through CO2 emission have grown into a mature economic sector.[11,12] Large scale, top-down regulatory changes, therefore, are complemented by affordable, scalable solutions to move towards cleaner, more resilient economies and sustainable development and innovation strategies which have embraced the sector.

Low-carbon policy is substantial, complex and multi-faceted in terms of what it covers, and how it is managed and implemented. Efforts are required to ensure close coordination between policy, technology and capital, and partnership between stakeholders. The transition of a low-carbon economy is economically and technologically feasible but its achievement is a question of policy competence and the will to drive economic and social change. This emphasises a number of key requirements in terms of policy development and delivery:[13]

- decarbonisation/commitment to low-carbon needs a solid legal, planned and institutional basis to ensure this area is given time, consistency and credibility;
- low-carbon objectives must be translated into credible plans/approaches to sectoral, technology and reform targets that can guide policy and be implemented in practice;
- as well as 'putting a price on carbon', low-carbon interventions must address wider market, investment and behavioural problems, which has implications for policy complexity and coordination;
- the low-carbon economy will remain highly electrified, making the power sector and clean electricity a key way to decarbonise many parts of the economy;
- the low-carbon transition is primarily a revolution of production, but both supply-side innovation and demand-side adjustments in lifestyle and behaviour are needed and actions are needed to manage the wider socio-economic consequences of decarbonisation.

One of the key challenges is to combine activities at national, regional and local levels in a coherent way and follow a coordinated approach. Experience demonstrates that synergies and coordination set out on paper in programme documents can lead to valuable opportunities to up-scale interventions, combine funding and maximise impact.

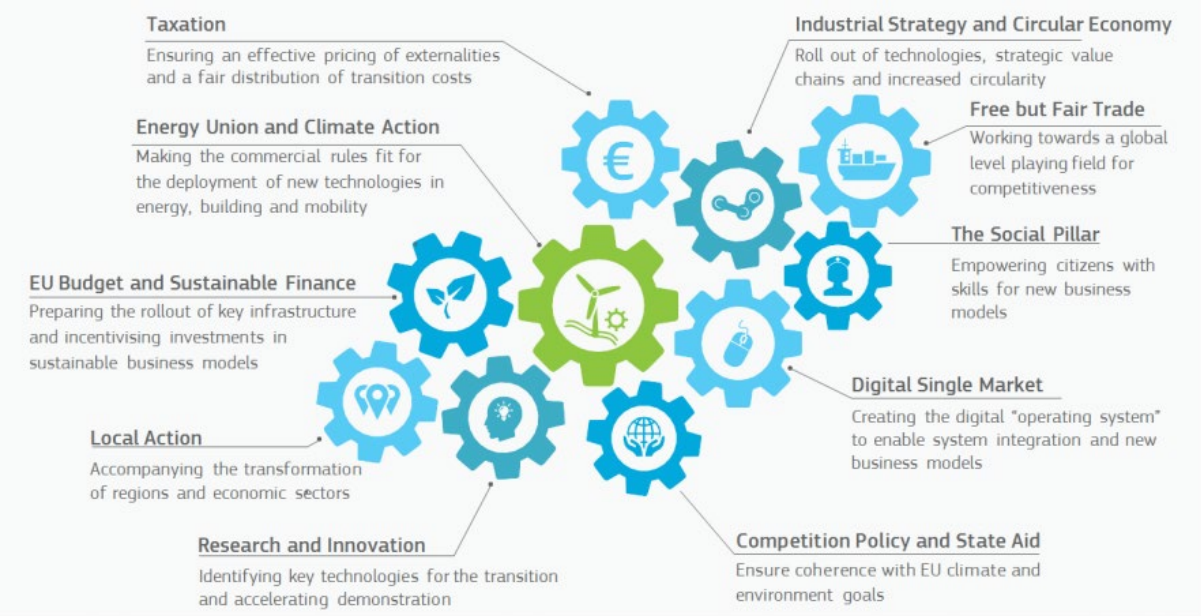
The regional level, in particular, brings the transition to a low-carbon economy 'to the ground'.[14] Case studies undertaken for the ESPON project 'Territories and Low-Carbon Economy' found regions to be particularly well placed to promote territorially integrated actions, with holistic, cross-sectional perspectives[15] and that the coherence between national, regional and European policies, particularly Cohesion policy, is key to success. In practice, synergies at the regional level should help to:

- combine regional with local implementation and make use of synergies in competences and resources;
- develop tailored implementation strategies for different economic sectors, energy sources and spheres of everyday life;
- consider the vastly different geographic and economic prerequisites of regions and actor constellations by developing individual strategies;
- exchange experiences and good practices between regions and make use of the impetus of international low-carbon initiatives at regional level;
- join resources at regional level in order to be able to apply for funding, financial investment aids and research funds;
- make use of the location of regional actors in the region and their regional knowledge;
- collaborate with the economic sector as a key partner in successful regional low-carbon transition strategies; and
- collect relevant information and inform regional stakeholders.[16]

2.1 The evolving role of Cohesion policy in supporting low-carbon economy

EU interventions to support the transition to a low-carbon economy cut across policy areas and involve numerous EU initiatives (Box 2). Cohesion policy plays an increasingly important part within this policy mix.

Box 2: EU policy, low-carbon and climate action



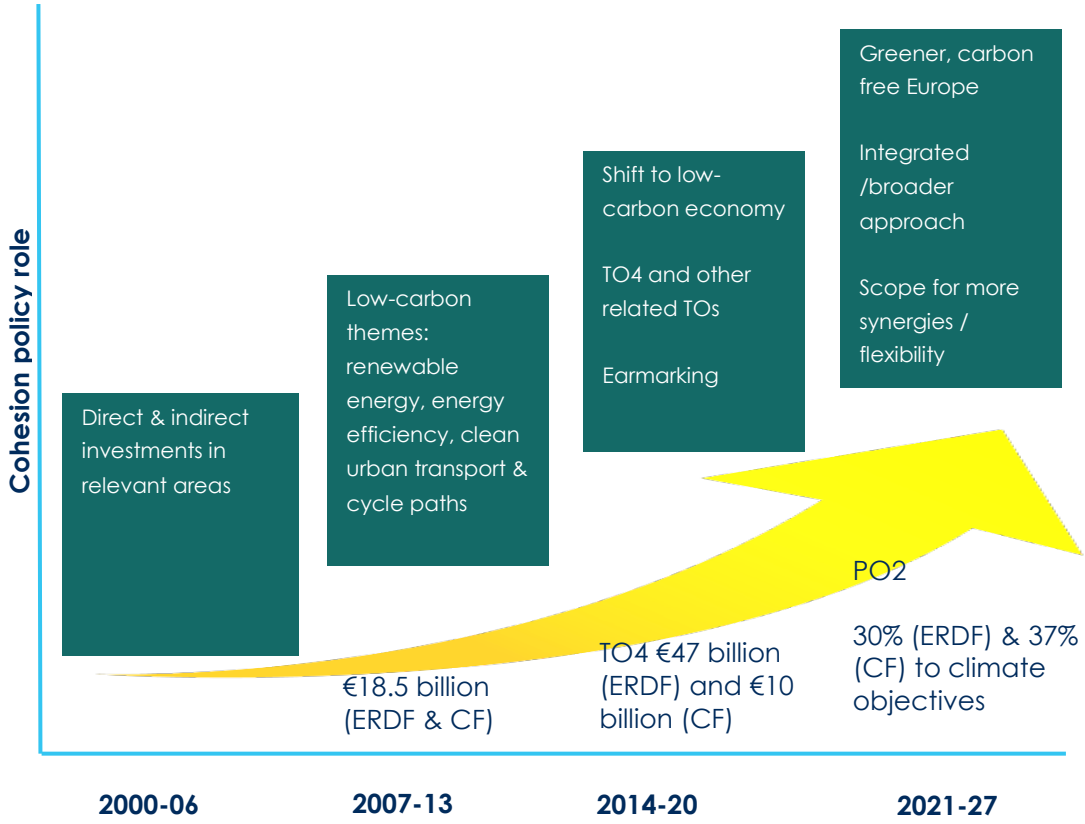
Source: Enabling framework. EPSC, referenced in CEC (2018) A Clean Planet for all - A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. *Communication from the Commission, Brussels, 28.11.2018 COM(2018) 773 final*

2.1.1 Emerging low-carbon economy focus 2000-06 and 2007-13

The low-carbon economy and the wider issue of climate change have been high on the EU agenda for over two decades now. The 2000-06 programme period introduced the Cohesion policy investment category 'direct and indirect climate investments' and the mainstreaming of environmental sustainability as horizontal objective paved the way for better integration of environmental concerns in EU sectoral policies. The main reference document at this time was the EU Sustainable Development Strategy (Gothenburg, 2001), which identified seven key challenges and corresponding targets and actions.[17]

In the 2007-13 period, €18.5 billion of the ERDF and Cohesion Fund was invested in low-carbon themes such as renewable energy, energy efficiency, clean urban transport and cycle infrastructure. However, in turn support for wider areas, such as the housing sector for example, was rather limited.[18] Although requirements for environmental impact assessments of policies, programmes and major projects were introduced in 2007-13, interventions were not driven by obligations such as earmarking, and climate change mitigation was not included as an explicit priority until the 2014-20 programme period. The incremental development of the role of Cohesion policy in low-carbon related themes is shown in Figure 3.

Figure 3: Evolving Cohesion policy role



Source: Author illustration

2.1.2 *Targeting transition to a low-carbon economy in 2014-20*

The role of Cohesion policy in supporting transition to a low-carbon economy was further developed in the 2014-20 period, with climate change concerns amplified by issues around energy security. 25 percent of the 2014-20 ESIF budget (€114.5 billion) is allocated to climate change-related actions across all thematic objectives (TOs) (see Table 1).

Table 1: ESIF supporting climate change-related actions in 2014-2020

ESIF	€ billion	%
ERDF	37.7	19.2
CF	17.6	27.8
ESF	1.1	1.3
EMFF	1.0	18.2
EAFRD	57.0	57.8
Total	**114.5**	**25.21**

Source: Adapted from 'Sustainable growth in an EU perspective – The cohesion policy contribution', Presentation to the Cities for Transnational Cluster Cooperation, Oslo 28 November 2018, Maud Skäringer, European Commission.

In the 2014-20 programme period, ESIF has 11 thematic objectives including the low-carbon economy specific TO4 ('Supporting the shift towards a low-carbon economy in all sectors'). TO4 has an allocation of €45 billion of ESIF, which represents the largest share of the EU budget into low-carbon investments.[19] The ERDF rules for the 2014-20 period also require Member States, for the first time, to allocate a mandatory minimum proportion of the available funding to the low-carbon economy. In addition, the Cohesion Fund, which can invest in TO4 to TO7, also forms a major funding source for low-carbon. The aim is to ensure a better alignment with the EU's policy objectives and the contribution to the overall climate targets in the EU budget. Investments are also seen to provide important benefits for regional development, competitiveness, growth and jobs, as well as reduce energy poverty.[20]

Table 2: Minimum allocation of ERDF (%) to TO4 in 2014-2020

Region type	Minimum ERDF to TO4
More developed regions	20 percent
Transition regions	15 percent
Less developed regions*	12 percent

Source: European Commission (2014) Commission communication on a policy framework for climate and energy from 2020 to 2030, COM(2014)0015, final, Brussels.

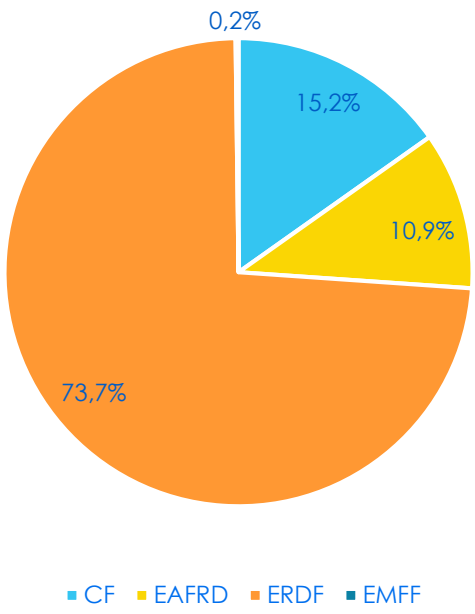
** Cohesion Fund resources can be used by less developed regions to achieve the minimum fund allocation to TO4, in which case the minimum percentage of funding directed to the objective increases to 15 percent.*

The expectation is that interventions will help, in particular, to implement investments in energy efficiency in buildings, renewable energy, smart distribution electricity grids or sustainable urban transport as well as in research and innovation in these areas.[21] Within the ERDF programmes the horizontal sustainable development theme, supporting integrated climate action, is to be integrated in all ESIF investments.[22] The potential for synergies with relevant sectoral initiatives to promote the low-carbon economy is also emphasised, e.g. the Energy Union framework strategy (2015). This adds further impetus to the integration of ESIF into the EU's climate change agenda more generally,[23] with Cohesion Policy playing a key role in translating EU priorities into a national and regional context.[24]

All five ESI Funds (ESIF) are tasked with addressing TO4 (see Figure 4). As well as ERDF, TO4 is also prioritised under the Cohesion Fund. While not explicitly targeted under ESF, TO4 can still be supported through, for example, awareness raising or skills development related to low-carbon technologies or helping to build synergies with other ESIF funding. ESF support can be used, for example, to train labour force working with renewable energy technologies that are funded under ERDF.[25] A key priority of EAFRD within TO4 is the promotion of resource efficiency and a shift towards a low-carbon and climate resilient economy in the agricultural, food and forestry sectors. 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).[26] Under EMFF, support is also provided to TO4.[27]

Figure 4: Total budget (%) to TO4 by Fund (CF, ERDF, EAFR, EMFF)



Source: https://cohesiondata.ec.europa.eu/themes/4

Although TO4 has an explicit focus on low-carbon actions, other TOs also provide direct or indirect support relating to low-carbon transition and sustainable growth.[28] These include: investments related to research and innovation, potentially in the low-carbon economy area (TO1); support to ICTs (TO2); investment in the competitiveness of SMEs, for example by improving energy efficiency (TO3); investments to climate change adaption and risk prevention (TO5); environmental protection support (e.g. air quality) and resource efficiency (TO6); and, sustainable transport and smart energy infrastructure (TO7).[29]

2.1.3 Thematic concentration and funding to PO2 in 2021-27

For the 2021-27 period, European Commission proposals suggest a reduction from the 11 TOs to five 'policy objectives' (POs). PO2 (Greener and carbon free Europe) is specifically to cover the clean and fair energy transition, green and blue investment, circular economy, climate adaptation and risk prevention, although low-carbon investments can also be embedded under other POs, most notably under PO1 (Smarter Europe).

Figure 5: PO2 - A greener, carbon free Europe

Source: Author illustration based on https://ec.europa.eu/regional_policy/en/2021_2027/.

ERDF resources are set to be concentrated on PO1 and PO2 with thematic concentration being applied at the national level with some flexibility for adaptation at the level of the programmes (see Table 3). Both ERDF and CF are expected to contribute to the EU's overall climate target of 25 percent. ERDF investments are set to contribute 30 percent and CF investments 37 percent to climate objectives.

Table 3: Thematic concentration on PO2 at national level (ERDF) in 2021-27

Member States with	Minimum (%) PO2
GNI below 75 percent	30 percent
GNI 75-100 percent	30 percent
GNI above 100 percent	Not applicable (PO1 and PO2 minimum 85 percent)

Source: European Parliament (2019) European Regional Development Fund and Cohesion Fund 2021-2027, Briefing.

3 PROGRAMMES SUPPORTING LOW-CARBON ECONOMY IN 2014-20

As outlined in the previous sections, the low-carbon theme is becoming increasingly important within ESIF. IQ-Net programme authorities now have experience of working on this theme across a range of intervention areas. This section looks in more detail at how Programmes have worked to support transition to a low-carbon economy, how the theme has been integrated, implemented and monitored and what lessons can be drawn for the future.

3.1 Integration of TO4 into Cohesion policy programmes

3.1.1 Ease of integration

The integration of the low-carbon theme (TO4) into the Cohesion policy programmes in 2014-20 was, in many respects, a natural process. Many Member States and regions were able to rely on existing expertise and experience gained in the context of domestic frameworks or previous Cohesion policy programmes. Timing was also favourable given the increasing awareness and political commitment attached to the theme as part of the wider climate change discussions. The policy and funding (earmarking requirement) push from the EU played a role in strengthening that commitment. This was notable especially in those countries where despite the increasing importance attached to the low-carbon theme and visibility in strategic frameworks, the political priority and ownership remained low (e.g. Czech Republic). In some cases, however, this was found to be a somewhat artificial top-down 'push' by the European Commission. In Denmark and Portugal, for example, due to other competing needs and themes, low-carbon investments would not have been prioritised to the same extent without the compulsory earmarking requirement.

Despite the fact that Member States and regions were generally willing to include the theme and recognised the importance of ESIF (especially ERDF and CF) support to low-carbon economy, there were specific (capacity) challenges that complicated the early stages of the programme period, including programming, which had potential knock on effects to subsequent issues throughout the programme cycle (see Figure 6).

Figure 6: Impact of capacity challenges on programmes

Source: Author illustration

Key challenges in this regard include the **lack of capacities and expertise, including thematic skills, time and setting up the appropriate administrative structures** (e.g. Portugal, Slovenia, Spain, Sweden, Vlaanderen, West Netherlands).

Some IQ-Net programme authorities reported an initial **lack of preparedness** linked, in large part, to the newness of the theme (e.g. Portugal, Slovenia). In **Slovenia**, for example, the MA found it difficult to gather the required information from sectoral actors which were not familiar with the Cohesion policy procedures and requirements.

In **Sweden**, the **lack of thematic skills as well as time pressures** were key factors behind the weak problem analyses identified in some OPs. As noted by the TO4 evaluation[30] in Sweden, some programme authorities carried out inadequate (in many cases too general) problem analyses during programming. The TO4 evaluation recognised that, while the problem analysis should not be overly detailed, the OPs needed to clearly set out what problems they aimed to solve and for whom. Where this did not happen, there could be a negative impact on the delivery of the objectives and it would be more difficult to achieve complex structural changes, such as transition to the low-carbon economy.

In some cases **concerns related to a specific investment priority** (IP). For example, in **Slovenia**, the MA faced some specific difficulties with the IP 'development and use of intelligent low-

and medium-voltage distribution systems'. The IP covered a new theme and there was a lack of experience, not only in the implementing body but also at the level of the beneficiaries.

In other countries, such as in **Portugal**, low-carbon investments carried out in the past programme periods provided some experience to draw on. However, as past projects involved largely smaller-scale pilot projects and public lighting (NSRF 2007-13 programme period) or support to the production of renewable energy (QCA III, 2000-06 programme period), **not all the experience was relevant for planning investments in 2014-20**.

In the **West Netherlands OP**, the willingness and capacity to set up new management structures targeted at TO4 was shaped by the **significant decrease in the overall budget** for 2014-20. This made it particularly challenging to include a new theme and find a meaningful niche in domestic policy, especially in comparison to TO1 where these structures (such as drafting the OP, consulting partners and stakeholders) were already in place.

3.1.2 Meeting ex ante conditionalities

Ex ante conditionalities (EACs) for the low-carbon theme (see Table 4) were meant to be fulfilled before the start of programme implementation but, as with EACs under other TOs, not all conditions were met on time and action plans were needed. For the thematic EACs under TO4, all action plans were completed by mid-September 2017. The EAC 4.1 was most problematic with 13 Member States required to develop action plans, while only two Member States were affected under EAC 4.3 and one under EAC 4.2.[31]

Table 4: Thematic EACs for TO4

EACs	
4.1	Actions have been carried out to promote cost-effective improvements of energy end use efficiency and cost-effective investment in energy efficiency when constructing or renovating buildings.
4.2	Actions have been carried out to promote high-efficiency co-generation of heat and power.
4.3	Actions have been carried out to promote the production and distribution of renewable energy sources.

Most IQ-Net programme authorities faced no difficulties in meeting the EACs and where problems did emerge they were generally under EAC 4.1 (e.g. Czech Republic, Greece, Portugal). In a more limited number of cases, problems were reported under EAC 4.3 such as in Warmińsko-Mazurskie where the preparation of the energy audit in the field of thermal modernisation of buildings turned out to be problematic, although this was consequently addressed through information and training activities. The key difficulty under EAC 4.1

concerned the numerous adaptation changes required to national legislation (e.g. Czech Republic, Portugal). For example, in Portugal, the EU Directive 2010/31/EU on Energy Performance of Buildings involved three alterations to the national law before the EAC met the Regulation's requirements. The process was perceived by the IQ-Net programme authorities to be stricter than anticipated in the EU regulations.

From the Commission's perspective, the process gave a significant push to the transposition of the Directive in a number of Member States (Czech Republic, Italy, Poland, Portugal, Slovenia and Spain).[32] As noted by one IQ-Net authority, "*in this context, the EAC could be seen as a way to oblige the Member States to do a transposition, which would possibly not have happened naturally or would not have been done so early/quickly*".

Programme authorities were especially critical about the **delays the EAC 4.1 process caused to project and programme implementation** (e.g. Greece, Portugal, West Netherlands), and questioned the relevance of the EAC process in some cases. In Portugal, project applications could not be approved under the Priority 'Energy Efficiency in Buildings' while in Greece, a self-suspension clause was in force, which prevented the MA from issuing calls until the EAC was fulfilled. In Greece, the process was further delayed by the new regulation on the Energy Efficiency of Buildings (KENAK), which had to be drafted and approved by the ministers. The new KENAK was not approved until late July 2018, which meant that calls could not be issued until after this date.

In the case of West Netherlands OP, the problems with EAC 4.1 related to the definition of the indicator for energy efficiency in existing buildings. Energy labels had not been ratified correctly, and as a regional authority, the issue was outside the control of the MA. The action plan was therefore initiated by the Ministry of Economic Affairs and Climate Policy. The problematic issue was that the Commission's guidelines prescribed a different method for the energy labels (requiring an expert check on buildings), in contrast to the existing national points-based procedure. This resulted in further discussions with the Commission and, while a compromise was eventually reached, this resulted in delays and the inability of the MA to allocate funding to housing corporations until after the issue was resolved. In the end, the Commission ruled that energy efficiency in existing buildings constituted such a very minor part of the OP and a decision was taken by the MA to amend the OP and not pursue with the EAC.

3.2 Delivering low-carbon actions in the Programmes

3.2.1 *Priority Axes*

The low-carbon theme has been integrated into Programmes in a variety of ways as a result of the planning and programming processes. **In most IQ-Net programmes, there is one dedicated priority axis for low-carbon** while one programme authority has adopted multiple dedicated priority axes to reflect different regional needs (e.g. Greece).

Priority axes	IQ-Net programmes
Dedicated priority axis sometimes implementing multiple TOs	CZ (OP EIC & OP E), Eng, FR (Bur), NRW, PV, Sco, SI, SE, W-M
Several dedicated priority axes	EL

- In **Greece**, TO4 is included in three priorities: Priority 8 covers less developed regions with ERDF supporting major projects related to urban mobility in Thessaloniki; Priority 9 covers more developed regions with CF supporting major projects related to urban mobility in Athens and Thessaloniki; and under Priority 10, ERDF supports energy efficiency in public buildings and use of renewable energy sources in hospitals mainly in Attiki region. This approach was adopted to ensure balanced investment into low-carbon in the regions.

Due to the close links with themes such as Sustainable Urban Development (SUD) and innovation, **some IQ-Net programmes have chosen a more cross-cutting approach and included the theme also under additional priorities or instruments.**

Priority axes	IQ-Net programmes
Dedicated priority axis plus included in other priorities / instruments (e.g. SUD)	AT, DK, NL-W, Pom, PT, Vla, Wal

- In **Vlaanderen** and **West Netherlands**, there is a dedicated priority for low-carbon. In addition, three provinces in Vlaanderen and three cities in the West Netherlands have included low-carbon in their ITIs. Similarly, in **Denmark**, TO4 is included both in the Priority 3 'energy and resource efficient SMEs' and Priority 4 'sustainable green urban development'.

- In **Wales**, the ERDF OPs have a dedicated priority for renewable energy & energy efficiency (Priority 3). This targets less developed sectors such as marine energy (tidal

and wave), where there is a need to invest in the infrastructure to develop these technologies and to attract investment into the programme area. Priority 3 also supports small-scale community energy schemes and energy efficiency in housing. In addition, low-carbon is an important focus of Priority 1'R&I', which provides opportunities for more developed renewable energy generation sectors to further develop technologies (wind & solar), including attracting finance from market leaders outside of the programme area.

Two programme authorities have chosen to implement the low-carbon theme as part of other **closely related priorities (e.g. innovation**) as in the case of Finland, or included it as **a specific objective** as illustrated by the example of IROP in the Czech Republic.

Priority axes	**IQ-Net programmes**
Included in related priority axis implementing multiple TOs	Vlaanderen
Other approaches	Czech Republic (IROP)

- In **Finland**, there is no dedicated priority for low-carbon but instead the theme is implemented through the Priority 1 'competitiveness of SMEs' and Priority 2 'R&D'. Having a separate low-carbon priority was perceived to be artificial and leading to a fragmented OP and potential duplication of efforts.

- In the **IROP of the Czech Republic**, TO4 is included as a specific objective rather than as a priority axis, as this was considered to provide more flexibility not least regarding allocations and the setting of indicators.

3.2.2 Investment Priorities

The investment priorities (IP) provide more detail on the type of projects that ERDF and CF fund under TO4. There are differences between programme authorities regarding the selected IPs (see Table 5).

As can be seen from Table 5, IPs (a), (b), (c) and (e) feature in most programmes although differences exist even between the OPs within a Member State. In Sweden, for example, the Stockholm OP has invested all the resources into one project under the IP 4c (Grön Bostad – Green residence), while other Swedish OPs have implemented a number of projects across different IPs (see Box 3).

Table 5: Investment priorities for TO4 (ERDF and CF)

Investment priorities	AT	Biz	FR (Bur)	CZ	DK	Eng	EL	FI	HR	NL (W)	NRW	Pom	PT	Sco	SE	SI	Vla	Wal	WM
(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 R&I in, and adoption of, low-carbon technologies (ERDF only)	✓			✓		✓					✓			✓	✓			✓	
(g) promoting the use of high-efficiency co-generation of heat and power based on useful heat demand				✓															✓

Box 3: TO4 Investment priorities and awarded projects in Sweden

In Sweden, there are large differences in the number of projects and total funding awarded across the different IPs. At the time of the TO4 evaluation, the state of play was:

- Highest funding levels are under IP 4b (included e.g. in the national OP).
- Highest number of projects, but lowest level of funding is under IP 4c.
- Lowest number of projects is under IP 4f. Efforts under this IP are notable in the Stockholm OP, Västsverige OP and Norra Mellansverige OP. The IP has fewer projects than the other IPs, possibly, due to the close links of the IP to TO1.

The TO4 evaluation questions whether the best results are achieved by allocating most funding to the IP 4b as this is aimed at a relatively hard-to-reach target group (i.e. SMEs). As per the IPCC recommendations, energy efficient buildings (IP 4c) is the most important area in the efforts to create a low-carbon future, which the evaluation also suggests could possibly provide better impact.

The question of **how best to target and focus programme efforts to the low-carbon theme is a particular concern.** Experiences vary regarding which projects are more 'straightforward' and 'well-performing', and which ones face specific problems and have slower progress. Shifting eligibility criteria to target specific priority axes is one way to ensure balance and maximise impact. However, as there is a mix of experiences under each IP, it is difficult to draw any clear conclusions as to which IPs are more successful / desirable than others. The European Commission also does not provide data on the funding or number of projects attached to IPs, which would have given an idea of the most prioritised themes. However, research across the IQ-Net programmes identifies commonalities in the factors which have facilitated and challenged the implementation of TO4 projects (see Section 3.3).

3.3 Project implementation

3.3.1 *Initial and on-going challenges*

Project implementation under TO4 has been challenging in many programmes, especially at the beginning of the 2014-20 period. The situation reflects the newness and (technical) complexities associated with the theme, and the different expectations and capacities of the actors involved. In many cases, the situation has improved in the course of the programme period, often due to specific efforts made to address emerging problems. The key challenges reported by programme authorities can be grouped under three broad headings: **low demand; weak competition in the project selection stage; and other specific challenges concerning the awarding of the resources**.

i Low demand for low-carbon projects

Many programme authorities reported low demand for low-carbon projects, especially at the beginning of the 2014-20 period and in comparison to the performance of other TOs. A number of key associated issues have emerged.

Competition from other measures supporting low-carbon. Other existing support schemes in the countries and regions can affect the demand for funding under TO4 and competition from domestic measures was reported, for example, in Austria, Sweden and West Netherlands. In Sweden, the *Klimatklivet* project of the Swedish Environmental Protection Agency was launched around the same time as the ERDF OPs, targeting similar actors and providing funding for similar interventions to TO4 (see Box 4).

Box 4: Klimatklivet[33]

> The Swedish Environmental Protection Agency has provided support to local environmental investments through the project called Klimatklivet which receives funding from the State budget. Since 2015, when the project started, over SEK 1 billion (c. €93.6 million)has been allocated to local climate investments, with a further SEK 700 million (c. €65.5 million) to be allocated by 2020.
>
> The support goes to local investments e.g. in municipalities, businesses, schools or the county councils. The investments are intended to provide climate benefits and the overall aim is to reduce greenhouse emissions. They include climate initiatives in areas such as transport, industry, residential, commercial, urban development and energy. Schemes may involve, for example, replacing fossil oil with biofuel.

Projects are characterised as technically complicated and administratively time-consuming. Bringing forward a full application under TO4 can require effort and time and can therefore be less attractive to potential beneficiaries. While the interest amongst the potential project

actors may be high, there may be too many conditions for the project actors to have the interest and capacity to submit an application (e.g. IROP in Czech Republic, Slovenia).

- In the **Czech Republic**, where the level of funding is relatively high e.g. under the theme of renewable energy sources (support for small-scale water power stations, processing of biomass and bio-gas stations etc.) of the OP EIC, the numerous conditions attached still resulted in a low level of interest, and the theme has been performing below expectations. Similar problems are reported concerning the theme of energy efficiency.
- In **Portugal**, meeting the initial programme eligibility criteria has been very demanding especially in public building projects as it includes a range of requirements such as: increase in energy efficiency classes; positive Net Present Value (requirement for the project to generate savings that allow to cover the investment costs); and fully repayable support.
- In **Wales**, projects related to community energy have been difficult since the schemes are not only complex but also bespoke, each responding to a particular community need.

Lack of capacities within the implementing bodies and at the beneficiary level. Lack of capacities in the **implementation bodies** (e.g. Burgundy OP in France, Slovenia, Sweden, Vlaanderen, West Netherlands) is generally related to the availability of resources such as knowledge and time, but also finances in some cases.

- In **Sweden**, the lack of capacity has contributed to specific problems in the delivery of TO4 including poor problem analysis and target group identification in the programming phase; limited synergies with relevant actors, measures and programmes, which have led to challenges in coordination; and problems concerning project generation and selection.[34]
- In the **West Netherlands OP**, the initial lack of capacities led to a delay and uncertainty both in the programming and implementation stages. Given the significantly reduced funding under the regional OP in 2014-20 (nearly 40 percent lower budget than in 2007-13), resources were limited in terms of setting up appropriate structures for TO4 and there was little experience in the creation of relevant working groups around the theme. For example, the Expert Committee, which is responsible for project selection, initially contained mainly innovation-specific expertise and little climate and energy knowledge.

IQ-Net programme authorities have also noted **lack of capacities at the beneficiary level** sometimes around specific themes (e.g. insulation of housing in the IROP in the Czech Republic; energy renovation projects in the Burgundy OP in France; energy renovation projects in Slovenia, and; community energy projects in Wales). This is because beneficiaries may represent very small organisations with limited capacities (including technical expertise) to prepare project proposals (e.g. IROP in the Czech Republic) and to obtain match-funding (e.g. Wales).

Complexities concerning the involved actors. Sometimes there have been **problems with the eligibility of 'relevant' low-carbon beneficiaries**.

- In the **IROP in the Czech Republic**, discrepancies have arisen between the owner of a property (i.e. potential applicant) and who actually pays the energy costs of the property and is interested in energy savings (i.e. tenant, who is not eligible for support).

- In **Spain,** a national evaluation has noted difficulties in accessing finance for 'owner communities', i.e. legal entities comprising individuals owning parts of a shared property / building, but also with respect to the ineligibility of individuals.

Other problems include the **different aspirations of beneficiaries compared with those of the programme authorities**.

- In **England**, the local authorities wanted to support insulation projects in social housing, while the MA was looking for innovation-oriented projects.

- In **West Netherlands**, differences existed between the Energy Agreement (domestic policy agreement of environmental organisations, energy corporations, public institutions, and trade and labour unions on investments in energy efficiency and production of renewable energy) and the Expert Committee responsible for project selection. The differences concerned the so-called bundling of resources by the local and provincial governments in the delivery of TO4 projects. While the Energy Agreement encouraged these institutions to use ERDF to form coalitions, the Expert Committee regarded this as financing civil servants and lacking sufficient innovation focus.

Some programmes have also noted their frustration concerning **the inconsistencies in the aspirations set out in the Regulations**, which for example encourage more renewables, but do not allow (grant-supported) projects to make a profit. Furthermore, the high demands set out at the EU level are not always realistically in line with the absorption capacities of the programmes. Some programme authorities have also even noted **reluctance by the domestic policy makers to apply past experiences / good practices from 2007-13 period**, which may have meant that the approaches in 2014-20 did not have the intended effect on implementation.

Another specific challenge concerns **the involvement of the business sector.** Difficulties in this regard often stem from different expectations and timescales (e.g. desire for a quick return of investment), which are hard to achieve in a normal TO4 project. Businesses can be hesitant to provide substantial investments in low-carbon themes (e.g. energy efficiency in Vlaanderen), and discouraged from participating in TO4 projects altogether (e.g. Wales). Even where progress with business involvement has been made, the intention and content of the Cohesion policy programmes is not necessary always clear to the business sector (e.g. Finland).

- In **Wales**, marine energy is a difficult sector to attract private developers. The maximum intervention rate for private sector development is 70 percent, meaning that a further 30 percent of the costs need to be funded from own resources or through other investors. While some are able to achieve this, it is challenging. Further complicating factors relate to the high costs of the projects, the lack of revenue stream to fund projects, and the fact that output can only be sold to the national grid for a set price per unit, which is unattractive to investors.

Lastly, some authorities have noted **issues relating to the saturated market**. Project beneficiaries are stepping back from projects because there is no capacity to meet the demand (e.g. Croatia) and due to lack of providers and rising costs in the market (e.g. OP EIC in the Czech Republic, Croatia, Slovenia).

ii Weak competition in the project selection

Related to the low demand, **limited number of potential beneficiaries** can also be a particular concern especially for more rural and sparsely populated areas (e.g. North of Sweden), but also within specific themes. For example, in **Portugal**, the implementation of renewable energy projects has had a weak uptake due to the small number of potential beneficiary companies. In the Highlands and Islands in **Scotland**, the limited pool of low-carbon actors has meant that activities have been carried out by key players such as the Highlands and Islands Enterprise and Highland Council.

Most IQ-Net programmes report having **adequate project selection criteria and procedures in place to ensure that the projects are addressing relevant low-carbon challenges**. However, difficulties have been reported in relation to lack of capacities in the project assessment, and the consequent awarding of resources to the 'available' rather than to the most relevant and best quality projects. In West Netherlands, for example, the national mid-term review[35] pointed to difficulties in project assessment experienced by the Expert Committee which resulted in a relatively high number of rejected applications. This was also an issue in Sweden, although improvements have taken place (see Box 5).

Box 5: Improving project selection processes in Sweden

In Sweden, the lack of thematic knowledge led to problems in the project selection. According to the TO4 evaluation, project selection took place without consideration of links to other projects and programmes. This in turn meant that funding was steered to 'energy efficiency in SMEs' rather than to 'sustainable building', despite the fact that IPCC's research indicated that the latter theme should be given priority.[36]

Another problem was that the projects focussed only on local and regional issues, without sufficient consideration of the wider external environment (e.g. environmental technologies or political decisions). In comparison to the early stages of the programme period, awareness-raising and knowledge building has taken place particularly amongst the Structural Funds partnerships which prioritise projects. This has

resulted in a better balance of projects and a clear move away from 'safer' projects, such as pre-studies.

Despite the weak competition in the project selection stage, programmes need to award funding not least to ensure financial absorption. In some cases, this has resulted in **higher award rates in comparison to other TOs**. This has been the case in **Sweden** where TO4 has experienced both lower demand but higher award rates, largely due to the pressures of absorption. As noted by the Swedish evaluation of TO4, this combination could risk the support of a lower quality of projects. Greater competition would provide more options for the selection of most relevant or highest quality low-carbon projects.

iii Other factors affecting the awarding of resources

A number of other factors can be identified which have affected the awarding of resources under TO4:

Long processing times related to infrastructure projects. For example, in Bizkaia, the progress under TO4 is slower in comparison to the other TOs (TO1 and TO3). This is largely because TO4 covers infrastructure projects involving lengthy procurement processes and longer implementation periods.

Lack of match-funding has been an issue for certain programme authorities affecting, for example, the themes of energy efficiency and renewable energy use in enterprises in England. Lack of match-funding has also been reported as a problem in the Highlands and Islands in Scotland.

Practical barriers such as realisation of projects in summer. In the OP EIC in the Czech Republic, for example, heating supply involves projects that can be only realised in summer, which has made the progress very slow.

Other external factors, including political developments, can make the situation uncertain for project actors. For example, in Wales, themes such as community energy have been affected by the uncertainty surrounding Brexit.

State aid is less of a concern to programmes where low-carbon projects focus on developing ideas and piloting initiatives as well as for those that use *de minimis* (e.g. Denmark). However, other types of TO4 project can involve specific State aid problems as noted by authorities in the Czech Republic (OP EIC), Croatia, England, Pomorskie, Portugal, Vlaanderen, Warmińsko-Mazurskie and West Netherlands. While GBER accommodates State aid, it may involve various (interpretation) problems concerning a wide array of Articles. Box 6 lists some of the key State aid concerns that have emerged in Vlaanderen during the implementation of TO4 projects.

Box 6: State aid and low-carbon projects in Vlaanderen

In Vlaanderen, there have been a number of State aid issues concerning low-carbon projects:

- Uncertainty around how to interpret State aid rules under the specific objective 3.4 'green heating and renewable energy production';
- Concerns about how the Audit Authority will treat State aid (leading to a conservative approach and uncertainty for potential beneficiaries);
- Problems with projects focusing on renovations in residential buildings due to lack of clarity on whether social housing corporations operate commercially given that they let out properties;
- Difficulty in applying GBER to individual projects e.g. comparing conventional energy impact with ERDF-related impact for the green energy objective (and definitions of 'conventional' may differ between countries);
- Differing requirements of CF and ERDF State aid rules in terms of taking stock of project revenue and eligibility of costs (e.g. external expertise is eligible but in-house expertise is not).

3.3.2 Delivering good projects and addressing challenges

Despite challenges encountered especially in the early phases of implementation, improvements have taken place in many IQ-Net partner countries and regions. Lessons have been learned about the types of projects that work better, and programme authorities have been active in adopting measures in response to existing or emerging project implementation challenges.

While programme authorities have different experiences regarding projects that perform well and those that do not, some more general lessons on facilitating factors in project implementation can also be identified.

i Find the focus: identifying the right issues and stakeholders

A broad (not prescriptive) programme can attract a wider range of project ideas. This enables the ideas to emerge from the outside rather than being imposed top-down by the authorities to the potential pool of applicants.

Projects that have relevant strategic focus based on identified problems, but also projects that promote a positive image and can therefore attract publicity (for ERDF and EU more generally) and wider commitment. For example, in Vlaanderen, the cycle highway projects provide a clear image of ERDF spending in the region and create positive publicity. In Pomorskie, the use of ITI has allowed the identification of specific low-carbon projects in advance and targeting of specific beneficiaries. This has also led to better analysis of project problems and consequently to higher quality of projects.

Projects that can provide results and have the financial capacity. In this regard, large projects can have more resources and technical capacities to meet the requirements (e.g. Croatia, Wales) and provide the necessary focus and create more sustainable impact (e.g. Vlaanderen). This includes larger project initiatives that have the potential to create new value chain cooperation in the development of green business models (e.g. Denmark). The downside is that larger projects take longer to develop although in Vlaanderen for example, larger projects are granted some additional time to avoid this problem. However, shifting the balance towards larger projects can mean that less attention is given to the specific needs of small-scale projects. For example, in Pomorskie, it was expected that most projects under the energy priority would focus on the larger-scale production of energy for the market, but in reality many project applications have been smaller-scale and focussed on the production of renewable energy for own use. In Wales, programme authorities plan to fund more preparatory work, invest in capacity building activities and feasibility studies, as well as demonstration zones (e.g. for wave energy and tidal stream), which helps to put the framework in place for future investments.

Projects that are implemented well and involve the **'right' stakeholders can facilitate interest and project generation**. For example, in Denmark, projects that have involved municipalities either as project managers or as active project participants have been generally more successful. In addition, municipalities have acted as important drivers in attracting more business participation (especially SMEs) by engaging in active dialogue with local businesses concerning green business models and circular economy. For example, in one specific project, the personnel from the waste management division of the municipality worked with the project to encourage their understanding of the commercial potential of the waste management of SMEs. Similarly, in Sweden, the Swedish Energy Authority has played a role in the national and regional OPs in terms of mobilising actors. In West Netherlands, new coalitions and partnerships among low-carbon stakeholders have been formed with partners that had not taken part in the OPs activities in the past (e.g. house owner corporations, energy companies). This resulted for example in a partnership of regional energy funds, in which domestic funding was combined with ERDF support.

ii Provide support: attract the right type of low-carbon projects

Most programme authorities have adopted at least some form of proactive measures to attract the right type of low-carbon projects that provide added value. This is commonly done in the form of various information dissemination measures to create awareness amongst partners and stakeholders, as well as through targeted calls. In addition, where challenges arise and additional efforts are required to further facilitate project generation, partners have also been responsive. Commonly used measures include:

Revisions to the OP focusing on the reallocation of funds or changes to the co-financing or funding conditions more generally. Some IQ-Net programme authorities have adopted

programme changes (e.g. Czech Republic, Denmark, Greece, País Vasco, Portugal, Slovenia) to increase demand and to ensure that financial targets are met.

Intensive communication activities with relevant partners and stakeholders. These type of activities are important in terms of raising awareness, but also to improve the quality of project proposals. In the IQ-Net countries and regions, this has taken place in a variety of ways including: wide-scale information campaigns (e.g. marketing and media campaigns); open days; and seminars or local workshops targeted at applicants and beneficiaries. In addition, there have been many other forms of meetings such as individual consultations, surgeries or specialist support through networks, help desks or contact points, or indeed a combination of the above.

Improvements to guidelines for applicants (e.g. Austria, Denmark, England, Slovenia) or **issuing guidance on specific themes** (e.g. Greece, West Netherlands). In **Finland**, a guidance document was developed in 2016 to provide an overview of the low-carbon theme. The guidance document sets out questions to help identify direct and indirect low-carbon impacts, and provides examples of what makes a good project supporting low-carbon as well as projects that are not recommended.

Adapting project selection criteria (e.g. Croatia, Pomorskie, Portugal, Warmińsko-Mazurskie, West Netherlands) and **simplifying requirements** for project applicants. For example in the Czech Republic, the MA of IROP in cooperation with its IB has simplified requirements for project applicants on several occasions. This has included, for example, the number and content of compulsory annexes and adjusting eligible costs.

Other measures adopted include **ongoing application rounds** (e.g. IROP of the Czech Republic), **extending call periods** and having a technical working group for each call (e.g. Vlaanderen), and the consideration of either a **wider range of supported actions in the call** (e.g. Portugal) or **targeted calls** (e.g. Warmińsko-Mazurskie).

Capacity building measures, including targeted training to civil servants (Greece) and specific initiatives, including ClimateSync in Sweden (see Box 7).

Box 7: ClimateSync[37] – National collaboration on energy and climate

ClimateSync (*Klimatsynk*) is a project run by the Swedish Energy Agency in cooperation with *Tillväxtverket* within the national OP. It was initiated on the basis that TO4 was a new theme in 2014-20 for most of the involved actors. There was therefore a need to increase the thematic skills of actors involved in the ESIF programmes, including those of *Tillväxtverket*.

The project runs until the end of December 2020 and has an ERDF budget of SEK 13 million plus (c. € 1.2 million) plus an additional SEK 13 million (c. € 1.2 million) of co-funding from *Tillväxtverket* and the Energy Authority.

The project functions as an online platform (www.klimatsynk.se) with the aim of finding synergies, avoiding overlaps, and increasing learning between the eight regional and one national OP within TO4. The work is carried out in four work packages: (1) mapping

of all approved projects under TO4, (2) categorising projects into project portfolios, (3) inviting project leaders to meetings to exchange experiences and to find solutions to shared challenges, and (4) organising dissemination activities and conferences.

Tillväxtverket has underlined the important role of ClimateSync in inspiring project and programme actors. The evaluation of TO4, however, notes that the activities promoted by ClimateSync have generally not increased the skills shortages of programme actors or supported the delivery of core tasks including project selection. Instead, the activities have focussed more on general skills development and raising the level of knowledge on energy and climate issues in general. The evaluation also notes, however, that the aim of ClimateSync is not to provide concrete support to the implementation of core tasks of programme actors. Furthermore, at the time of the evaluation, it was possible to disseminate only limited learning and results through the programmes and projects as it was too early in the implementation cycle.

The European Commission has also provided support through various means (see Box 8). Similarly to the experience of the IQ-Net programmes, some of these initiatives are still finding their role and the best approach to address the needs in the Member States and the regions in the implementation of low-carbon priorities.

Box 8: Support by the European Commission in the delivery of the low-carbon theme[38]

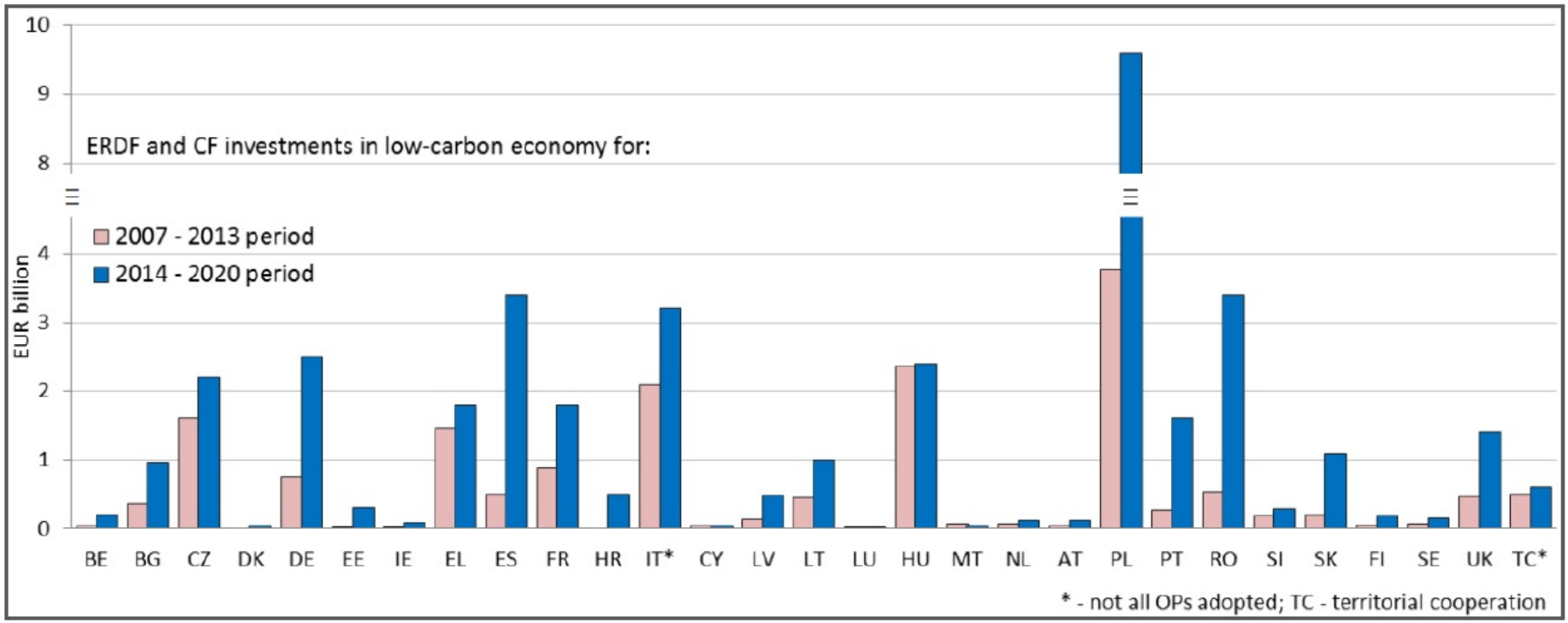
- Smart Specialisation Platform;
- Platform for Coal Regions in Transition (2017) / Secretariat for the Coal Regions in Transition (2019);
- Advisory platforms for financial instruments, e.g. fi-compass; off-the-shelf financial instruments;
- Administrative capacity support, including TAIEX, REGIO PEER 2 PEER and support on public procurement and state aid;
- JASPERS – Joint assistance to Support projects in European Regions;
- Various Networks (e.g. EMA), guidance documents, RegioStars Awards, European Week of Regions and Cities, workshops.

3.4 Funding low-carbon projects

3.4.1 Focus on spending

Funding for low-carbon projects has seen a substantial increase in 2014-20. Through the earmarking, a minimum of €23 billion of ERDF was set aside to TO4 with further funding from other ESIF and domestic co-financing to support the shift towards a low-carbon economy. ERDF and CF investments in low-carbon economy have more than doubled in comparison to 2007-13, with a six- to seven-fold increase in some countries (see Figure 8), especially in Poland, Romania, Spain and Germany.

Figure 7: ERDF and CF investments in low-carbon economy in 2007-13 vs 2014-20



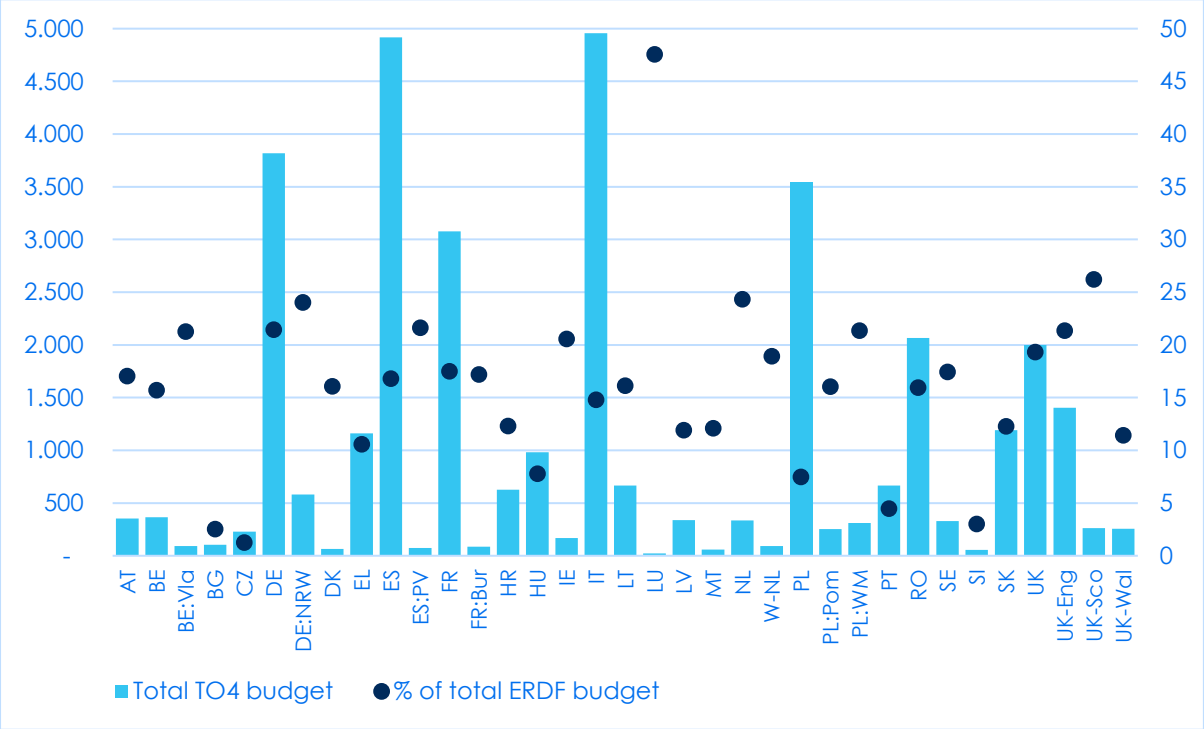
Source: European Commission (2015b) *European Structural and Investment Funds 2014–2020: Supporting the shift towards a low-carbon economy* (Non-Paper)

Funding has focussed on energy efficiency and renewable energy projects. The planned expenditure for these themes is substantially higher in 2014-20 than in 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 €20 billion in energy-related expenditure (see also Annex 1). Of this, almost €10 billion is accounted for by increases in energy efficiency spend, and about €1 billion by increases in spend on renewables.[39] One reason behind the significant focus on energy efficiency over renewable energy projects could be the dominance of national aid schemes and regulations for renewable energy production.[40]

Although the increase in funding between 2007-13 and 2014-20 has provided new opportunities for low-carbon, it has also led to various **spending challenges**. Many countries and regions cite the thematic concentration requirement as a principal reason for their increased levels of low-carbon funding (e.g. Austria, Denmark, Czech Republic, Bizkaia, Portugal, Slovenia). In some other countries, the low-carbon ambition would have been high regardless, not least due to the domestic importance attached to the theme (e.g. Finland, Nordrhein-Westfalen) or the pressing need for climate change mitigation (e.g. Greece, Sweden). Spending challenges have generally related to the 'newness' of the theme, and in some cases to the large budget increases for the theme. Other challenges include access to match funding (e.g. England, Scotland), regulatory compliance issues (including construction permits) and an imbalance between demand and institutional capacity (e.g. Croatia). In addition, the very nature of the low-carbon projects can entail specific challenges because of the incremental spending pattern. As noted by one of the programme authorities *'low-carbon project spend is incremental with minimal spend at the start, but this is not reflected in the performance framework targets nor in the annual allocation profile, nor has it fed to the n+3 requirement'*.

Despite the initial concerns by the Commission that earmarking targets for 2014-20 period would not be met, **some Member States have gone beyond this and exceeded the minimum funding allocation requirements to TO4 in 2014-20 period.** Although the Commission has encouraged the process, it is the Member States that have led on the commitment and the adopted measures that have pushed the low-carbon targets beyond the minimum. Amongst the IQ-Net programmes, those that exceed their respective minimum allocations (20 percent for more developed regions, 15 percent for transition regions and 12 percent for less developed regions) include Croatia, England, Finland (although data not available in Figure 9), Vlaanderen, Scotland, Nordrhein-Westfalen, País Vasco (including Bizkaia), Pomorskie and Warmińsko-Mazurskie. Countries with a relatively low budget allocation to TO4 are Bulgaria, Czech Republic, Portugal and Slovenia (see Figure 9).

Figure 8: Total planned TO4 budget relative to total ERDF in EU28 (in million € and % of, 2018)*



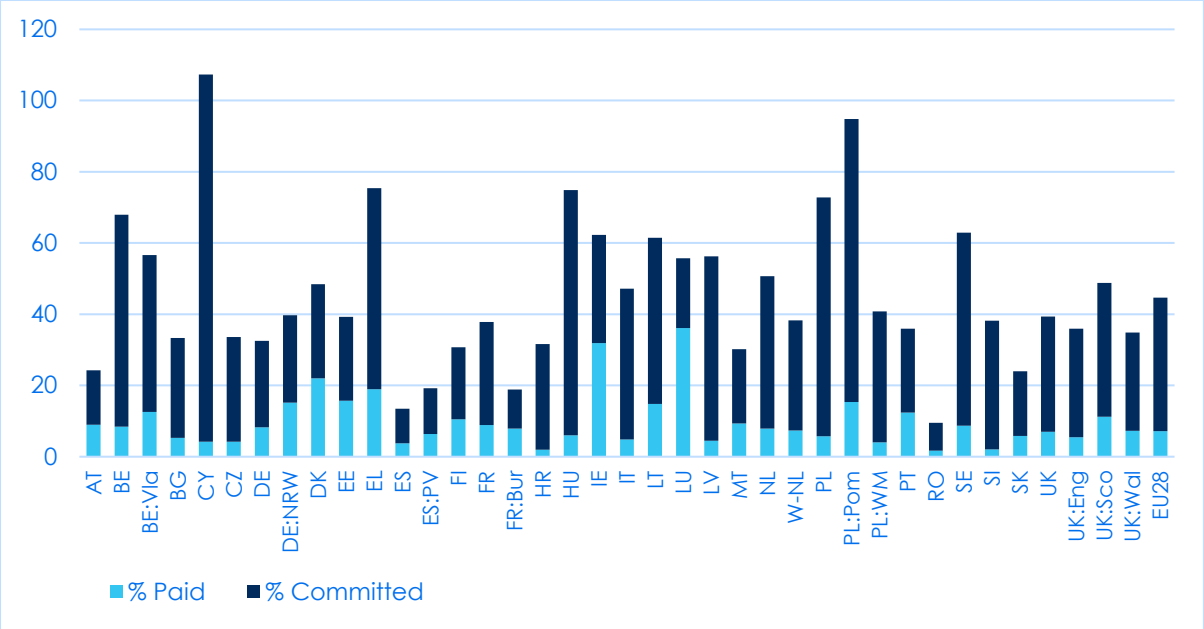
Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 20 May 2019.

* ERDF figures do not show Estonia (EE), Finland (FI) and Cyprus (CY), since their financial data do not include TO4 as a separate category.

To meet the earmarking targets, much of the focus has been on spending, which has remained low especially in comparison to the progress under many other TOs. The slower financial absorption reflects challenges faced at the beginning of the programme period in terms of slow approval rate of projects and expanding investment activity in some of the specific investment themes, such as energy efficiency.[41] At the end of 2017, a total of €23 billion had been allocated to TO4 under all ESIF (45 percent of the planned budget), with spending standing at €3.7 billion (7.2 percent).[42] The allocation of ERDF was €13.1 billion (37.3 percent) and ERDF spending on average €1.7 billion (4.9 percent).

Figure 10 and Figure 11 illustrate the commitment and payments (total EU and national funding) in the IQ-Net programmes in 2017. Figure 10, which includes commitment and payment levels of all ESIF to TO4 in 2017, shows that performance in Vlaanderen, Greece, Pomorskie, Sweden and in Scotland was above the EU28 average. This was also largely the situation when looking at ERDF commitment and payments levels to TO4 (Figure 11). Lower progress across commitments and payments to TO4 in both ERDF and across all ESIF was notable in Austria, Czech Republic, Croatia, England, France, País Vasco, Portugal, Slovenia and Wales.

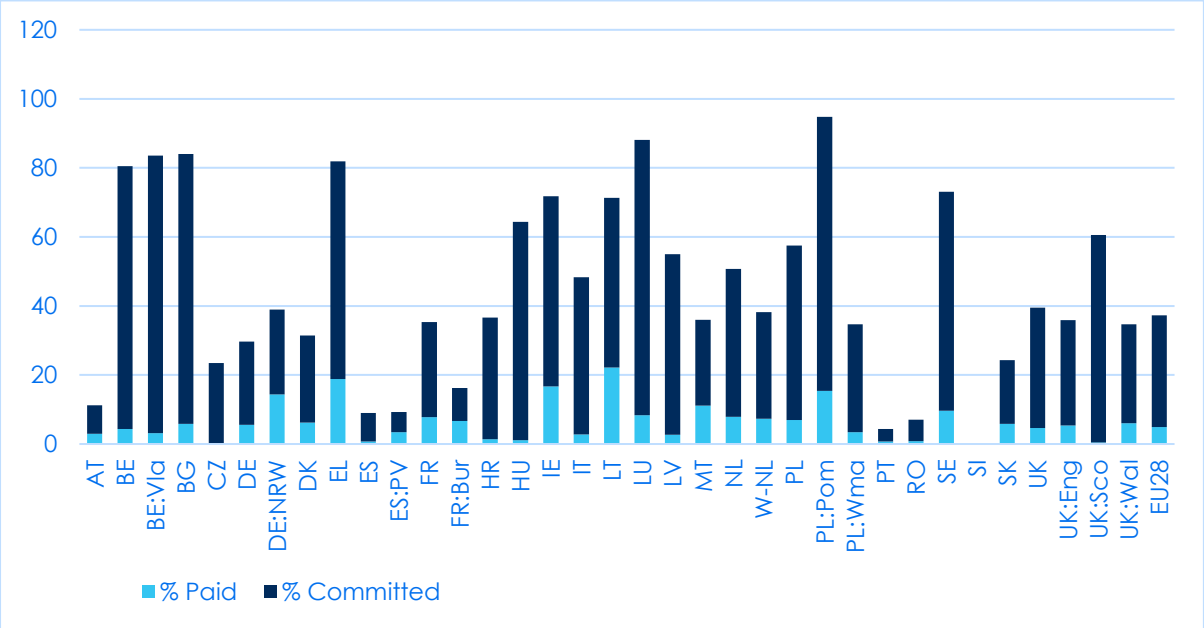
Figure 9: Commitment and payment levels in EU28* in 2017 in % of total planned TO4 budget (ESIF)



Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 22 May 2019.

*EU28 total excludes Territorial Cooperation (Interreg). Bizkaia data are part of the País Vasco region (PV) in the data available in the online portal.

Figure 10: Commitment and payment levels in EU28* in 2017 in % of total planned TO4 budget (ERDF)**

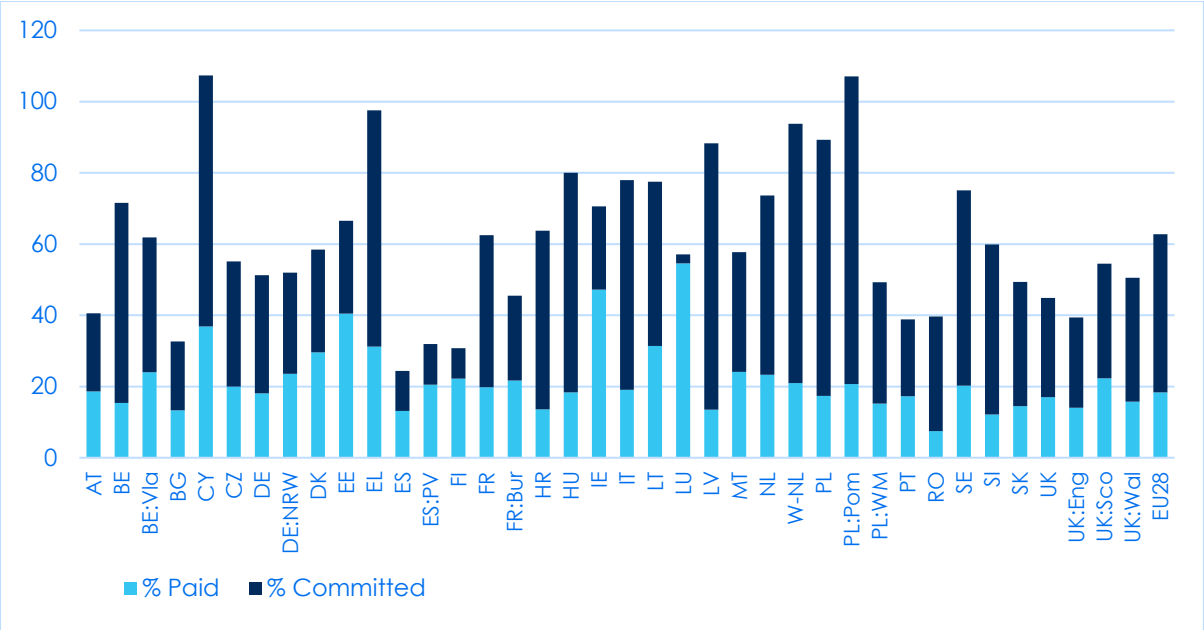


Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 22 May 2019.

* Bizkaia data are part of the País Vasco region (PV) in the data available in the online portal.
** ERDF figures do not show Estonia (EE) Finland (FI) and Cyprus (CY), since their financial data do not include TO4 as a separate category.

The situation has improved in the course of 2018, with figures from 8 November 2018 showing an increase in total ESIF allocations to €28 billion (56 percent of the programmed amount) with payment levels reaching €6.1 billion (12.4 percent).[43] The latest data (end of 2018) show a further acceleration, with allocations and payments standing at 62.8 and 18.4 percent respectively (see Figure 12). For ERDF, €19.1 billion had been allocated to TO4 projects by the end of 2018 (58.6 percent of the budget), with payment levels standing at €5.3 billion (16.1 percent) (see Figure 13). The latest annual data show a substantial increase in both commitments and payments to TO4 across many countries, with Vlaanderen, Greece, Croatia, Pomorskie, Sweden and West Netherlands among those performing above the EU28 average.

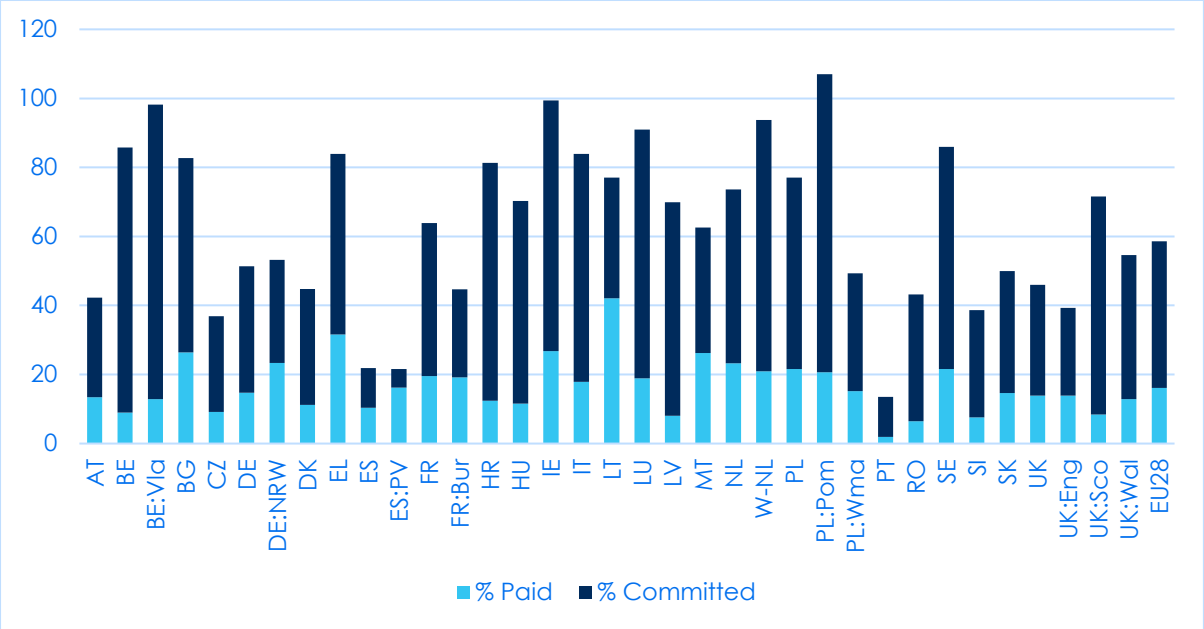
Figure 11: Commitment and payment levels in EU28* in 2018, in % of total planned TO4 budget (ESIF)



Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 22 May 2019.

*EU28 total excludes Territorial Cooperation (Interreg). Bizkaia data are part of the País Vasco region (PV) in the data available in the online portal.

Figure 12: Commitment and payment levels in EU28* in 2018, in % of total planned TO4 budget (ERDF)**

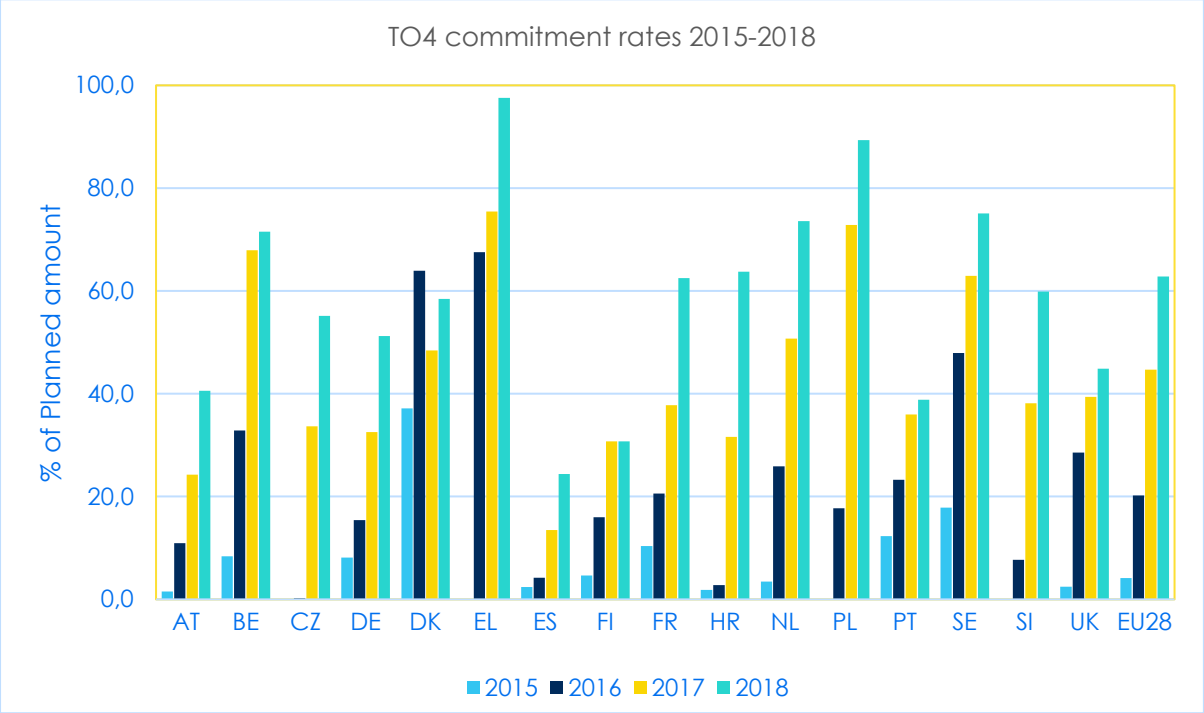


Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 22 May 2019.

* Bizkaia data are part of the País Vasco region (PV) in the data available in the online portal. ** ERDF figures do not show Estonia (EE), Finland (FI) and Cyprus (CY), since their financial data do not include TO4 as separate category.

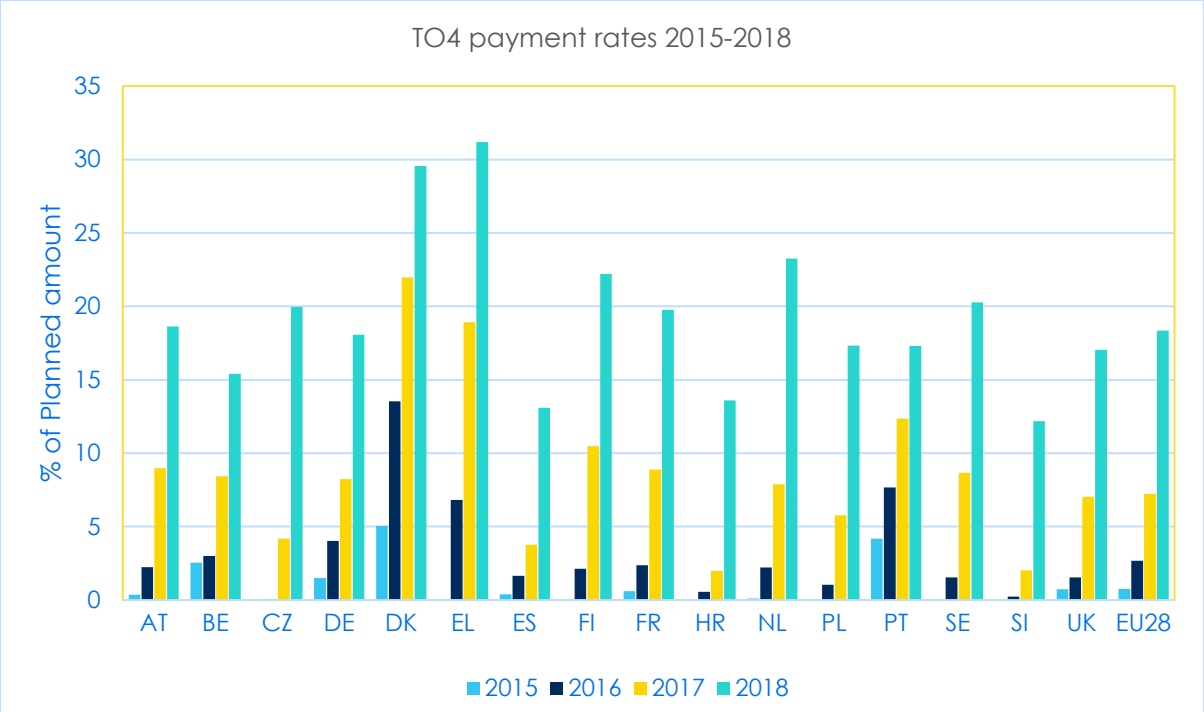
Looking at ESIF implementation since 2014, **many IQ-Net programmes display a steep upward trend with low project commitment and spending until 2016, followed by large increases in later years** (see Figure 14 and 15). Countries such as Czech Republic, Croatia, Poland and Slovenia have largely caught up with the EU-28 average commitment rates in 2018. Other countries (e.g. Austria, Finland, Spain, Portugal and UK) were still to commit the majority of their planned budgets at the end of 2018.

Figure 13: Commitment rates since 2014 in IQ-Net countries (all ESIF)



Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 10 May 2019.

Figure 14: Payment rates since 2014 in IQ-Net countries (all ESIF)



Source: Open data portal for the European Structural and Investment Funds, ESIF 2014-20 Finance Implementation Details, data downloaded 10 May 2019.

3.4.2 Use of financial instruments

The 2014-20 regulations extended the scope to use financial instruments (FIs) to all thematic areas. In the case of TO4, Member States were recommended to earmark up to 20 percent of the low-carbon allocations to FIs, though this was not a mandatory target.[44] The extent to which MAs proposed to use FIs for TO4 varies but based on the proposals set out in the OPs, **few meet the suggested target of 20 percent of spend on low-carbon economy in the form of FIs**[45]:

- In Croatia and Lithuania, almost half of TO4 spend is proposed to be in the form of FIs while 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 seven countries, the OPs do not propose the use of FIs for TO4 at all (Austria, Bulgaria, Denmark, Estonia, Greece, Ireland, Luxembourg).

Overall within TO4, some €3 billion were planned in the form of FIs in the OPs, approaching ten percent of the total. In addition, however, there are priority axes in the OPs that cut across TOs (so-called multi-TO priority axes) which may also contain FIs relevant for energy-efficiency and renewables. These may be priorities that address R&D&I (TO1), SME competitiveness (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 energy efficiency and renewable energy sources. A review of multi-TO priorities comprising FIs suggests that a further €668 million for FIs may also be relevant to EE and RES investments, a total of some €3.7 billion (excluding national and any other co-financing).[46]

In practice, **decisions to actually implement FIs for EE and RES were dependent 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. 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 MAs generally have considerably more experience.[47] These findings echo some of the IQ-Net MA's experiences:

- In the **Czech Republic** the low-carbon theme was initially perceived as attractive for FIs, but the practical application has proved to be cumbersome in the case of the IROP. There were issues related to the low interest of banks to become fund holders and generally low competitiveness of FIs in the financial market. Notwithstanding difficulties, FI for TO4 under IROP is under preparation.

- In **France (Burgundy OP)**, an FI was set up for district heating projects following a push from the European Commission. Given the low interest rates offered by commercial banks, interest in the FI has been weak (with no funded projects) and its future continuation remains doubtful.

- In **Portugal**, support initially intended to be implemented through an FI has been replaced by repayable grants (IP 4.2 'energy efficiency in companies'). Following the first calls for applications for repayable support in 2016 (IP 4.3 'energy efficiency in public administration'), there was a weak uptake by the public administration due to financial capacity issues resulting from the economic and financial crisis. The authorities have decided that the repayable support model in the public sector has not worked and promoted a shift from repayable or FI support to non-repayable support, with greater support intensity.

Some programmes are, however, progressing with their FIs:

- **Pomorskie** is the only Polish ROP to use FIs under TO4 through the renewable energy loan fund. The fund is a preferential debt instrument in the form of a loan for energy modernisation of heating in residential buildings. The loan will also be offered to finance projects in the field of energy generating installations from renewable sources, if these are attractive in terms of the assumed ecological effect and efficiency cost. A financial intermediary has been selected for implementation.

3.5 Operational synergies and coordination for low-carbon

3.5.1 Approaches to building coherence and synergies

As the preceding sections highlight, the transition to a low-carbon economy requires measures in all sectors, a wide range of approaches and solutions, and involvement of a variety of stakeholders.[48] In the IQ-Net programmes, policy coordination is pursued in a range of ways and at various stages. Examples include strategic coordination, informal coordination (e.g. regular exchanges of information and experience) or operational coordination where the ESIF management and implementation arrangements facilitate coordination. The emphasis on synergies and coherence across funds and programmes means that for many, coordination on low-carbon interventions is all part of 'general coordination' efforts.

The result is practical coordination on a variety of issues across sectors, levels of government, territories, policy areas, agencies, programme priorities, and projects. IQ-Net programmes have adopted a variety of approaches involving links and complementarity between and within programmes, across to domestic policy interventions and other EU funding and also to ensure overlaps are avoided by clearly delineating and separating actions.

i Coherence between Programme & Domestic policy

In many IQ-Net countries, there are numerous, well-established, national and sub-national strategies in place promoting low-carbon investments. These frameworks provide the foundation and direction for other (often 'additional') investments, including those supported by ERDF. Coherence between national, regional and European policies (especially Cohesion policy) in the implementation of low-carbon interventions is important, especially in those Member States and programmes where ERDF budget is considerably smaller in comparison to domestic resources for low-carbon. ERDF is therefore essentially used to focus on gaps and unlock larger (domestic) investments, or support projects taking place within existing plans (e.g. Austria, England, Vlaanderen).

Strategic planning efforts mean that, to a great extent, **there is coherence between national, regional and European policies (especially Cohesion policy).** In **Vlaanderen**, TO4 investments are closely linked to domestic climate-related frameworks and the MA has ensured that the specific objectives are in line with and add value to the domestic priorities. In **Sweden**, close alignment is noted between low-carbon priorities supported by ERDF (under TO4) and the priorities of the key regional policy document, the national Strategy for Sustainable Regional Growth and Attractiveness 2015-2020. There is a particularly clear link to the Strategy's priority on 'innovation and entrepreneurship' with many TO4 projects promoting this theme.

ii Coordination of ESIF Programmes

Complementing wider coordination efforts is **coordination and complementarity across Cohesion policy programme interventions**. For example,

- In the **Pomorskie** ROP, TO4 actions are designed to complement work done by sectoral OPs, particularly the OP Infrastructure and Environment (OPIE). For example, under some energy efficiency headings, the national OP will cover metropolitan areas while the ROP will cover smaller areas. In Pomorskie, there has been a partial territorial overlap of support in the thermal modernisation of buildings with the OPIE, although the ROP finances projects through FIs while the OPIE uses grants.

- In **Portugal**, a good example of intra-ESIF coordination is IFRRU 2020, the Financial Instrument for Urban Rehabilitation and Revitalisation. Under this FI, investment in urban rehabilitation under the ROPs is coordinated with investment in energy efficiency under the Thematic OP Sustainability and Efficiency in the Use of Resources (IP 4.3, Cohesion Fund).

Coordination of efforts within the programmes themselves is also important. For example in **Vlaanderen** project-selection for low-carbon interventions involves coordination with the programme's innovation priority, which recognises the scope for thematic overlaps/complementarity.

iii Links between Programme and other EU funding

Direct links to other forms of EU support for low-carbon and low-carbon projects are also explored. For example, in **Vlaanderen** 'logical' exchanges with Interreg take place, facilitated by the wider relevance of the theme across programmes and the fact that the programmes are both administered by the same agency. In Sweden, the **Norra Mellansverige** OP has started coordinating with the Rural Development Programme with the aim of submitting relevant project applications to the Rural Development Programme. In addition, coordination with relevant aspects of Horizon 2020 is expanding.

iv Separation of Actions

Avoidance of overlaps and clear delimitations of responsibilities is also an important dimension of coordination. In Portugal, the danger of overlap between interventions led to a shift away from ESIF funding for improved energy efficiency in housing. The decision was taken that the proposed scheme could be most effectively delivered through an EIB 'efficient house' scheme.

3.5.2 Challenges and solutions to ensuring coherence and synergies

Where they have been undertaken, evaluations note some specific issues that are both barriers to coordination on the low-carbon theme, and also examples of the need to pursue cooperation and collaboration. For example:

- **The proliferation of support for low-carbon interventions has led to competition for projects and target groups**. For example, in **Denmark,** a programme mid-term, evaluation, notes there is some overlap between advisory services on energy savings under Priority 3 'Energy and resource efficient SMEs' and the national Energy-Saving Scheme managed by the Danish Energy Agency. In this case, in order to limit competition with the national scheme, it is recommended that ERDF projects focus more on material savings and more comprehensive training for enterprises concerning energy savings.
    - **TO4 investments can be less attractive than other funding sources,** as many project actors associate EU Structural Funds with more administrative burdens and State aid issues. Additionally, in some of the more-developed countries the scope for the Programmes to deliver meaningful impact and results in relation to low-carbon is marginal and their added value has to be carefully considered.
- **Changes to domestic frameworks**. Changing domestic frameworks can lead to regular changes to the OP implementation processes, for example re-writing of calls for proposals in order to address a particular type of intervention.

- **Lack of coordination between domestic and EU funding** is a concern. Despite the direction provided by the national strategic frameworks, the practical coordination between ERDF and domestic resources may be limited (e.g. England). Investing time and energy into avoiding overlaps and coordinating effectively with other programmes can be at odds with the tendency to pursue financial absorption (e.g. Denmark).

    - **Identifying the right 'niche' for ERDF within the domestic context**. Identifying a 'niche' for ERDF interventions that brings added value to the domestic investments may not be a straightforward process. For example, in Vlaanderen, insufficient domestic resources have meant that the MA needs to choose a particular type of intervention carefully, for example no standard cycle ways (only commuter-oriented); only major infrastructure projects in the case of cycle highways; focus on demonstration projects in the area of energy efficiency in social housing; geothermal energy (not covered by domestic funds).

To avoid these challenges and support better coordination in the future, the following is noted:

Importance of engagement/coherence with national policy frameworks – Particularly, in the more developed regions, when compared to other sources of financing and support national policy frameworks are of the highest relevance for effective low-carbon-transition strategies.

Links to Smart Specialisation (S3). By addressing emerging opportunities and market developments in a coherent manner, regions avoid duplication and fragmentation of efforts and support regional economies in their transition to low-carbon economy. This is particularly relevant for regions lagging behind in economic development, but showing potential in either renewable energy generation or in energy efficiency measures.

Need for simplification. Synergies are being limited by administrative complexities. The procedural demands of linking, for example, an innovative RTD oriented project which could up-scale with Cohesion policy funding, can be off putting.

Willingness. There needs to be a willingness to support and pursue cooperation and coordination, which can take time, effort and staff resources to develop.

3.6 Progress - Monitoring and Evaluation

3.6.1 Monitoring and measuring progress

Project monitoring procedures to demonstrate that EU funding delivers expected results is a key concern for the 2014-20 programmes.[49] Some programme authorities (e.g. **Austria, Bizkaia**)

have found TO4 comparatively easy to monitor. In **Austria**, the IB Kommunalkredit Public Consulting (KPC) has prior experience of running schemes in this field, which has eased the process. For some indicators, measurement is comparatively straightforward, e.g. the indicator 'number of enterprises receiving support'.

However, as numerous evaluation reports and, notably, the European Court of Auditors[50] found operationalising effective results-oriented systems for monitoring and measuring progress can be technically challenging and time/resource consuming for both projects and programme authorities. Many of the widely identified challenges are particularly acute for low-carbon interventions.

i Big issue – small interventions

As has already been noted, the low-carbon theme is large, complex, and interlinked with many other issues/themes. For measurement, this presents multiple challenges:

- **How to measure the effects of small-scale interventions on a large-scale issue?** For example, measuring CO2 reduction is especially difficult for developmental, booster or demonstration projects, such as those funded in West Netherlands or in Finland.

- **How to identify the 'soft' contributions of projects implemented over comparatively short timescales?** The more readily available 'hard' result indicators such as 'savings measured in KWh' are commonly too 'blunt' a measure to reflect the change that the programmes can expect to deliver, due to their size, coverage and levels of funding. TO4 projects in the Swedish national ERDF OP consist heavily of 'softer' information-related measures, targeting groups unfamiliar and not heavily active in the field. These 'soft' interventions will deliver gradual shifts and changes but not easily measurable large-scale, tangible, rapid results.

ii How to reflect the range of processes and projects?

Indicators for the low-carbon theme are difficult to define where there is a large variety of programmes and projects expecting to deliver very different results. There is a risk that they become unbalanced towards certain types of projects or regions / countries. As stated by one MA representative, *'the (current) indicators have been largely developed with the Cohesion Member States in mind* (considering their specific objectives and projects), *and consequently measurement is focussed on energy savings and on other measurable data'*. Some programme authorities consider that the results from other types of projects (i.e. those related to R&D) are therefore difficult to capture by the current indicators. Given the diversity of the projects partners, programmes such as **West Netherlands**, found it particularly hard to define a single indicator for CO2 emission reduction. Similarly, indicators such as 'energy saved' does not provide a broad understanding of what low-carbon interventions entail.

The range of beneficiaries are not necessarily fully reflected by the indicator sets.

- In **Finland**, for example, typical target groups include businesses, R&D institutes and municipalities, but the indicators focus only on businesses. More generally, low-carbon interventions are increasingly embedded across numerous programme interventions supporting business activities, such as businesses development, transport, environmental protection. However, these interventions may not have a low-carbon related indicator.

- Also in **Sweden**, indicators are one of the focus areas for the future period. There is general reluctance by the Swedish authorities to adopt overly concrete and focussed indicators which are seen to complicate the implementation of projects. Rather there is a wish for more generic indicators (e.g. those that involve SMEs). *Tillväxtverket* is currently working to develop proposals for indicators that suit the programmes.

iii Time for results to emerge and attribution

Particularly in the case of low-carbon interventions, measurable outputs and results may not emerge until after the end of the project/programme. In the case of the renovation of an apartment block, for example, there is no change in the number of buildings with increased efficiency during the project and only on completion of the project will the number/indicators increase. In **Vlaanderen,** the Programme MA is expecting to exceed overall targets for an indicator on number of energy efficient home (465 vs 200 expected), but they were not in a position to report any change until 2019. The same applies to the cycle highways or paths as: people will not ride over a new bridge until it is opened, making some indicators difficult to monitor during projects.

In some areas where results are apparent, establishing a direct line of attribution to Cohesion policy is not always clear cut. For example, interventions focussed on SMEs tend to attract businesses that are already engaged in the issue, which reduces impact.

iv Lack of experience

Sweden's TO4 evaluation found that the quantification of TO4 productivity indicators has been challenging for some bodies with limited experience in this area. Similar problems elsewhere have led to related issues including:

- **Inconsistency in interpretation of indicators and measurement.** Ensuring that monitoring indicators are uniformly applied and interpreted is a challenge. For example in **Croatia**, there have been some difficulties with regard to understanding certain indicators, specifically the methodology for calculating the expected values and reporting on achievement.

- **Lack of baselines and data.** The low-carbon economy is a relatively new field, so to get reliable baseline figures and monitor them is difficult from the outset. Compounding this issue, the sector is very dynamic and moving at pace where any baseline is always

changing. In **Scotland**, estimates used for a baseline on low-carbon jobs are currently being revised downwards, which means the MA is having to review the OP.

Although challenges remain, IQ-Net programme authorities have responded to the initial difficulties in a number of ways.

Tailored measurement methodologies. Dedicated systems and models have been developed aiming to bring the 'apples and oranges' of energy projects into more uniform models, e.g. in **West Netherlands**. In **England**, a methodology to calculate estimated, rather than actual, greenhouse gas emissions is used, as there are too many variables to measure 'actual'. In **Vlaanderen**, to generate reliable project-level data for its interventions on cycle highways, the MA requires relevant projects to use a cycling counter at different stages of the project. In **Portugal,** as there was no history or effective indicators to measure the impact of the supported projects, work was done at the beginning of Portugal 2020 to create indicators with the objective of establishing methodologies, baselines and targets. Even so, there are still indicators that need greater methodological robustness.

In some cases shortcomings in monitoring data and tools has led to **a change of approach**. For example in **Denmark** the initial approach (Climate Compass) did not sufficiently take into account the total value chain CO2 emissions and improved energy efficiency. A newly developed tool (Sustainable Bottom Line) aims to reflect the effects that take place in cooperation between companies/organisations. Due to the complex nature of the tool, project partners will need assistance from experts to collect and measure data. In order for the OP to better reflect the progress in **West Netherlands**, the indicators for the priority 'energy efficiency in existing buildings' have been amended.

Preparation of guidance and support materials. In Nordrhein-Westfalen at the start of the programme period the MA produced a guidance note on measuring greenhouse gas emission reductions in order to ensure a common approach. In **Greece**, each indicator is accompanied with an Excel file which provides details on the methodology. This is attached in the calls that are issued and is incorporated by beneficiaries in target setting and monitoring. Each beneficiary is obliged to send the indicator progress achievement fiche at least once a year which is verified by the MA based on the indicator fiche. Progress indicator fiches are submitted electronically via the Monitoring Information System, and then aggregated.

Consultation and dialogue. In **Croatia**, there have been some difficulties in understanding the indicators used (methodology for calculating the expected values and reporting on the achievement) and documents supporting / proving the achievement of indicators. Uncertainties have been resolved through consultations between MA and IBs. Further, some actors, according to the evaluation, have pointed out that it would be beneficial to have more information on how to capture the results of interventions.

Looking to the future, the role and importance of accurate monitoring looks set to increase with initiatives, for example which base payments on results (see Box 9).

Box 9: Austrian pilot project on 'payments based on results'

Rationale: The reform of the EU Financial Regulation ("Omnibus Regulation") of August 2018 made it possible for the first time to trigger repayments from the EU budget not on the basis of invoices but via financing conditions. In order to test this 'payments not linked to costs' approach in practice and to check its broader applicability for 2021-27, a pilot project was created in Austria for 2014-20. The model is being developed with the IB Kommunalkredit Public Consulting GmbH (KPC), which, at the time of writing, was in coordination agreement between the Austrian MA (ÖROK Secretariat) and the European Commission.

Implementation structure: The implementation of the pilot project takes in the form of an "operation" according to Art. 2 Reg. 1303/2013. It is embedded in the Austrian ERDF OP in Priority Axis 3 (TO4) under Measure 11 'Business Investment in Renewable Energy and Energy Efficiency'. Based on the Annex to Commission Delegated Act Regulation 2019/694, the saved tonnes of CO2 per year are used as an intermediate and final financing condition for the "operation". Further intermediary financing conditions are the jury meetings of the project selection committee of KPC. The beneficiary is KPC (so far only IB).

Procedure: KPC submits an application for ERDF funding of an "operation", which is appraised and approved by the MA (ÖROK Secretariat). As a result, the MA is also responsible for preparation of the contract and the financial management of the "operation". In order to receive payment of EU funds (refund to the ERDF OP), the beneficiary KPC must demonstrate the fulfilment of the "intermediary" and "final" funding conditions specified in the contract, which will later be subject to administrative verifications by the MA. The verification of the intermediate financing condition "project selection meeting" is carried out by the MA, that of the "saved tons of CO2 per year" with the support of an external auditing firm. The recording of the respective results in the monitoring system according to Art. 125 (2) (e) of Reg. 1303/2013 is also carried out by the MA, which ultimate has responsibility for the results. To achieve the "final funding condition", KPC carries out individual projects with project promoters on the basis of Austrian environmental promotion law. The sum of tons of CO2 saved by these projects must reflect the value of the final funding condition. With regard to the forms of accounting used, there is a separation between the different levels and within the "operation", KPC settles with the final beneficiaries on the basis of proof of investment costs. With regard to the MA, and then also the MA vis-à-vis European Commission, the achievement of financing conditions is used as the basis.

Conclusions and outlook: This is not only a new approach in Austria, but a pilot for the whole EU. EU payments are carried out if agreed targets are met and not when invoices are submitted. It has the advantage that the Member State is responsible for the detailed,

actual implementation on the ground. KPC can make use of its established domestic Austrian procedures in dealing with the actual beneficiaries receiving support. Another important advantage is that the audit authority only checks the basic method and there are no additional checks at the level of the actual beneficiary. Over the course of spring 2019, ÖROK had a number of meetings with the European Commission and the aim is to have an agreement about KPC acting as formal final beneficiary before the summer 2019.

Source: ÖROK.

3.6.2 *Evaluation*

The challenges linked to monitoring mean that evaluation can serve a particularly important role, looking at contributions overall, the role of soft intervention, and taking into account the interactions of interventions. IQ-Net programme authorities are taking a variety of approaches to evaluation:

- **Dedicated thematic evaluation or assessment of TO4**, e.g. in Austria, Croatia, Portugal, Spain, Sweden
- **Evaluations of low-carbon priority axes in programmes as part of 'mid-term' review processes**, e.g. in Denmark, Vlaanderen
- **Broader programme evaluations expected to capture findings on the low-carbon theme**, e.g. in Czech Republic, England, Finland, France (Burgundy), Greece
- **Additional evaluations**, e.g. in the context of the use of FIs for low-carbon, e.g. in Portugal, Spain, Sweden

In some cases, evaluations have yet to start. For example, in **Slovenia** work has been tendered, but there were insufficient suitable bidders to make the process successful. Evaluators have to be completely independent and cannot be involved in any projects funded under the same priority axis. This is very difficult in Slovenia, where there is a very small market with a limited number of potential evaluators. In Scotland, evaluation work is also expected to be carried out, but more generally around the theme of sustainable development, which may focus on TO4 or TO6.

The evaluation findings, where available, are feeding to further discussions and decisions on the key lessons to be considered for the future period. A key finding from the Swedish TO4 evaluation, which could also apply more widely, is that programmes are expected to contribute to incremental, but not structurally transforming results.[51] Further issues emerging include: the added value of TO4; effective targeting of resources; links to key stakeholder groups; implementation capacity; clarity on roles and responsibilities in delivery; and maximising and capitalising on synergies.

4 FUTURE PERSPECTIVES

4.1 Lessons from 2014-20

It is an early stage to be assessing programme results and impacts, especially for programmes aiming to support the transition to a low-carbon economy with a small amount of money and a limited number of projects. Nevertheless, as is indicated in preceding sections of this report, progress for some IQ-Net programmes has been good and, for others, significant improvements have been seen, especially in the latter parts of the programme period. Areas of activity showing results are diverse and include: buildings undergoing thermal modernisation; reduction of primary energy consumption by buildings; associated reduction of greenhouse gas emission; increase of energy production from renewable sources; increase of the length of the heating network; tackling energy poverty; and increase in the use of low-carbon transport solutions. In many programmes, spending has been a challenge (see Section 3.4.1) and this has affected impact on outputs and results, and complicated the accurate measurement of results.

Taking a wider view of the role of the low-carbon theme in Cohesion policy a number of additional points emerge. Drawing on the IQ-Net programme authority feedback and previous research, the benefits of Cohesion policy in the delivery of low-carbon interventions vary in their extent:

- **Marginal role in the more developed regions**: The relevance of Cohesion policy programmes is more marginal in these regions, particularly in comparison to other sources of funding and support available, and other programmes (national or EU) supporting innovative actions tend to dominate. For example, in **West Netherlands**, the OP's primary focus is on innovation which is reflected in the TO4 theme, for example, in the inclusion of 'innovativeness' is one of the assessment criteria for TO4 project proposals. In **Sweden**, ERDF funding under TO4 goes largely to 'soft' measures, which lead to incremental results (rather than being structurally transforming). The scope of the OP, therefore, is marginal in comparison to other measures implemented in the Swedish regions.

- **More significant role in the less developed regions:** The less developed regions have profited significantly more from the allocation of funds to low-carbon. Cohesion policy therefore has an immediate impact, as it can deliver major projects with tangible results, e.g. transport infrastructure of Thessaloniki and Athens metro systems, and the completion and expansion of district heating systems in **Greece**. It has also acted to raise the profile of low-carbon initiatives, e.g. in **Portugal**, where there was limited experience of using ESIF for supporting the energy sector in 2007-13.

The extent of Cohesion policy impact varies, especially in relation to 'hard outputs and results'. However, an important dimension of Cohesion policy's role in this area is its 'soft' impact and influences. Again, there is variation in the extent of impact, but similar themes recur in both more developed and less developed regions.

Visibility. For many programmes, low-carbon projects are very visible and positive for the image of ERDF and the organisations involved. For example in Scotland, at a high level, the interventions have raised awareness and increased activity. The programme has provided stable and long-term funding and continuity, which has given beneficiaries more confidence, helping them be less risk-averse and offering more scope to pick projects beyond the safe and obvious. Additionally, more activities are happening sooner, thus making it more noticeable.

Priority. Increased ambition amongst the regional actors concerning energy and climate issues is another impact. Cohesion policy programmes are offering a clear signal that the transition to a low-carbon society is something to prioritise. In particular, the minimum threshold/ring-fencing is seen as a positive step, and helps drive changes in behaviour. For example in **Scotland**, the OP has enabled a lot more support for SMEs to embed resource efficient approaches within businesses who would not normally have engaged.

Leverage. ERDF may give a 'nudge'/leverage to domestic policies where progress has been slow e.g. the current pace of building cycle highways would allow the Flemish network to be finished by 2027, or to revive projects 'shelved' under domestic funding.

Coordination & coherence. The requirement to align interventions with national and EU strategies embeds an element of coordination. However, the sheer scale, diversity and interrelatedness of the topic also demands innovative ways of working, joint action and synergies (see Section 3.5). Programmes have provided stable and long-term funding and continuity. This stability has given beneficiaries working in a comparatively new field more confidence and operations can sit alongside, and be complementary to other (domestic) projects. Low-carbon is increasingly embedded in activities across programmes as the theme is promoted through various interventions (the development of businesses and processes, or to the transfer of more energy-efficient equipment and facilities) and interventions can add value in relation to existing policies at the national and regional level.

Experimentation/innovation/engagement. The explorative/experimental nature of some of the projects supported through Cohesion policy programmes adds value and a basis that 'mainstream' domestic instruments could follow-up on if they prove successful. For Cohesion policy programmes, the low-carbon theme has led to the involvement of new stakeholders and new actors who themselves have adopted new and innovative approaches.

- For example, in the **Pomorskie** Programme interventions have increased residents' awareness of renewable energy sources and energy awareness, leading to an increasing realisation of the need to think carefully about how energy is produced. Key to this in the future will be drawing in a wider range of actors and more work to encourage individuals, not just organisations, to become involved in efficiency initiatives.

Knock on benefits. Low-carbon interventions are associated with numerous knock on-benefits. For example, in the **Czech Republic's IROP**, investment in refurbishment of housing stock with a view to improving energy efficiency has encouraged other improvements to the properties (they look better due to façade improvements, internal renovations and upgrades). Interventions have also driven technological innovation and led to cost saving to individuals living in the houses.

4.2 Shifting from TO4 to PO2: low-carbon in 2021-27

Preparations for the future period are ongoing (see Section 7 in the IQ-Net Review Paper 44/1) and further analysis of evaluations and mid-term reviews will provide a clearer idea of the low-carbon priorities in the Member States and regions in 2021-27.

The 2021-27 period entails **an integrated policy approach** where investments have a **broader perspective.** The PO2 encompasses themes such as energy transition, circular economy, climate adaptation and risk management bringing together previously separate TOs (TO4, TO5 and TO6). The Commission argues that this simplification enables synergies and flexibility between various strands within a given objective, and removes artificial distinctions between different policies contributing to the same objective. It also provides flexibility to reallocate funding within priorities during implementation given the wider scope of action.[52]

Most IQ-Net programme authorities see the shift from TO4 to PO2 as positive. PO2 is seen to provide opportunities for a wider range of interventions by promoting links within the various themes under PO2; and with the other POs, notably with PO1. For example, in **Finland**, the new approach is welcomed as it is expected to allow a broader scope of low-carbon projects, which in the 2014-20 programme period have been limited to supporting 'energy efficiency in SMEs' and 'solutions based on renewable energy and energy efficiency'. Other programme authorities also recognise opportunities to combine the previously separated themes under PO2 (e.g. **England**). More focus is planned by various IQ-Net programmes on a range of low-carbon themes including: water management and retention; intelligent energy systems and networks and storage systems; adaptation measures; modernisation and increasing energy efficiency in production, transfer, distribution and accumulation; dynamic management of energy flow; and, more generally, the transition to circular economy.

Due to the limited resources, **prioritisation and strategic focus is underlined as important, as well as the need to consider the eligibility of low-carbon activities under other POs**. Although PO2 enables a continuation of themes that were supported under TO4 (plus more), programme authorities have noted specific problems with themes, such as public transport. For example, in **Pomorskie,** investments in sustainable urban mobility, which were carried out under the TO4 heading in 2014-20 programme period, may not be possible in the future under the PO2 as transport themes appear to be more linked to other POs, including PO3 (a more connected Europe) and PO5 (a Europe closer to citizens - including SUD). Similarly, in the **Czech Republic**, some specific themes, such as the ineligibility of gas industry in PO2, is seen as potentially problematic. More generally, having the oversight of all the themes and setting out concrete conditions for their support is considered to be challenging.

Having low-carbon investments taking place under other related POs, namely under the PO1, will link low-carbon, climate and environmental investments to more innovative projects, often closely tied to the Smart Specialisation Strategies. This approach aims to accommodate the needs of Member States in receipt of limited EU funds and with well-established national schemes, but which were nonetheless 'required' to invest in TO4 in 2014-20 (e.g. Denmark). In the future, such an obligation no longer exists and low-carbon can be linked to other related POs, most notably to PO1. Based on the 2019 European Semester country reports[53], six Member States are recommended by the Commission to integrate low-carbon investments under PO1 (see Table 6) with different levels of prioritisation. The recommendations of the country reports will form the basis for the bilateral negotiations with the Member State and the Commission, and it remains to be seen whether these will be adopted.

- In the **West Netherlands**, the MA, the partners and other stakeholders are divided on the low-carbon focus in the future OPs. In case PO2 is not included, projects may be accommodated under PO1. The MA estimates that around half of the TO4 projects could fit under the new PO1, as they are innovative, experimental or highly research relevant.

- In **Finland**, the opportunities of linking PO1 and PO2 are acknowledged, but there is also some concern about limiting low-carbon efforts only to PO1. The evaluation of the programmes, for instance, notes a concern that if low-carbon does not have a visible role in the future programme period, there is a risk that its role will be similar to those of the horizontal objectives.

Table 6: Low-carbon implemented as part of PO1 in 2021-27

Member State	Low-carbon focus under PO1
Denmark	Low-carbon not explicitly mentioned.
Finland	Innovations that reduce harmful environmental effects and risks; R&D&I on quality and sustainable use of environment and resources; piloting and demonstration actions.
Ireland	Eco-innovation and R&D&I on green and blue innovation (water); clean energies; climate change mitigation; low-carbon technologies; circular economy.
Luxembourg	Eco-innovation; development of sustainable and circular district and cities; smart mobility systems.
Netherlands	Investments under PO1 could also help address the challenges related to energy and climate transition and the circular economy.
Sweden	Eco-innovation and green- and bluetech sector technology.

Source: Based on the 2019 European Semester country reports

While the opportunities are generally appreciated, **some programme authorities also note no particular change in their overall approach to low-carbon investments in 2021-27**. This is due to the fact that there no major changes are anticipated to the overall approach adopted in 2014-20 period (e.g. Bizkaia) or to the funding levels and competing funding sources (e.g. Austria). Further, PO2 is viewed to largely continue the types of investments that were carried out under TO4 (e.g. Vlaanderen).

4.3 What future improvements?

As has been highlighted throughout the paper numerous lessons can be carried forward and applied in the future period including:

- **Setting ambitious, but realistic, objectives that take into account of regional differences.** While ambitious, it is also important to be realistic and understand the added value that can be achieved with the funding available. Accommodating different regions (regional categories) has also been noted (e.g. Austria, Czech Republic) in that their requirements and absorption capacities differ.

- **Importance of effective and efficient targeting.** Linked to the issue of added value, in such a wide area of intervention and with finite resources, it is important to focus efforts.

In some cases, the need is to narrow the focus to specific areas of activity where Cohesion policy interventions can add value. However, taking a wider, more strategic view of the challenges and issues is also important. For example, in the future as experience of the theme grows, there could be scope to target/link to more strategic challenges, not just short-term adjustments. Rather than focussing solely on energy savings for SMEs, for example, this could be extended to reducing material consumption, which requires cooperation with other companies and an increased focus on value chain cooperation and larger companies in the projects. It is difficult for SMEs to work on material flows on their own, and therefore the operators can add value through the processes, by supporting the work on value chain cooperation.[54]

- **Early start to implementation.** Having an early programme approval, relevant structures in place and procedures approved (e.g. designation of bodies) will facilitate a timely start of implementation. Some programme authorities have noted concerns that possible delays to project implementation will lead to financial absorption pressures, not least due to the anticipated n+2 rule. For example, the MA in Vlaanderen has underlined the importance of approving large investment projects at the beginning of the future 2021-27 programme period (in year one or two) in order to meet the future financial indicators. It also takes time to generate interest among the potential beneficiaries when changes are introduced. Therefore, early engagement and communication with local/regional stakeholders and potential projects can be helpful. An important part of this is **building demand**, providing more support for project generation (e.g. France) as well as strengthening information and communication activities. In particular, efforts can include attracting stakeholders that are not already engaged in the issue.

- **Flexibility and continuity with agreed requirements.** Some programme authorities have called for more flexibility on determining what concrete activities are allowed / not allowed, as well as more continuity with the agreed requirements and conditions on support. It is important that these requirements and conditions do not change substantially during implementation, as projects under the theme can involve long-term preparations. In 2014-20, the gradual introduction of requirements and narrowing of eligibility of support affected the practical financial absorption in programmes such as IROP and OP EIC in the Czech Republic.

- **Recognition of the need for a combination of 'soft' and 'hard' policy measures and productive synergies with other interventions**. For example in Finland, although the delivery of the low-carbon theme is progressing well (in accordance with the OP targets), the benefits of the interventions are not recurring or spreading beyond the immediate project environment, for example through cluster type projects. Low-carbon has the potential to be better linked to the key smart specialisation themes. Some programmes aim to ensure this by carrying out programming simultaneously or in close coordination with other relevant OPs and the Partnership Agreement, and by

ensuring that there are linkages between the proposed actions and measures and relevant domestic plans and strategies. This entails discussions with all relevant partners on the barriers and opportunities of the various themes, as well as their implementation settings. In Denmark, the changes to the domestic structures (i.e. the reform of the business promotion system, see more in the IQ-Net Review Paper 44/1) are anticipated to help the MA and the national secretariat in encouraging potential operators to generate projects and to ensure links and synergies with national strategies (e.g. strategy for circular economy).

- **Building implementation capacity,** especially in terms of thematic skills and capabilities both in the implementation bodies and at the beneficiary level. Operators could, for example, include a third-party expert validation in their project applications. Special academic insight into the work with energy and energy resource reductions is needed to assess the realism of the targets for these reductions and to validate the quality of data used to qualify objectives (e.g. Denmark). In Denmark there are also indications that the cross-municipal business development centres will take on a stronger role in generating low-carbon projects.

The low-carbon economy requires a policy mix (soft e.g. information dissemination and hard e.g. economic and regulative measures), a broad range of interventions, and policy coordination.

- **Simplification.** Programme authorities have called for more simplification efforts to facilitate the administrative procedures in the implementation bodies as well as at the beneficiary level (especially for SMEs). For example, in Portugal, the authorities would like to simplify the support in terms of allocating a lump sum (fixed sum) based on the results defined in terms of reducing energy consumption or reducing emissions. The simplification measures could have a positive effect on understanding the cost of investment by potential beneficiaries and, at the same time, reduce the administrative costs of the entities responsible for the implementation of ESIF. Others have called for simplified cost options, as well as more overall simplification of the requirements on applicants in some specific areas (e.g. in terms of not employing additional selection criteria, but only the formal criteria), and the introduction of more simplified versions of project applications. Related to this, some have suggested more flexibility in the applications. For example, the authorities in the OP EIC in the Czech Republic have noted that in rapidly evolving fields it would be desirable to follow a *design2build* approach where applicants frame their project proposals flexibly. In other words, the project applicants would not have to think of concrete technological solutions, as they do not necessary know the best solution available at the market, and could instead propose technological problems that are effectively the objective of the support.

5 CONCLUSION

Cohesion policy programmes are highly active in supporting the transition to the low-carbon economy, through both direct interventions under TO4 and work under related themes, for example, innovation. For a number of IQ-Net programme authorities, focus on the low-carbon economy has been a natural progression. There is familiarity with the field and policy and stakeholder connections are generally well established. In other programmes, interventions targeting the low-carbon economy have been driven through much more as a result of pressure from the European Commission, and involved a 'steeper learning curve' and capacity building measures. Initial problems have included lack of preparedness, weak issues analyses and, in some cases, also difficulties and delays meeting the ex ante conditionalities.

Reflecting wider debates in the academic and policy literature, the question of **how best to target and focus programme efforts on the low-carbon theme is a particular concern**. Programme authorities have adopted different approaches to the inclusion of the theme into their programme priorities. In most IQ-Net programmes, there is one dedicated priority axis, although some have adopted multiple dedicated / related priorities, or a more cross-cutting approach with low-carbon included under additional priorities or instruments. The selection of investment priorities is similarly diverse, with at least investment priorities (a), (b), (c) and (e) featuring in most programmes. Experiences vary significantly regarding which projects under which priorities are more 'straightforward' and 'well-performing', and which face specific problems or have slower progress.

Based on the research across the IQ-Net partner programmes, a number of **factors that have facilitated and challenged the implementation of TO4 projects** can be identified. Key challenges reported include:

- low demand for projects due to issues with stakeholder capacity (in the implementing bodies and amongst the project partners) and different interests (e.g. different expectations of the business sector), eligibility of beneficiaries and competition from other sources of funding (especially domestic);
- weak competition in the project selection, due to capacity issues in project assessment and the subsequent awarding of resources to the 'available' rather than the most relevant and best quality projects;
- other specific issues such as long project preparation and lead-in times, State aid, lack of match funding; and
- challenges in monitoring and evaluating programme results and impacts.

Despite these challenges, which were encountered especially in the early phases of implementation, improvements have taken place in many IQ-Net countries and regions. Lessons have been learned about the types of projects that work better, and programme authorities have been active to adopt measures in response to existing or emerging project

implementation challenges. As a result, projects and programmes are beginning to deliver early results. **The extent of low-carbon impact varies, especially in relation to 'hard' outputs and results. However, an important dimension of Cohesion policy's role in this area is its 'soft' impact and influences.** Again, there is variation in the extent of impact, but similar themes recur in both more developed and less developed regions. Areas of notable value that emerge are linked to: visibility and the positive image that TO4 interventions can project for the Programme; increasing priority that the theme attracts amongst regional actors; the leverage effect on domestic policies where progress has been slow; the push for coordination and coherence; the explorative/experimental nature of some of the projects adding value for domestic instruments to follow-up if they prove successful; and, the knock on benefits that result from TO4 projects.

Looking to the future, the 2021-27 period entails **an integrated policy approach** where investments have a **broader perspective.** The PO2 'greener, carbon free Europe' encompasses themes such as energy transition, circular economy, climate adaptation and risk management, bringing together previously separate TOs (TO4, TO5 and TO6). The changes are expected to allow a broader scope of activities for low-carbon projects. At the same time, pressure to deliver results and limited resources means careful prioritisation and strategic choices (e.g. eligibility of low-carbon activities under other POs). This paper raises a number of lessons for the 2021-27 programme period:

- Setting ambitious, but realistic objectives that account for regional differences;
- Focusing efforts to create added value in the context of finite resources (e.g. decisions between strategic challenges vs. short-term priorities);
- Ensuring an early start to implementation with timely programme approval and procedures and structures in place to build demand and avoid financial absorption pressures;
- Building implementation capacity, including thematic skills and capabilities in the implementing bodies and with beneficiaries;
- Recognising the need to combine 'soft' and 'hard' policy measures and productive synergies with other interventions; and
- Simplification, flexibility and continuity with agreed measures.

ANNEX

Annex 1: Energy-related allocations under Cohesion policy 2007-13 and 2014-20 (€ 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: Wishlade F, Michie R & Vernon P (2017) Research for REGI Committee – Financial instruments for energy efficiency and renewable energy, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.

Notes: Some level of caution is needed when comparing the two programme periods due to the definition of so-called 'intervention fields' in 2014-20. Relevant expenditure may be

underestimated for 2007-13: the intervention fields in the 2014-20 ESI Fund rules[1] 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 €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.

Notes

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[16] Ibid.; See: https://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf.

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