STUDY

Requested by the REGI Committee

European Parliament

Cohesion Policy in EU Coal Regions

Regional Development

Policy Department for Structural and Cohesion Policies
Directorate-General for Internal Policies
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RESEARCH FOR REGI COMMITTEE

Cohesion Policy in EU Coal Regions

Abstract

Decarbonisation brings both significant challenges and opportunities for coal regions. This study analyses the implementation and impact of Cohesion Policy, including Just Transition Funds, in EU coal regions. Looking retrospectively at the 2014-2020 programming period and forward to the 2021-27 period, the study concludes that Cohesion Policy has made, and is likely to continue to make a real contribution to achieving smarter, greener and more socially connected development of EU coal regions.

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LIST OF ABBREVIATIONS

CF	Cohesion Funds
EIB	European Investment Bank
ERDF	European Regional Development Fund
ESF	European Social Fund
GHG	Greenhouse gas
JTF	Just Transition Fund
JTM	Just Transition Mechanism
NECPs	National Energy and Climate Plans
OP	Operational Programme
PA	Priority Axis
PV	Photovoltaic
REACT-EU	Recovery Assistance for Cohesion and the Territories of Europe
REGI	The Committee on Regional Development
RQ	Research Question
START	Secretariat Technical Assistance to Regions in Transition
SO	Specific Objective
TA	Technical Assistance
TARGET	Technical Assistance for a Green Energy Transition
TJTP	Territorial Just Transition Plans

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EXECUTIVE SUMMARY

Objectives and background

Cohesion Policy is expected to play an important role in supporting regions to meet European Union decarbonisation commitments and ambitions. This role is heightened in coal regions that not only face the challenge of adopting new technologies but, also, of instituting fundamental structural economic change while safeguarding their social fabric and citizens' livelihoods.

This study offers an analysis of the implementation and impact (actual or expected) of Cohesion Policy at regional and local levels in EU coal regions. Attention is given to the different contributions of ERDF and ESF over the 2014-20 period, and to the prospects for future programmes, including Just Transition Fund (JTF), to further support and ameliorate transition towards decarbonisation in these regions.

The study is underpinned by an overview of the underlying socio-economic and territorial characteristics of EU coal regions and in-depth analysis of the application and programming of Cohesion Policy in six case study regions.

Main findings

EU coal regions display diverse socio-economic and territorial characteristics, making the identification of common challenges difficult. With exceptions, coal regions tend to have lower levels of GDP per capita and higher shares of people facing poverty or at risk of social exclusion than their corresponding national averages. Other challenges often shared by coal regions are lower levels of educational attainment, high unemployment rates (including for long-term unemployment) and lower job vacancy rates, when compared to national averages. Economic and social dynamics of coal regions were negatively impacted by the COVID-19 pandemic, notably in terms of declines in regional GDP per capita that were observed in all coal regions.

As the weight of coal-related activities in the overall economy varies considerably among coal regions, the consequential relative magnitude of transition required adjustments at the regional level can be quite different, meaning that there is not a common applicable roadmap for achieving a just transition. This variation seems to be reflected in differing priorities of regional just transition policies and actions, which merits consideration for the design of Cohesion policies and funding programmes.

Cohesion Policy over the 2014-2020 period did not make explicit reference to coal phase-out and the corresponding Operational Programmes (OPs) did not include any policies specifically tailored to supporting transition in coal regions.

Nonetheless, analysis of the projects and investment spending in the six case study coal regions **points to Cohesion Policy instruments playing an important role in EU coal regions. Specifically, Cohesion Policy has helped to pave the way towards transition via a multitude of Priority Axis (PA) and Specific Objectives (SO). These PAs and SOs were either transition-relevant and/or supporting low-carbon and climate resilient investments by addressing both the social, economic and environmental aspects of transition.** More specifically, ESF-programmes in all six case study regions were used to address social aspects of transition through, for example, up-skilling, re-skilling, or other training actions. While EDRF/CF programmes in several, but not all regions, contained SOs allowing for environmental rehabilitation and revitalisation of mining sites, and transformation of carbon-intensive installations, the case study analysis found only a few examples of larger flagship projects in coal regions. Nonetheless, where such projects have been funded, they appear to have

acted as a catalyst for the inclusion of additional stakeholders in transition efforts, sparking follow-up project ideas and inspiring new stakeholders to follow the lead set by the flagship project.

Despite the collaboration of Managing Authorities (MAs) in the drafting phase, persistent delays in the approval of Operational Programmes and Territorial Just Transition Plans (TJTPs) for coal regions creates problems for the alignment and implementation of Cohesion Policy within Member States and, also, for alignment and comparability across the EU.

Moreover, within the six case study regions, **the establishment of the JTM, including the dedicated JTF, has raised the level of attention to transition in coal and carbon intensive regions and brought about changes to the way Member States programme their use of Cohesion Policy funds.** For the 2021-27 period, there is an increase in the share of SOs that either explicitly or implicitly cover planned investments into transition topics. Not only have Member states introduced OPs/PAs specifically focused on transition of coal and carbon intensive regions but, also, the development of TJTPs (a requirement to receive JTF funds) has impacted the design phase of other non-JTF programmes.

Finally, evidence from the six case study regions suggests that **Cohesion Policy instruments were not only used to support short-term responses to the Covid-19 pandemic but, also, that the pandemic has induced some long-term changes in programming for the 2021-27 period**. As part of the short-term response, Cohesion Policy was used as a crisis tool to react to and mitigate the impacts of the pandemic, particularly in the areas of health, employment and education. Over the longer-term, at least in some regions, reactions to the pandemic can be seen in a greater prioritisation of areas such as labour market, social protection and healthcare in Cohesion Policy programmes for the 2021-27 period.

Key Recommendations

Findings from this study support some key recommendations concerning the interplay between coal regions and Cohesion Policy:

- Policies and instruments to support just transition should accommodate the specific characteristics of each coal region, which may require strengthening regional-level inputs into their design.
- Programming and implementation of Cohesion Policy programmes for 2021-27 should recognise the multidimensional aspects of transition, including environmental rehabilitation and revitalisation of mining sites, and transformation of carbon-intensive installations, together with variable scales of projects from small to large.
- The European Commission, together with relevant national and regional administrations should be encouraged to speed up, monitor and evaluate the implementation of Cohesion Policy for the 2021-27 programming period, including with regard to strict observance of procedures and timelines.
- The fundamental importance and need to strengthen alignment, coordination, and cooperation among Managing Authorities for ERDF, ESF, CF and JTF should be underlined, with the purpose of creating synergies, avoiding duplication of project funding instruments, and enhancing flexibility and availability for beneficiaries.
- Efforts should be made to better inform EU coal regions on the considerable body of good practice examples and lessons for achieving transition in a socially acceptable way, together with informing them of available technical assistance and capacity building instruments supporting just transition, including recently launched facilities such as exchangeEU and TARGET.

1. INTRODUCTION

1.1. The role of Cohesion Policy in meeting the challenges of just transition in EU coal regions

Decarbonisation policies in the EU risk compromising the long-term economic sustainability of regions that have historically been dependent on the coal industry. Declining use of coal, reinforced through efforts to reduce greenhouse gas (GHG) emissions and accompanying loss of competitiveness of fossil fuels, has resulted in the development of many coal regions progressively lagging the EU as a whole. In fact, between 2014 and 2018, 58 coal mines were closed across the European Union since they were no longer profitable. Notwithstanding recent events, namely the COVID-19 pandemic and Russia's invasion of Ukraine, for which the long-term impacts on energy transition in the EU are still to be seen, a successful coal phase out is crucial if the EU is to achieve the climate and environmental goals of the European Green Deal.

However, the coal sector remains significant in several EU regions and a phase-out from coal will inevitably have a myriad of economic and social impacts. Attention must be given, therefore, to avoid coal phase out leading to major economic and social disruptions in these regions.

EU coal regions are diverse, with coal occupying a different significance in its position and role in their economies. It is the case, also, that regions differ in their progress towards transition, with some in the process of completing the phasing out coal while others remain at an early stage. Regions such as Silesia, one of the targeted regions of the study and with circa 70 000 workers in the coal sector, is potentially the most vulnerable to coal-related job losses, while regions in Czechia and Bulgaria may face employment losses reaching a third of total regional employment. Looking beyond the impacts of coal phase out on employment, the transition towards a more sustainable energy model presents various challenges for coal regions. For instance, coal remains an important energy source for home heating, particularly in Eastern Europe. Thus, consideration must be given to the potential impacts on households that rely heavily on coal to keep their homes warm, and of the consequential risks of energy poverty within the populations of these regions.

Decarbonisation poses a new set of technological and capacity challenges for the regions, for which they may not be prepared and for which there may be an urgent need to find solutions. Challenges may arise, for example, from the loss of coal and carbon-intensive industries, a rise in long-term unemployment, loss of cultural heritage, or other social and environmental consequence arising from the phase out of coal. Regions will need to address these, for example through stimulating innovation, creating new employment opportunities, diversification of economic activities, and addressing the environmental legacy of coal mining, and from finding technical solutions to specific problems (e.g., zero-carbon alternatives for heating). Failure to address the challenges of decarbonisation may result in drastically uneven or incomplete transformation that would threaten economic, social, and territorial cohesion - a long-term and central objective in the Cohesion Policy that has been a backbone of the European Project since the 1970s.

The European Parliament and its Committee on Regional Development (REGI Committee) have been active players in supporting a just energy transition that ensures no coal region is left behind, with EU Cohesion Policy funds playing a fundamental role. EU initiatives, such as the Just Transition Mechanism, demonstrate the EU's commitment to safeguarding the social fabric and livelihoods in those regions most affected by the transition, especially coal regions. The development and implementation of Territorial Just Transition Plans (TJTPs), alongside adjustments to national and regional climate strategies, will be central to efforts to accelerate the journey of regional transition while doing so in a

way that adheres to the principles of a just transition. At the same time, for any transition to be truly just, the voices of regional and local actors in governments, labour unions, business organisations and civil society groups must be included. Through their participation, the effects of a coal phase-out on the economy, environment and society can be properly assessed and accounted for.

Cohesion Policy will have an essential role, since the transformation of coal regions is not simply a question of adopting new technology and clean energy sources but of deploying fundamental structural economic change that safeguards the social fabric and citizens' livelihoods. Already, from 2014 to 2020, total climate-related Cohesion Funds spending amounted to EUR 56.5 billion (European Regional Development Fund (ERDF) 67%, CF 31% and European Social Fund (ESF) 2%). For 2021- 2027, 30% of the EU budget finances should be dedicated to support climate change actions. In the case of Cohesion Policy Funds 2021-2027, it is that climate change actions will account for 30% of ERDF and 37% of CF.

1.2. Study objectives and research questions

Addressing potential asymmetric regional impacts of decarbonisation, which may be seen between regions but also within regions, will pose a major challenge for Cohesion Policy. Therefore, safeguarding the "do no harm" principle for financing all Cohesion Policy investments will remain a challenge, considering that the energy transition can bring welfare losses that would require interventions concerning both social and territorial cohesion. 'The Agenda for Cohesion Policy in 2019-2024: Key issues for the REGI Committee' underlines the need for developing more significant synergies between Cohesion Policy and other energy-transition oriented policies, supporting cross-border approaches to common climate vulnerabilities, and aligning adaptation strategies developed at European, national, and regional or local levels with interventions specific to climate vulnerabilities and priorities of each territory. Coal regions will require constant policy attention to ensure that the positive impacts of climate action do not contribute to divergences between coal regions and other regions.

Importantly, Cohesion Policy needs to investigate energy transformation impacts within coal regions. Therefore, this study will support a holistic understanding of the energy transformation challenge and complement the existing REGI knowledge base on cohesion and energy, as the REGI Committee previously researched climate change and Cohesion Policy and climate-related cohesion spending.

This study will provide further inspection of the challenges, opportunities and negative impacts of the coal phase-out, the effectiveness of and potential unintended consequences of Cohesion Policy and the effect of the COVID-19 pandemic specific to transitioning coal regions. This shall facilitate the addressing of emerging challenges by the REGI Committee through providing inputs to coal regions as a critical “puzzle” in the Cohesion Policy landscape.

In sum, the overall objective of this study is to analyse the implementation and impact of Cohesion Policy and Just Transition Funds (JTF) at local and regional levels in coal regions. It is particularly focused on the different contributions that both ERDF and ESF have had in these regions in the 2014-2020 period, as well as it examines what future programmes can offer to ease the coal transition within coal regions in the European Union. The achieve this overall objective, a number of more specific objectives are described in the Table 1 below together with a number of research questions:

Table 1: Specific objectives and research questions

Specific Objective	Research Questions (RQ)
1. Providing an overview of the territorial and socio-economic characteristics of EU coal regions	▶ What are the characteristics of regions in the EU with ongoing coal-related activities? ▶ How do EU coal regions compare in terms of socioeconomic characteristics to national and EU averages? ▶ What is the contribution of the coal sector to the economies of EU coal regions (including the labour market)?
2. Understanding how Cohesion Policy and JTF is implemented at local and regional levels in coal regions	▶ Which 'tailor-made' policies have been put in place in the six case study regions to facilitate coal transition in the past? ▶ How has Cohesion Policy (2014-2020) been implemented in six case study regions? ▶ How will Cohesion Policy (2021-2027) be implemented in the six case study regions? ▶ How will TJTPs be implemented in the six case study regions?
3. Analysing the contribution of Cohesion Policy to support of the transition to Carbon and Climate resilient activities	▶ How has Cohesion Policy 2014-2020 contributed support of the transition to a low-carbon and climate resilient economy so far? ▶ What example are there of investment projects in coal regions supporting the transition to a low-carbon and climate resilient economy ▶ How has the TARGET facility assisted beneficiaries in coal regions and what synergies are there with Cohesion Policy instruments? ▶ How has the exchangeEU programme assisted beneficiaries in coal regions and what synergies are there with Cohesion Policy instruments?
4. Providing an analysis on the effects and aftermaths of the Covid-19 pandemic and its impact on the implementation of EU Cohesion Policy in the coal regions	▶ How has the COVID-19 pandemic affected coal regions as compared to the Member State as a whole? ▶ How will coal regions benefit from the Recovery and Resilience Facility? ▶ How did Cohesion Policy change in the coal regions since the beginning of the COVID-19 pandemic? ▶ What impact have post-COVID-19 economic recovery policies had on coal regions?

1.3. Study approach and research limitations

To achieve these objectives and to answer the RQs presented above, some information gathering, and analytical approaches are utilised, including literature review and desk research, interviews with Managing Authorities, statistical analysis and most fundamentally case study research.

Six-case study regions (NUTS2-level) and within these, NUTS3 coal regions[1], have been selected to draw detailed and specific evidence on the application and programming of Cohesion Policy within coal regions. The six case studies provide insights on the different policies that have been put in place across Europe to facilitate a just transition. By examining the different policy approaches that have been adopted across relevant domains (e.g., socioeconomic, environmental and climate), inferences can be made about the ways by which local and regional stakeholders are able to respond to closure of coal infrastructure and the loss of jobs this entails.

[1] The quantitative analyses done in section 4.1 is based on the NUTS3 level as investments at NUTS2 level are in some regions not representing the actual investments into coal regions which are often sub-regional. NUTS3 coal regions are taken from the list of regions eligible for JTF funding (European Commission, 2020).

The selection of the six case study regions set out below has been based on the four objective criteria:

- **Geographical balance** across the EU
- **Different transitions stages** (early strategy development; ongoing transition; project selection; phase-out close to completion).
- **Economic fabric** (mono-industrial, economically diverse, urban and rural regions).
- **Cohesion Policy** funding received in the period 2014-2020 and the category of region (less developed, transition, and more developed region)

The six NUTS2 case-study regions and NUTS3 coal regions included therein are the following:

Table 2: Case study regions (NUTS2 and NUTS3 level)

NUTS2 case study region	NUTS3 coal region	Type of region	Transition Stage
ES12 - **Principado de Asturias (ES)**	ES120 - Asturias	Transition region	Phase-out close to completion
PL22 - **Śląskie** (PL)	PL225 - Bielsko–Biała; PL227 – Rybnicki; PL228 – Bytomski; PL229 – Gliwicki; PL22A – Katowicki; PL22B – Sosnowiecki; PL22C - Tyski	Less developed region	Early-stage transition
DEA1 - **Düsseldorf** (DE)	DEA1D - Rhein-Kreis Neuss	More developed region	Ongoing transition
CZ04 - **Severozápad** (CZ)	CZ041 - Karlovarský kraj; CZ042 - Ústecký kraj	Less developed region	Ongoing transition
EL53/EL13 - **Dytiki Makedonia** (GR)	EL531 - Grevena, Kozani; EL532 – Kastoria; EL533 - Florina	Less developed region	Ongoing transition
BG34 - **Yugoitztoche**n (BU)	BG341 – Burgas; BG342 – Sliven; BG343 – Yambol; BG344 - Stara Zagora	Less developed region	Early-stage transition

Source: Own elaboration

Geographical balance has been achieved, with the six case-studies encompassing regions in north, east, south, and west of Europe. Also, these regions provide a spectrum of mature, ongoing, and early-stage transition processes and, moreover, varying types of regional economic fabric. This provides the basis for identifying common and specific problems and obstacles faced by the selected regions, and developing insights and lessons learnt that may be relevant for other EU coal regions.

Moreover, there are some research limitations for the present study which ought to be noted. Firstly, there have been disparities between regional average socio-economic characteristics observed at a NUTS2 region level and those pertaining at the sub-regional level of 'coal' areas within the region. Secondly, up-to-date data are not uniformly available (e.g. socio-economic data, health data, data from Annual Implementation Reports (AIRs) of 2014-2020 Operational Programmes (OPs). Thirdly, not all TJTPs and OPs for 2021-2027 for the Case Study Regions have been approved at the time of the writing of this report (3 out of 6 TJTPs and 6 of the 23 OPs are not yet approved), making cross-comparison of the impacts of Cohesion policy in the 2021-2027 programming period incomplete. As such, conclusions coming out the analysis of the new Cohesion Policy programmes 2021-2027 should be treated with a degree of caution.

1.4. Overview of structure of the report

Section 2 provides an overview of the territorial and socio-economic characteristics of EU coal regions. A series of indicators are analysed in a structured manner in order to get an overview of the key socioeconomic characteristics of these regions, with special attention given to the contribution to the labour market in terms of employment.

Section 3 builds on Section 2 and sets the scene a detailed analysis of how Cohesion Policy and JTF is implemented at local and regional levels in coal regions (i.e. Section 4). As such, an analysis is provided of six diverse case study regions which are selected as case studies, including a comparative overview of the the policies put in place across Europe to facilitate a just transition.

Section 4 focuses on the implementation of Cohesion Policy programmes (OPs) in the past funding period (2014-2020) and the current funding period (2021-2027) along the six selected case study regions.

Section 5 provides a description and analysis of the impacts and benefits of the exchangeEU programme and TARGET facility.

2. TERRITORIAL AND SOCIO-ECONOMIC CHARACTERISTICS OF EU COAL REGIONS

KEY FINDINGS

- The identification of common challenges is difficult due to significant variance between the socio-economic characteristics of EU coal regions. However, common challenges include the general lower GDP per capita values and higher shares of people facing poverty or at risk of social exclusion than their national averages.
- Moreover, there are some regional specific challenges shared by some of the regions: lower educational attainment in some of them, high unemployment rates, including long-term unemployment and lower job vacancy rates, compared to their national averages.
- Besides from the different socioeconomic contexts in each of the regions, the fact that the weights of the coal industry in the different coal regions is highly varied developing future needs in the transition process is different in each region, with no one single roadmap for achieving a just transition
- The transition to a low-carbon economy must be handled in a socially inclusive, equitable and just manner, considering the needs of working citizens; failure to do so could worsen social inequality and income disparity.

This section presents the socio-economic characteristics of the coal regions from the latest data available, providing an overview of the socioeconomic challenges that these territories have faced or are facing due to the end of coal extraction and the resulting transition. To realise the purpose of this section, research has been conducted with a dual purpose of:

1. identifying relevant open-access databases with comparable information on key indicators for all coal NUTS2 regions, and
2. collecting relevant studies and academic papers with additional information on the characterisation of coal regions.

Drawing on this research, a data matrix was created to include all indicators identified as key to the characterisation of the regions. The matrix includes the following indicators, per area

- **Economic structure**: GDP per capita, Weight of the industry sector, Expenditure in GERD
- **Demographic Structure**: Median age of male/female population, Population Density, Male/female population
- **Employment**: Unemployment and long-term unemployment rate, Job vacancy rate, Number of direct, indirect domestic and non-domestic jobs, Indirect/direct job ratio, Distribution of indirect jobs in intra and inter-regional supply chains, Plant O&M jobs, Mining Jobs
- **Estimated jobs at risk:** Estimated jobs at risk in NUTS2 regions by 2020, 2025, 2030
- **Poverty and exclusion**: People at risk of poverty or social exclusion, NEET rate
- **Digital skills**: Percentage of individuals who access internet weekly, Individuals who have never used a computer

- **Education**: Students in Tertiary education, Ratio of students (ISCED 5-6), Lower secondary education and below
- **Energy**: Available energy for final consumption, Energy sector - coal mines, Energy sector - oil and natural gas extraction, Gross Electricity production, Gross Heat production[2], Potential loss (value added and production)
- **Coal mines**: Coal mines production, Coal fired power plants capacity

Data collected on the coal regions present their main characteristics in terms of labour market, energy, economy and demography, while a larger number of indicators is used to conduct a comparative analysis on how these regions perform in comparison to their national and European contexts. Afterwards, an understanding of the impact that coal-related jobs (direct/indirect/induced) have on the regional/country labour market will be presented.

2.1. Main socio-economic characteristics of coal regions in comparison with their national and EU averages

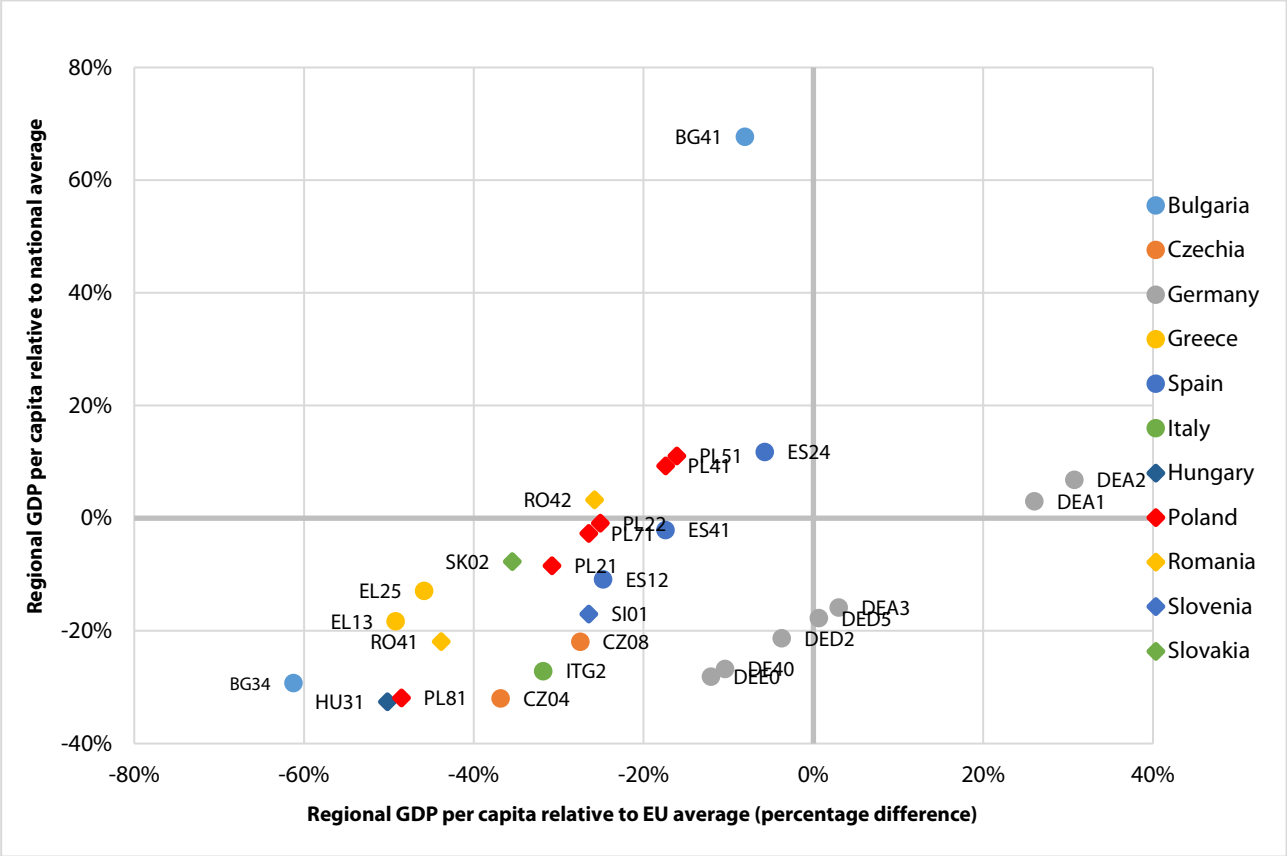
2.1.1. Economic development

The data collected, shows that on average coal regions have a lower GDP per capita (EUR 23,286) than the European average (EUR 29,900). Figure 1 below presents all the regional values below or not significantly above the EU value. The highest number of regions is concentrated along the lower left quadrant, meaning that they tend to be both below their national averages and below the EU average for GDP per capita. However, this is not a set rule and there are also some coal regions which are above the national average of their respective countries.

German regions are different as some are below the national average but above the EU average, due to Germany's GDP per capita on average higher than the EU's. Two German regions are the only ones in the dataset to have per capita GDP levels significantly above EU average. GDP per capita levels are also below national average in most coal regions, with only one region (BG41) with per capita GDP more than 20 percent above the national average.

[2] Eurostat data

Figure 1: GDP per capita rates of coal regions compared to national and EU average (2021)

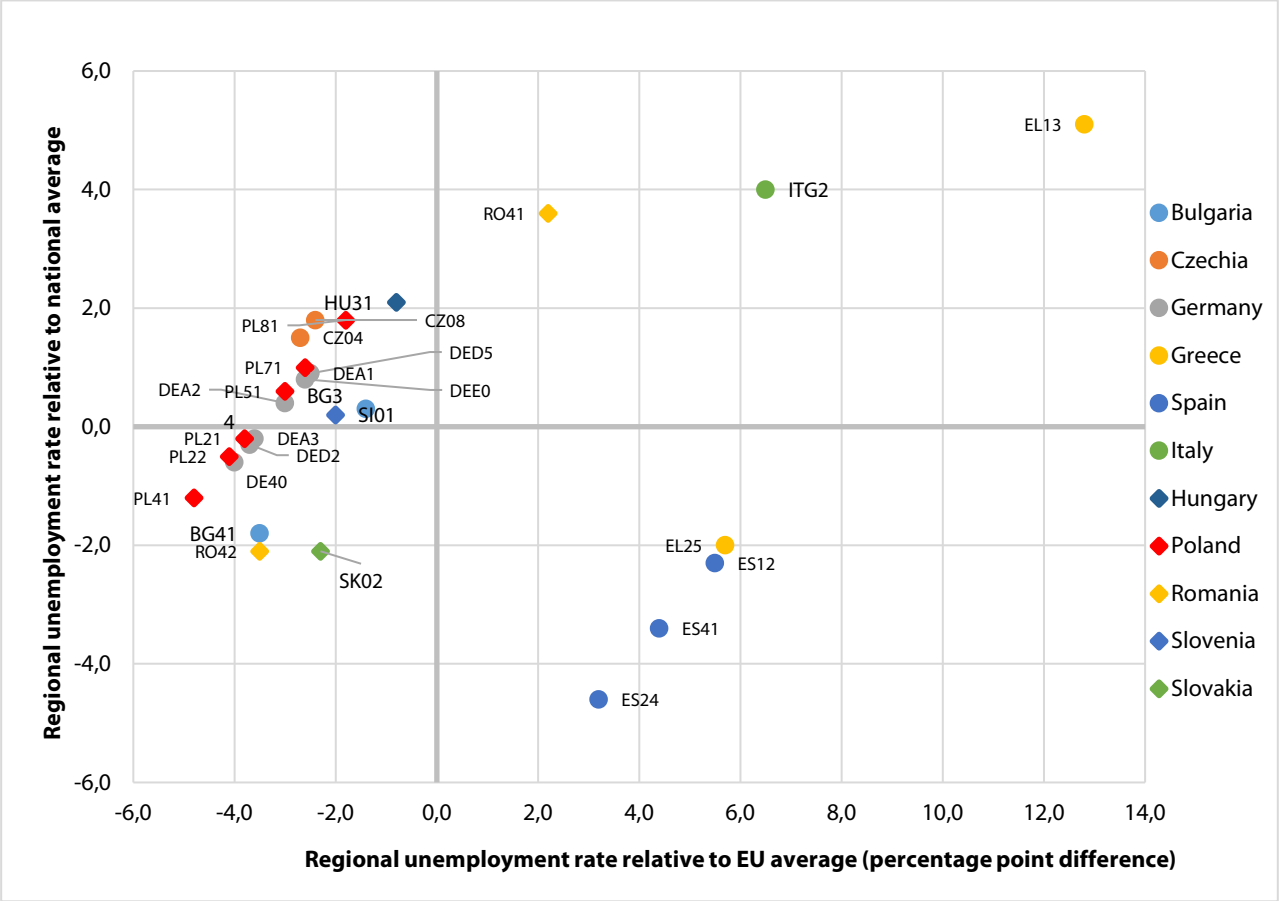


Source: own elaboration based on data from Eurostat

2.1.2. Unemployment levels

While the unemployment rate is usually inversely related to GDP per capita (higher levels of GDP per capita are correlated with lower levels of unemployment) the previous analysis on the relative position of coal regions does not fully stand when it comes to analysing unemployment rates. Latest available data suggest that most coal regions have most coal regions have unemployment rates below the EU average, with approximately half of them also having unemployment rates below their national average. In general, coal regions with the unemployment rates substantially above the EU average are found in southern European countries (e.g., Greece, Italy and Spain), although this seems to be more reflective of national conditions rather that their status as a coal region. Overall, coal regions do not exhibit a clear tendency towards either higher or lower unemployment rates relative to their national averages.

Figure 2: Unemployment rates of coal regions compared to national and EU average (2021)



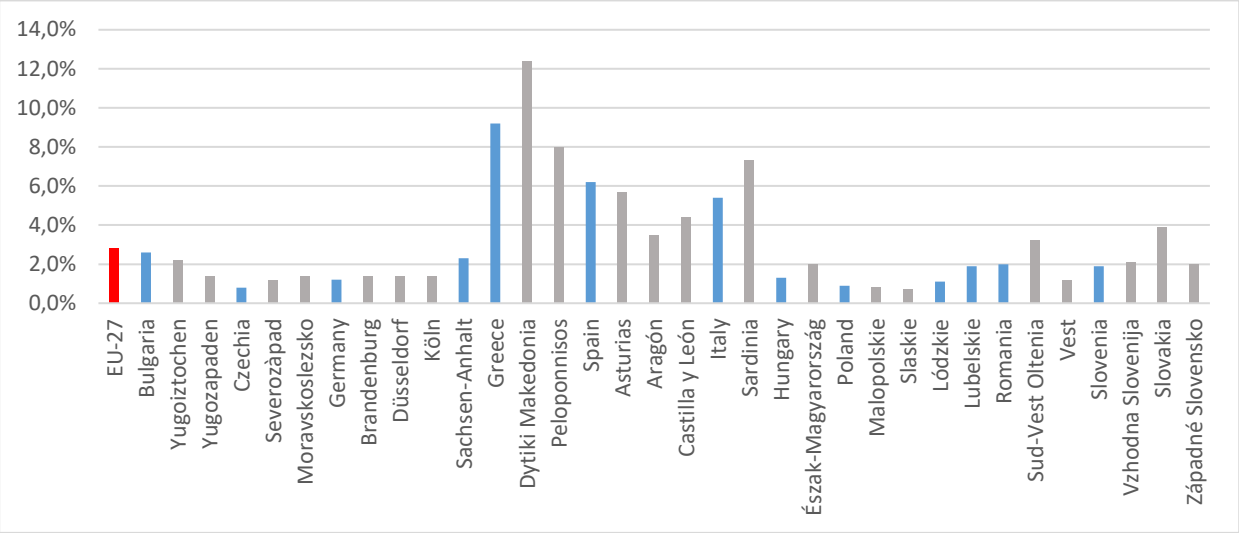
Source: own elaboration based on data from Eurostat

Long-term unemployment refers to the number of people who are out of work and have been actively seeking employment for at least a year. Many factors can drive long-term unemployment, including structural changes in the labour market, the result of an economy reorganising, usually because of technological changes or offshoring that render some jobs obsolete or demographic changes that create a mismatch of skills between generations. Long-term unemployment is a particular concern for policymaking in the coal regions due to their transition process and need for efficient population reorganisation. High rates of long-term unemployment indicate that labour markets are operating inefficiently[3].

A similar pattern is observed in long-term unemployment rates, with the highest values in Greece, Italy and Spain, with Dytiki Makedonia and Sardinia above their national averages and Spain below the national average but above the EU average.

[3] OECD (2016), "Long-term unemployment", in OECD Factbook 2015-2016: Economic, Environmental and Social Statistics, OECD Publishing, Paris.

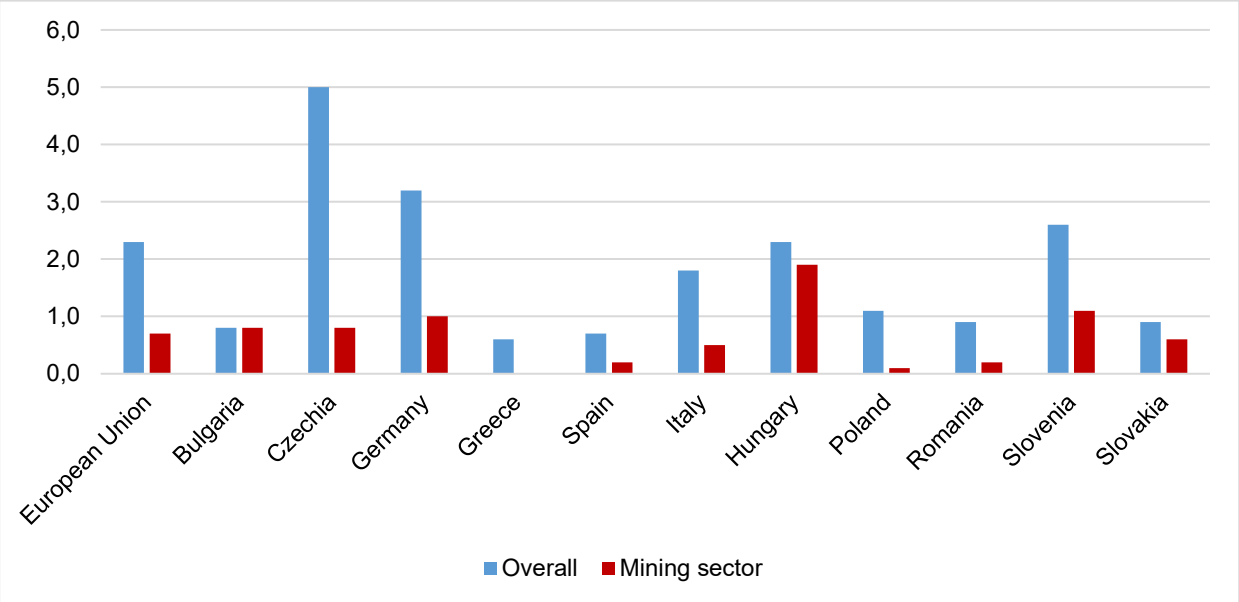
Figure 3: Long term unemployment (2021)



Source: own elaboration based on data from Eurostat

Job vacancy statistics provide information on unmet labour demand[4]. Even though up to date data is not available at the regional level, at the national level the job vacancy rates for jobs related to the mining sector are systemically below the overall job vacancy rate for all industries, which likely points to the fact that the labour market related to coal jobs is less dynamic than the overall labour market.

Figure 4: National job vacancy rates (overall and for mining sector) by region (2021)



Source: own elaboration based on data from Eurostat

[4] https://ec.europa.eu/eurostat/web/labour-market/job-vacancies

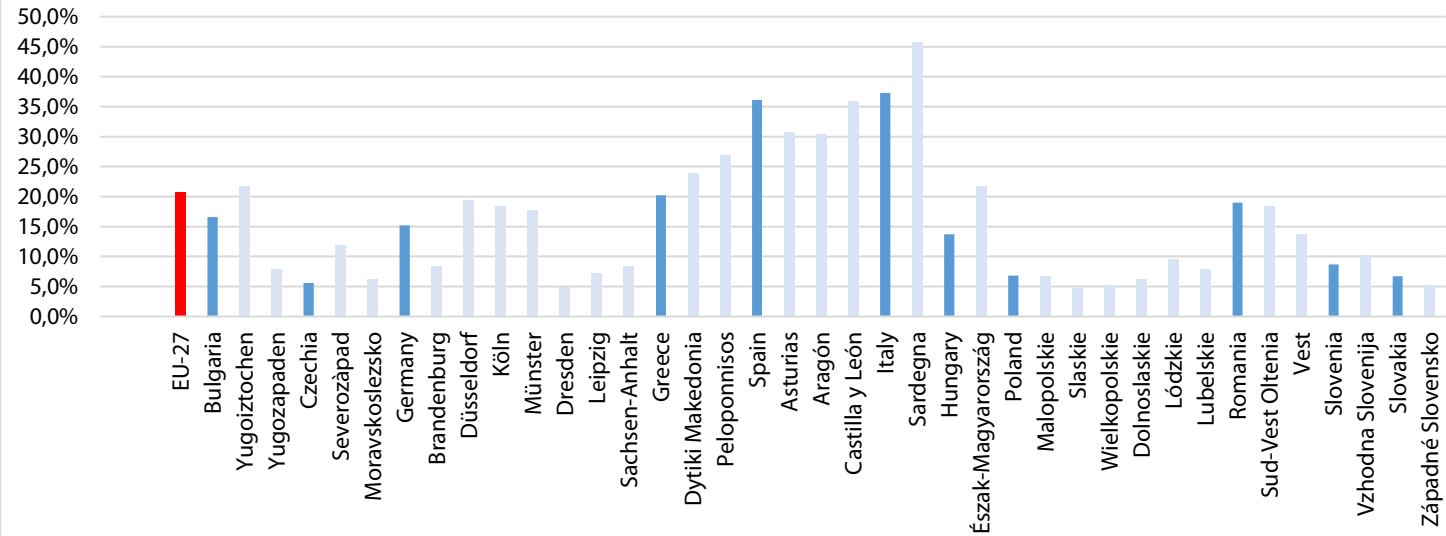
2.1.3. Educational attainment

Participation in the labour force is highly determined by the level of educational attainment (Aliprantis & Zenker, 2011). Workers that obtained a high school diploma or a higher educational level statistically tend to have a higher wage and more reskilling options than those who dropped out of school or did not attend university.

The percentage of people that have attended only either primary or lower secondary education in coal regions is quite heterogeneous (see Figure 5). Once again, those regions in southern EU countries present levels significantly higher than the EU average (with the Italian region of Sardinia nearly touching 50%) whereas all the other territories in central and eastern Europe present values that are below or just above the EU average. It is important to underline the significantly low values of the Polish regions (with Śląskie and Wielkopolskie just reaching 6/7%).

A general tendency of the coal regions in this regard is still difficult to be identified, but it appears that there is a demarcation between educations patterns in central-eastern Europe and those found in southern Europe.

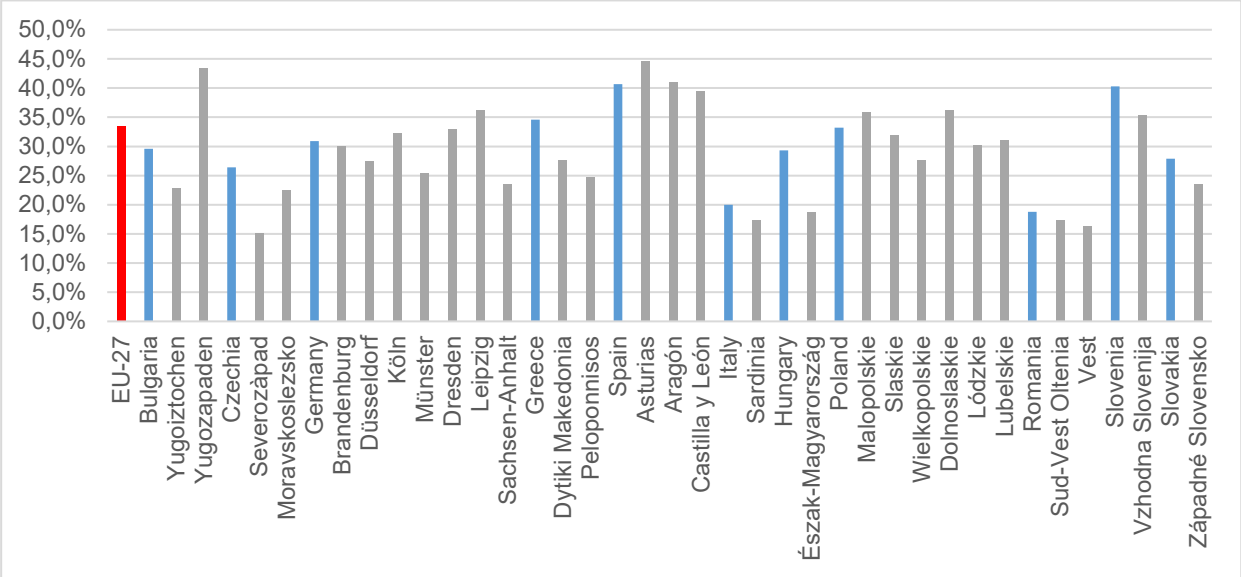
Figure 5: Less than primary, primary, and lower secondary education (2021)



Source: own elaboration based on data from Eurostat

When it comes to the percentage of people in coal regions who have attended tertiary education, there is no discernible pattern across coal regions. Some regions display values above their national averages, and also above the EU average, while others have values below their national averages, meaning that the population in those regions has on average a lower educational level than in other regions in the country.

Figure 6: Population aged 25-64 that attended tertiary education (2021)



Source: own elaboration based on data from Eurostat

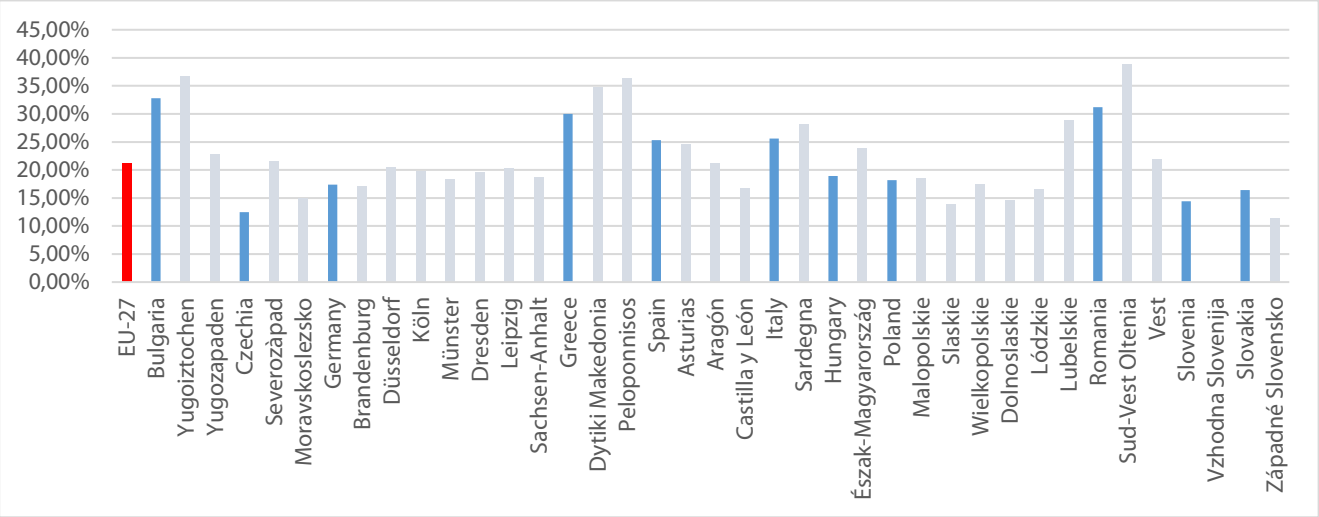
2.1.4. Social exclusion

At risk of poverty or social exclusion, usually abbreviated as AROPE, corresponds to the sum of persons who are either at risk of poverty, or severely materially and socially deprived or living in a household with a very low work intensity. The AROPE rate is the share of the total population which is at risk of poverty or social exclusion. It is the main indicator to monitor the EU 2030 target on poverty and social exclusion and was the headline indicator to monitor the EU 2020 Strategy poverty target[5].

In the case of coal regions, they tend to display, on average, higher rates of social exclusion than their national averages and EU averages, with the general exception of Spain and some Polish regions. Bulgaria, Greece, Spain, Italy and Romania are the countries where people are more exposed to poverty or social exclusion with rates that exceed significantly the European averages. Within these countries coal regions present higher rates than their national values. Furthermore, in countries where the national rates are in line with the EU, some of the coal regions tend to still present significantly higher values (Severozàpad in Czechia, Észak-Magyarország in Hungary and Lubelskie in Poland).

[5] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:At_risk_of_poverty_or_social_exclusion_(AROPE)#:~:text=At%20risk%20of%20poverty%20or%20social%20exclusion%2C%20abbreviated%20as%20AROPE,a%20very%20low%20work%20intensity.

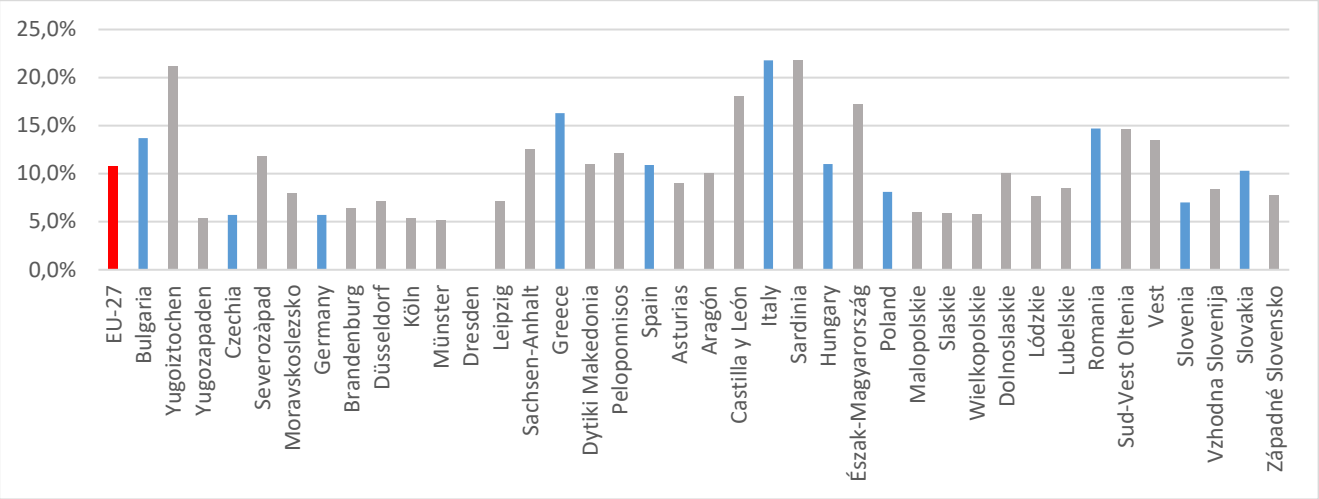
Figure 7: People at risk of poverty or social exclusion (2019)



Source: own elaboration based on data from Eurostat

The indicator of young people neither in employment nor in education and training, abbreviated as NEET, corresponds to the percentage of the population of a given age group and sex who is not employed and not involved in further education or training[6]. It is common to have high NEET rates for people with a low level of education and low NEET rates for people with a high level of education. Figure 8 shows how NEET rates were almost always highest for young adults with a low or medium level of education compared to tertiary education. Looking at the regional dimension, some coal regions have higher NEET rates than their national averages and the EU average, although the pattern is not as strong as for the AROPE rate, and it varies strongly by region, so national trends are not so evident.

Figure 8: NEET rate (2019)



Source: own elaboration based on data from Eurostat

[6] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Young_people_neither_in_employment_nor_in_education_and_training_(NEET)

2.2. Contribution of the coal sector to the economies of EU coal regions (including the labour market) 7

In line with what was highlighted by the Joint Research Centre (JRC) regarding coal regions in transition, the highest numbers of directly coal related jobs in Europe are currently in Poland, Germany, Czechia, Bulgaria, and Romania (Table 3). In the six Polish regions approximately 112,553 jobs are directly related to coal activities. Thus, there is an important number of jobs that could be put at risk as a result of the transition to a carbon-free economy. Spanish regions have almost completed their phasing out of coal extraction, with the coal industry no longer a big economic driver. However, Polish regions still have a high number of people directly employed in coal-related jobs and with no clear phase out plan. Moreover, the values of the Śląskie region in Poland are significantly high, the number of coal-related direct jobs present in this region (76,564) represent an important feature which calls for specific measures and initiatives addressing the territory.

Furthermore, Mandras & Salotti (2021) have calculated the number of jobs indirectly related to coal activities by using a precise model called RHOMOLO-IO[8]. Table 3 below shows the absolute number of direct and indirect jobs in each of the coal regions, and in Figure 9 below there is a visualisation of the relative weight in each region of the percentage of direct and indirect (domestic and non-domestic) jobs relative to the total number that are present in each of the regions. Poland accounts for half of all direct coal-related jobs in the EU, followed by Germany (16%) and Czechia (10%). In terms of indirect jobs, Germany has the highest share (30% of all indirect jobs), followed by Poland (19%) and Romania (11%).

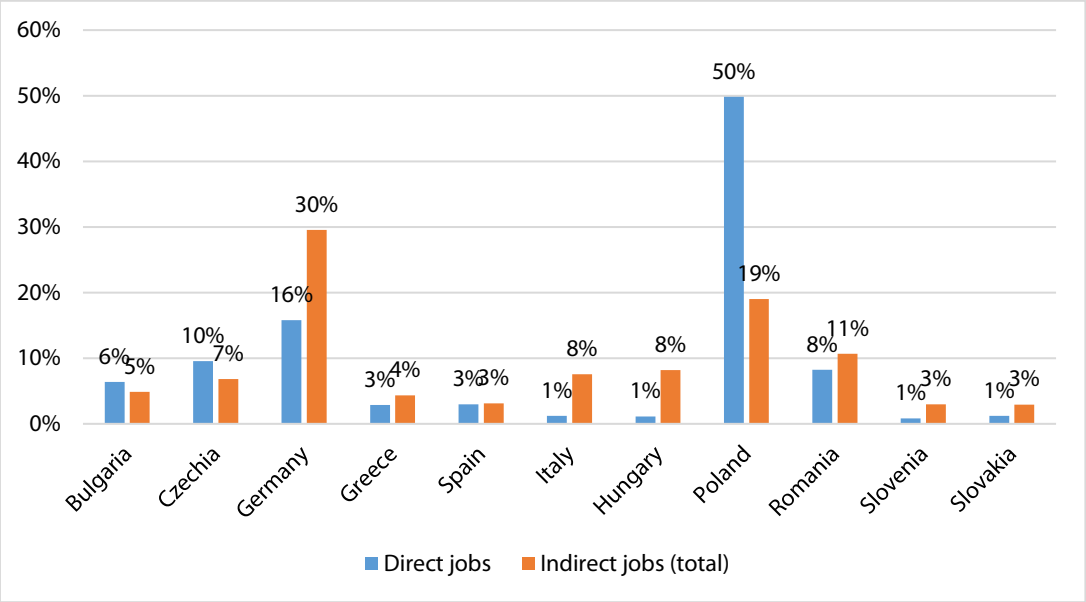
Table 3: Number of direct and indirect jobs related to the coal industry (2021)

NUTS-2 Region	Direct jobs	Indirect jobs (total)
Total	**225,781**	**111,286**
Bulgaria	14,443	5,423
Czechia	21,555	7,589
Germany	35,665	32,892
Greece	6,527	4,810
Spain	6,674	3,465
Italy	2,714	8,392
Hungary	2,509	9,095
Poland	112,553	21,160
Romania	18,598	11,864
Slovenia	1,847	3,332
Slovakia	2,696	3,264

Source: own elaboration based on data from Mandras & Salotti (2021)

[7] Throughout this report the understanding of the coal sector is everything that encompasses a broad value chain, applying to all organisations involved in coal mining, exploration, processing, transport, and storage.
[8] More information regarding how the model is structured and elaborated can be found here

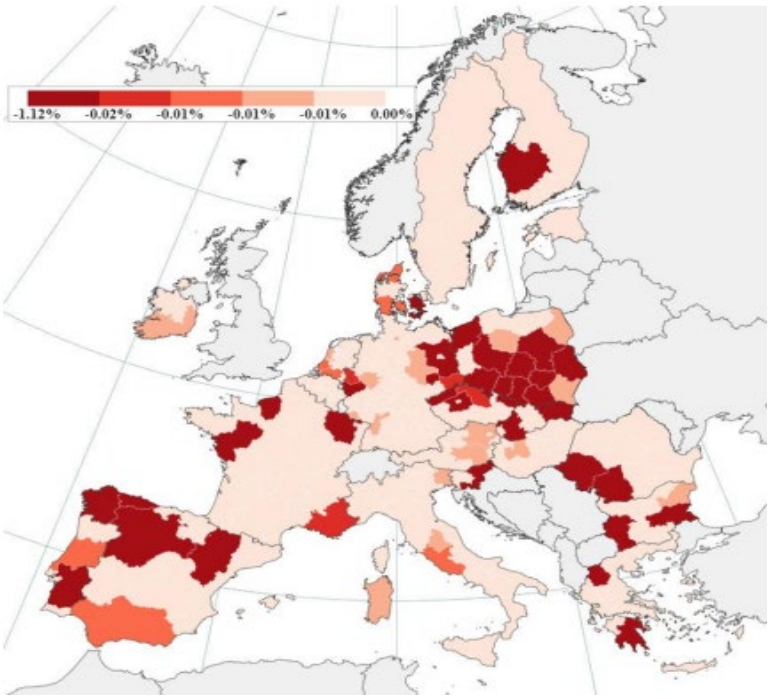
Figure 9: Country shares of EU total direct and indirect jobs related to the coal industry (2021)



Source: own elaboration based on data from Mandras & Salotti (2021)

Finally, the relevance that the coal industry has in these regions is further analysed in the maps provided by Mandras & Salotti (2021). Overall, according to these estimates, regions in Poland are expected to lose between 0.2% and 1.12% of their value added due to the coal phasing out process. Territories in Spain, Czechia, Romania, Slovakia and Slovenia are expected to suffer a similar loss in the coming years according to the model, whereas regions in Italy and Hungary are not expected to suffer significant losses. A heterogenous data distribution is shown in Greece (with Dytiki Macedonia expected to encounter higher losses than Pelopponisos), Bulgaria (Yugoiztochen expected to suffer bigger losses than Yugozapaden) and Germany (Brandeburg and Sachsen-Anhalt are the regions that will face the hardest losses in their value added due to decarbonisation). Higher losses are concentrated in those regions relying more on coal as a source of electricity production (Mandras & Salotti 2021).[9]

Figure 10: Regional value added at risk due to decarbonisation (2021)



Source: Mandras & Salotti (2021)

2.3. Identifying common challenges and needs

EU coal regions are, on average, characterised by a **lower GDP per capita** than the EU average (except from some cases like Düsseldorf and Köln in Germany). This poses the need for measures to make economies more dynamic to bring them to average national and EU values.

Common challenges	Challenges specific to some regions
Lower economic development	High unemployment and long-term unemployment
	Lower educational attainment
Higher share of people facing poverty or at risk of social exclusion	High share of the coal industry
	Less dynamic economy and labour market (lower job vacancy rates)

Table 4: Identified shared and region-specific challenges in coal regions

Source: Own elaboration.

Regarding the unemployment rates (general, long-term, female and male) of coal regions, there is not such a clear and discernible pattern (as there is with GDP per capita), with approximately half of the regions presenting unemployment rates above their national averages and the other half below national averages. Two different trends are identified within the territories, with the southern European regions generally being affected by higher rates of general unemployment, following their national

averages. In this sense, the high unemployment rates in these regions probably reflect the national tendency of these countries, which have persistently high unemployment rates. Other coal regions are aligned with average European values. Therefore, unemployment cannot be defined as a common challenge to all regions, but rather as a challenge for some countries (and, consequently, for the coal regions in those countries).

The challenges posed by low economic production and above average unemployment are reflected as well in the percentage of people facing poverty or social exclusion. Southern European coal territories in Bulgaria and Romania see relatively high percentages of people at risk, and in general coal regions face values above their national averages when it comes to people at risk of social exclusion (with the notable exceptions of Spain and Poland). Therefore, addressing the number of people facing poverty or at risk of social exclusion can be identified as a common challenge in many coal regions.

Furthermore, the population density in coal regions present values generally in line with EU values, but with the exception of those territories that comprehend important urban areas (especially in Germany, Poland, and Czechia) presenting significantly higher values than the European average. This poses a challenge for the delivery of and access to public services.

Data is heterogeneous for the percentages of people attending only primary or lower secondary education, with southern European territories presenting significantly higher values than other regions. The data on tertiary education is even more heterogenous, with territories exhibiting high values but also those with low percentages. For example, Asturias has above 40% of people in or having attended tertiary education, contrasted to less than 20% in Sardinia and Severozapad. From the analysis it emerged that coal activities have a significant role in some of the economies and labour market of EU coal regions. Specifically, territories in Poland (Śląskie) and Germany (Brandenburg and Sachsen-Anhalt) have the highest number of workers employed directly in the coal sector than the rest of EU.

It is also possible to provide an assessment of the indirect jobs related to coal activities. Regions in Germany, Poland and Greece have the highest numbers of indirect coal-related jobs compared to other European coal regions. Specifically, the mining areas in these countries are characterised by several indirect activities that are related to the coal industries. In fact, the chain of values and jobs that a mine creates in a determined area is quite significant (depending of course on the size of the mining site). It was described in the Secretariat Technical Assistance to Regions in Transition (START) regional fiches[10] how the Silesia and Peloponnese areas are characterised by densely populated areas near the mining sites but with a low overall population density. Moreover, coal activities have the relative power of inducing other related sectors to enhance and create other job opportunities in the areas (such as restaurants, hotels, education facilities, etc.) (Mandras & Salotti, 2021).

It is also possible to discern the potential loss in terms of value added that coal regions would face when decarbonisation occurs. The results of this analysis point out how important the coal sector is for these economies, with expected losses reaching 1.12% generally in all the regions, with the only exceptions of Italy and Hungary. Building on all the information above, Figure 11 below classifies coal regions along three dimensions:

- According to their economic development as defined by the EU Cohesion Policy (less developed, in transition, and more developed regions),
- With regards to how they stand relative to their national averages (in terms of GDP per capita) and

[10] Secretariat Technical Assistance to Regions in Transition (START) (europa.eu)

- Respective to the share the coal industry has in their economy

There is a significant variety in the different socioeconomic characteristics of the coal regions. As such, no one-size fits all classification for them all. Thus, although there are some common challenges and patterns shared across some of the coal regions, any measure or policy aimed at helping the transition must be done at the regional level based on regional specificities.

Table 5: Profiling of the coal regions

		SHARE OF THE COAL INDUSTRY IN THE ECONOMY	
Reference to national average	**Region classification**	**High share of the coal industry**	**Low share of the coal industry**
Below national average socio-economic position	**Less developed region**	**Yugoiztochen Severozapad Sud-Vest Oltenia Lódzkie**	**Moravskoslezsko Észak-Magyarország**
	Transition region	**Dytiki Macedonia Brandenburg Dresden Sachsen-Anhalt**	Peloponnese Sardinia
	More developed region	Münster Leipzig	Asturias Castilla y León
Above national average socio-economic position	**Less developed region**	Malopolskie Lubelskie Vest Śląskie Dolnoslaskie Wielkopolskie	Yugozapaden Vzhodna Slovenija Západné Slovensko
	More developed region	Düsseldorf Köln	Aragón

Source: own elaboration based on data from Eurostat and Mandras & Salotti (2021)

2.3.1. Initial thoughts for the way forward

This section concludes that based on the territorial and socio-economic analysis carried out for all EU coal regions that, even though decarbonisation is widely recognised as the way forward in terms of sustainable development, there are potential negative impacts of the ongoing shrinkage of the coal sector on employment and the economy in regions hosting mining activities and coal-fired power plants. This is particularly relevant given that some of these regions are already facing lower economic performances and higher unemployment rates compared to their national and EU averages.

Regardless of the origin of the support provided, if the transition to a low-carbon economy is not handled in a socially inclusive, equitable and ultimately just manner, taking the needs and concerns of working citizens into account, there is potential for the worsening of social inequality and income disparity. Each country or region undergoing a transition will have its own unique requirements, but there are some common key elements in supporting the just transition. These are reflected in the International Labour Organisation's 'Guidelines for a Just Transition' (2015), which highlight the need to secure the livelihoods of those who might be displaced or otherwise negatively affected by the transition from high-carbon to low-carbon economies.

Developing appropriate employment and skills strategies will necessitate multi-stakeholder involvement at different levels of governance to engender consensus and a common vision ahead. The role of EU Cohesion Policy in ensuring that transitions are handled in a just and inclusive manner is therefore key, and this role and contribution will be further analysed in the following sections of the study. Specifically, the following section provides a closer and more in-depth analysis of the characteristics and policies of a selection of six case study regions, before examining how Cohesion Policy has contributed towards their coal-transition.

3. SELECTION AND ANALYSIS OF SIX CASE STUDY REGIONS

KEY FINDINGS

- The coal related statistics demonstrate how data on coal mining and related employment can be used to elucidate key differences between coal regions in relation to their industry specificities and political commitment to coal phase out (reinforcing the findings of Section 2).
- The case study regions share many transition challenges and opportunities relating to environmental, social and economic concerns, while also diverging on certain aspects due to their own geographical, historical and industry differences.
- Divergences between the regions seem to be reflected in the priorities of their just transition policies, with key considerations to be drawn from them as to the future priorities of policies and funding.
- Geopolitical ramifications of the Russian war in Ukraine on energy prices may risk exacerbating further energy security uncertainties in transition regions, and should be duly considered to prevent detrimental consequences for the energy transition in the longer term.
- The COVID-19 pandemic has caused significant negative changes on the economic and social dynamics of coal regions. While some indicators, such as regional GDP per capita, show common negative trends in all coal regions, performance on other indicators heavily differ between regions. Nevertheless, given the intrinsic multifactorial nature of economic and social indicators, it is hard to determine the degree of causality of COVID-19 through a cross-regional analysis.

The six case studies selected provide a diverse and detailed overview of the different policies that have been put in place across Europe to facilitate a just transition. In examining the different socioeconomic, environmental and climate policies, wider conclusions can be made as to the ways in which local and regional authorities can compensate for the closure of coal infrastructure and the loss of jobs this entails.

A robust case study fiche template was developed by the research team to ensure the consideration of all relevant policies, from economic diversification and investments to employment, research and innovation, environmental rehabilitation, and clean energy.

3.1. Coal related statistics

Through examining and comparing the statistics relating to coal in each of the six case study regions, it is possible to elucidate key disparities between them. Although they all have exhibited a historic dependence on coal, they each have their own unique specificities in terms of histories, geographies, and political commitments to phasing out coal and embracing a just transition.

These disparities can be seen reflected in the information and data shown in Table 5. Firstly, the type of coal and mining conducted in the region will entail different considerations in terms of operations,

infrastructure, and phase out. Four out of the six regions mine lignite, which is mostly extracted from open-air pit mines that entails land destruction. Lignite also has a high climate change potential and is used in power plants producing electricity with relatively low efficiency. Meanwhile underground closed mining, which extracts hard coal through wells, incurs myriad environmental impacts, including land subsidence, water loss, soil erosion, air pollution and biodiversity loss. The differences associated with the different methods and types of coal mining means that the transition considerations amongst the regions will differ when it comes to environmental degradation, infrastructure and the skills and specialisations of the workforce.

The generally high numbers associated with the Śląskie region in Poland is logical when considering that the Member State has yet to commit to the phasing out of coal at a national level, while the similarly elevated figures of Yugoitztochen and Severozápad reflect the relatively late commitments to phasing out coal in Bulgaria (2038), and Czechia (2033) respectively. In contrast, Member States whose governments have either committed to phasing out coal, or at least have indicated to do so soon, demonstrate lower numbers in coal related statistics: Greece has set a 2028 commitment, Spain 2030, while Germany has proposed to bring forward its 2038 commitment to 2030 as well.

Table 6: Coal related statistics of the six case study regions

Region (MS)	Type of coal mined	Number of coal power plants	Number of coal mines	Installed capacity (MW)	Share of coal in the regional power generation mix (%)	Production of coal (Mt annual)	Direct employment in coal power plants	Direct employment in coal mining	Indirect employment (other coal related activities)
Principado de Asturias (ES)	Hard	2	3	2073	56.3	0.2	688	800	1950
Śląskie (PL)	Hard	4	17	6344	85	59	2911	73,00	22,106
Düsseldorf (DE)	Lignite	1	1	3622	-	29	1400	-	-
Severozápad (CZ)	Lignite	4	5	2930	40	29,433	3600	8000	10,000
Dytiki Makedonia (GR)	Lignite	3	2	2585	92	10.3	1329	2285	1365
Yugoitztochen (BU)	Lignite	4	3	3272	37.18	32.60	1885	10,773	2459

Source: Own elaboration based on case study fiches.

3.2. Key Transition Challenges and Opportunities of the six case study regions

Building on and furthering the analysis carried out in Section 2, in assessing the key challenges and opportunities of the transition away from coal in the six case study regions, the discussion can be framed in relation to two critical, interlinked considerations: whether transition processes are likely to exacerbate or alleviate existing characteristics of the region, and whether existing characteristics are expected to facilitate or inhibit the transition process.

Applying these considerations to the six case study regions entails the examination of their respective assets and liabilities that each region will be able to leverage or need to address to promote or facilitate the transition. This elucidates mechanisms that can be used to valorise the regional assets, which may include inward investment, technological adoption and transfer, enterprise development, and skills and employment measures. Such mechanisms themselves will be influenced by the existing specificities of the region, like the level of development, economic structure and diversification, available natural resources, and geographical location. Through the contrasting of commonalities and differences between six case study regions with these considerations and mechanisms in mind, it is possible to develop relevant policies and measures that will have valuable applications in other coal regions of the EU.

To aid in their consideration, the challenges and opportunities of the transition can be broadly related to social, environmental and economic concerns, with strong interlinkages between them, alongside slight divergences owing to regional specificities (see Annex I).

3.2.1. Social challenges and opportunities

Regarding the social aspects, all regions exhibit a historical dependence on coal with their economies strongly intertwined with industries both directly and indirectly reliant on coal extraction and burning. It is therefore logical that the loss of direct and indirect employment is a major common challenge in these regions, amongst coal workers and workers of energy-intensive industries. Mitigating the impacts of loss of employment is integral to ensure that the transition does not entail raising rates of unemployment and the negative social impacts this incurs. Herein also lies the opportunity posed by the transition to provide reskilling and upskilling to former coal workers to promote sustainable and high-quality employment.

Workforces of some regions have been identified as highly skilled, with a great degree of specialisation, while several regions have also invested in education and research infrastructure. These assets can be utilised to provide appropriate education and training and assure the maintenance of employment rates. In contrast, some regions show low workforce participation and a lack of qualifications or narrow skill sets. Investments in education that have proved successful in other regions would help to limit the transition exacerbating this challenge.

Other demographic considerations also pose challenges amongst the regions, including shifts arising from low birth rates, aging populations, accelerated retirements and emigration, resulting in negative effects on the regions' workforce composition. Support targeting education, networks, infrastructure, and projects is needed to help address these concerns through the promotion of quality work and labour mobility.

3.2.2. Environmental challenges and opportunities

Environmental concerns are a common trait across the regions, resulting from the myriad negative impacts that coal mining and power generation has on the climate, environment, and health. The specific impacts differ between hard and lignite coal, but generally coal mining negatively affects the environment through the destruction of the landscape, and the pollution of air, water and soil with chemicals and dust. Furthermore, coal combustion emits GHGs and produces toxic waste, with negative consequences for both the climate and the health of local people.

Addressing these concerns represents both a vital challenge and an opportunity of the transition away from coal. The extent of environmental degradation will vary according to the types of coal activities conducted in the region. For example, the regions of Severozápad and Śląskie are shown to have especially poor environmental records, owing to not only their historic ties with coal mining and burning but other industrial activities as well, with Śląskie exhibiting the highest rate of environmental degradation in Poland.

Former mining sites represent prime opportunities for their restoration and repurposing to boost local economies, which could include not only ecological restoration, but also their use for sustainable agriculture, the production and/or storage of renewable energy, and cultural and tourism activities. Such actions would also provide the opportunity to better equip the regions with climate change adaptation and mitigation measures.

Challenges do arise in restoration activities, including the question as to the liability for their costs. The polluter pays principle would place the bill covering the cost of environmental damage with the mining companies, but the exact responsibilities these companies will shoulder for restoration activities will be dependent on certain obligations.

An integral aspect of the restoration and repurposing of mining sites will be to ensure that it is conducted in a manner that will maximise their potential to contribute to a just transition. This will entail the consideration of the individual regions' specificities to assess potential options from a wider development perspective and choosing those that are most viable and will best serve the transition process.

3.2.3. Economic challenges and opportunities

The economic considerations of the regions diverge and converge at several points. Firstly, regarding the energy transition itself and the economic base of the regions, several show an unsurprising economic dependence on coal and a consequential low economic diversification and competitiveness. The regions also differ in their prevalence of SMEs, with some exhibiting SME dominance and other more reliant on larger companies. The phasing out of the coal industry in these regions will therefore obviously have myriad impacts upon the longstanding bases of the regional economies, with significant perturbations (e.g., Asturias will shift from a regional exporter of energy to a regional importer). Such economic shifts incur a pressing need to redefine production models and economic activities.

The potential to repurpose industry infrastructure for various functions is one way in which regions can mitigate the negative effects of the transition and efficiently leverage their existing assets to aid in the process. Repurposing for the production and storage renewable energy, for example through photovoltaic (PV) plots, is one such measure that would bring economic benefits and diversification, as well as helping to meet wider sustainability goals. Meeting goals on energy efficiency is also a potential opportunity, for example via the repurposing of sites for industrial waste heat recovery. Repurposing efforts that develop tourism and cultural projects can be respectful to and utilise a region's historical and cultural association with coal mining and related activities, as a means to redirect a community's pride in their heritage to engage the local populace and build their acceptance, ownership and participation in the transition process.

Regions can use to their advantage other existing assets to facilitate the transition, such as if they are in locations that offer prime geographical vantage points for exports and/or logistical diversification, as is the case for Asturias and Dytiki Makedonia. Similarly, well-developed research infrastructure like that of Asturias, will provide an excellent basis for further development of relevant technologies to drive meaningful change.

The geopolitical ramifications of the Russian war in Ukraine on energy prices will be of concern for regions in transition, risking exacerbating further uncertainties pertaining to energy security at a time of profound change in their economic and social structures. It will be vital to consider this novel dimension of the transition to ensure that immediate effects of the war do not incur detrimental consequences for the energy transition of these regions in the longer term.

3.3. Just Transition Policies

In examining the transition policies, their priorities and how they deploy funds across the regions, common trends and differences can be identified (see Annex II). Several Member States opted for broader approaches, addressing different aspects of the transition through different policies and strategies implemented at the national level. Meanwhile, other countries integrate funds into joint programmes encompassing multiple considerations, as is the case for Germany, Greece and Spain. Alternative funds are sometimes used instead, for example the Miners Funds in Spain, or the Structural Strengthening Act in Germany. The case study fiches also provide the basis for a cross-comparison of the just transition policies in place, and a table has been created to aid the consolidation and cross-comparison between the six case study regions (Annex V).

Generally, the six case studies suggest a more common top down and centralised policy approach to the just transition rather than one from a bottom up and regionalised approach. Countries manage the transition via national level plans and strategies, as is the case for Czechia's RE:START Strategy being the main basis for the transition of its coal regions, and the national Miners Funds in Spain used rather than the ERDF and JTF to target the social, renovation and training aspects on the region. Regional engagement is still important, with various regional strategies, agencies or other entities facilitating the transition. For example, several regional level committees and working groups in Asturias act to guide regional strategies and goals in alignment with wider energy transition goals, while in Düsseldorf, the agency Zukunftsagentur Rheinisches Revier (ZRR) acts to facilitate a stakeholder process in the transition with relevant strategies. In comparison, in Greece where the transition is managed at the national level, the regional involvement is more limited to a supporting sub-prefect and studies measuring the regional impact.

The relevant priorities of the various just transition policies also allow for the elucidation of commonalities and differences, as well as the evolution of these between the funding periods. Across all regions, common priorities often focused on supporting businesses and SMEs through investments, the development of research and innovation, developing renewable energy and/or energy efficiency, as well as substantial focus on education, reskilling and upskilling programmes, and strengthening social mobility. In regions of countries that are less engaged or committed to the coal phase out process, namely Bulgaria and Poland, their priorities are less focused on decarbonisation specifically. This reflects the distinction between the countries and regions that already had a focus on a just transition rather than those which were stimulated into the process (at least partly) due to policies and funding at the EU level.

For the regions that the Territorial Just Transition Plans are available, the planned funding periods are from 2021 to 2027/2029. These funding periods will cover the current transition phase the regions are undergoing, at which point for most the initial transition periods will be developing into the next phase

characterised by the scaling-up and acceleration of investments into the transition to other forms of energy, economic diversification, environmental restoration, infrastructure, and assets.

3.4. Analysis of impact of COVID-19 on health, social, economic and sectoral matters

Coal mining and its related activities require the physical presence of workers, therefore the COVID-19 pandemic unavoidably resulted in the temporary ceasing of coal operations in Europe. The activities of some plants have still not resumed, thus aggravating an already unstable economic situation in some coal regions. This section will analyse relevant data on how the pandemic has affected the economic sectors and other relevant macroeconomic indicators, as well as the social welfare of the regional populations.

The following areas are considered: healthcare, macroeconomics, sectoral and social. The data and information used are those most recently available from official public institutions, although limitations in data availability limits the possibility to thoroughly analyse the regions across all the regions.

3.4.1. Healthcare

While the suddenness of the pandemic catching healthcare facilities and personnel unprepared was common across the EU, the incidence of COVID-19 was not uniform across coal regions. For instance, while the region of Dytiki Macedonia recorded 11 deaths per 100 thousand inhabitants (compared to the less than 2 deaths on average in Greece[11]), other regions such as Asturias had a significant lower cumulative incidence of cases (173.68 cases per 100 thousand inhabitants[12]) compared to other similar Spanish regions in terms of demographics (such as Castilla y León, which records 249.34[13] cases per 100 thousand inhabitants).

The pandemic evolved differently across the regions, with substantial changes to the availability of healthcare personnel and equipment. Available hospital beds and doctors (both per 100 thousand inhabitants) are suitable indicators, as these factors became increasingly important as the pandemic progressed.

Based on latest available data, it seems that certain regions may have handled the impacts of the pandemic more effectively with a higher availability of hospital beds, thus being able to stabilise higher numbers of patients. While most regions had in the range of 600 available beds, Dytiki Macedonia and Asturias in 2020 had close to 300 available beds. This might help to explain the significantly higher death rate in Dytiki Macedonia compared to the national average (Greece averages 418 available beds per 100,000 inhabitants). In the case of Asturias, the low availability of hospital beds was aggravated by its population being one of the most aged in Spain. It is also worth highlighting that, even if other regions had a similar bed availability, regions like Śląskie recorded an exponential decrease of availability.

Concerning the number of doctors, most regions show an increase in 2020, as the urgency of the situation required the reinforcement of health personnel to manage rising hospitalisations. The only exception found in this trend is Dytiki Macedonia, recording a considerable decrease in the number of doctors available during 2020.

[11] https://orca.cardiff.ac.uk/id/eprint/139124/1/Second_Newsletter_Covid_Employment.pdf
[12] https://cnecovid.isciii.es/covid19/
[13] https://analisis.datosabiertos.jcyl.es/pages/coronavirus/

3.4.2. Macroeconomics

The COVID-19 pandemic entailed widespread economic consequences. The sudden halting of the economy and productive sectors resulted in a significant decrease in trade flow between nations, with a consequent moderate loss of GDP across the coal regions. Additionally, lockdowns meant a reduction in the workforce. Analysing the development of the unemployment rate, long-term unemployment rate, regional GDP, and regional GDP per capita allows for the identification of how the pandemic impacted the economies of coal regions.

a. Unemployment rate

Unemployment rate covers all unemployed individuals between 15 and 74 years of age. The main conclusions that can be elucidated from the analysis of unemployment rate across the coal regions is that it generally increased in 2020 and 2021. The only exception amongst the case study regions is that of Dytiki Macedonia, which recorded a 4.8% decrease in 2020, which then remained stable in 2021. Even so, Dytiki Macedonia and Asturias are the regions that exhibit the highest unemployment rate out of the six case studies. The other regions experienced a slight increase between 0.3% and 1.3% in 2020. The subsequent effects of COVID-19 in the unemployment rate varied across regions in 2021, as some performed better, and others did worse. Düsseldorf and Asturias recovered considerably from 2020, while Yugoiztochen saw almost a 1% increase from the previous year.

The multifactorial nature of employment means that the exact determination of the pandemic on the changes observed is not entirely possible. Nevertheless, a quarterly analysis might suggest more detailed trends, highlighting a likely higher unemployment rate during the early stages of lockdowns and the pandemic in general. The annual analysis shows that the majority of the regions were capable of managing the situation in a way that the unemployment rate remained close to pre-COVID years or even lower.

b. Long-term unemployment rate

The scope of the long-term unemployment rate analysis focused on individuals that have been unemployed for at least 12 months in the age range of 15 to 74 years within the total active population. Data suggests that long-term unemployment rate did not suffer drastic changes from 2019 to 2020. All regions (except Śląskie, for which data is not available) recorded a lower rate in 2020, which may be due to newly unemployed persons not included in the data given that they were unemployed for less than 12 months. This indicator will have a lag consideration in showing the effects of the pandemic, which can be observed looking at data from 2021. Five out of the six regions (except Düsseldorf) experienced a higher long-term unemployment rate between 0.1% and 0.7%. Programmes and policies will need to consider the long-term potential impact of the pandemic unemployment for more than 12 months.

c. Regional GDP and Regional GDP Per Capita

The evolution of regional GDP and GDP per capita are uniform across all six regions. Although data availability is restricted beyond 2020 due to the existing one-year gap in GDP reporting by national governments, data observed shows a clear downward trend in regional GDP across coal regions. This dynamic is likely to be a result of the different macroeconomic trends that were seen during the COVID-19 pandemic (such as the closing of businesses and industries due to lockdown, the cease of trade flows between countries due to health restrictions and protectionist measures) that have accelerated an economic downturn in these regions. Furthermore, the economic dependence that some of the selected regions have on certain productive sectors (such as industry) have likely worsened the situation.

3.4.3. Sectoral analysis

a. Employed persons by economic sector

The sectoral trends across regions between 2018 and 2021 are quite diverse. There is no clear trend of one sector increasing or decreasing across all regions. In the Śląskie region, for instance, employment has been stable across all sectors in the period of observation, suggesting limited significant impact of COVID-19. The services sector has decreased in three regions (Severozápad, Düsseldorf and Yugoiztochen), while it remained at similar levels in Asturias and Śląskie comparing 2018 to 2021. The agricultural sector has decreased in three regions (Asturias, Dytiki Macedonia and Severozápad), while it only increased in the Düsseldorf region in the period of observation. The construction sector has been stable in most regions while it increased in 2020 in Dytiki Macedonia and decreased in Düsseldorf in 2020 and 2021. The industry sector decreased in Dytiki Macedonia and Yugoiztochen while it increased in Düsseldorf, Severozápad and Asturias.

b. Gross Domestic Product weight by economic sector

The GDP weight by sector is only available for three regions. In Asturias the services sector was the most affected by the COVID-19 pandemic evident in the decrease in 2020. While the agricultural and construction sector have been stable or even slightly increased (agriculture), the industry sector was also negatively impacted. In Yugoiztochen and Düsseldorf the industry sector had the largest impact by the COVID-19 pandemic followed by the services industry. The construction sector in Düsseldorf is the only sector in which the GDP weight increased.

c. New and dissolved companies

Data on new and dissolved companies only exists for the Asturias and Śląskie regions. In both regions, more companies have been newly registered than dissolved between 2018 and 2021. The number of new and dissolved companies is lower in 2020 than in 2019 in both regions. In Śląskie, the number of new and dissolved companies exceeds the level of 2019 while in the Asturias region 2021 levels are higher than the 2020 and lower than the 2019 levels.

3.4.4. Social

a. Unemployed persons by educational level

The effects of the COVID-19 pandemic on the unemployment rate varies across regions and educational level between 2018 and 2021. The unemployment rate rose for people with upper secondary and post-secondary non-tertiary education in all regions except Dytiki Macedonia where it decreased. The unemployment of people with less than primary and lower secondary education increased in Düsseldorf and Severozápad while it decreased in Dytiki Macedonia, Yugoiztochen and Asturias. The most variation can be found for people with tertiary education. In Düsseldorf and Asturias unemployment increased, in Severozápad and Dytiki Macedonia it decreased while the unemployment rate was stable in Śląskie and Yugoiztochem.

b. At-risk-of-poverty rate

In Asturias and Yugoiztochen the at-risk-of poverty rate increased slightly in 2020 and decreased below 2019 levels in 2021. The rate increased to a lesser extent in Yugoiztochem than on the country-level of Bulgaria. In Śląskie and Severozapád the at-risk-of-poverty decreased in 2020 compared to 2019. In Slaske the rate increased slightly over 2019 levels in 2021 while in Severozapád it kept decreasing. In Dytiki Macedonia, in contrast to the country-level, the at-risk-of-poverty rate stayed stable in 2020 and increased in 2021.

c. Early school leavers

The picture of early school leavers is diverse across regions and there are no common patterns to be observed. Positively, only in one out of the six regions, Severozapád, the share of early school leavers increased, and it decreased in four of the other regions. In Yugoiztochen the share of early school leavers has decreased in 2020 and 2021 and is at its lowest level in 2021 in the period between 2018 and 2021. In Asturias the share of early leavers reached its lowest levels in 2020 in the period of observation increasing again in 2021. In Dytiki Macedonia the share of early school leavers was stable between 2019 and 2020 at a low level. In Severozapád the share increased in 2020 and decreased below the levels of 2019 in 2021. In Śląskie the share of early school leavers decreased in 2020 and 2021. In Düsseldorf the share decreased slightly in 2020 and increased at its highest level in 2021 within the period of 2018-2021.

4. COHESION POLICY IMPLEMENTATION AT REGIONAL AND LOCAL LEVELS IN THE CONTEXT OF SMARTER, GREENER AND MORE CONNECTED EUROPE

KEY FINDINGS

Even though explicit references to coal phase out and transition are only made in 2021-2027 programmes, transition-relevant investments have already been financed extensively in the previous 2014-2020 policy period, leading to a smarter, greener, and more connected Europe.

- **Within the 2014-2020 Cohesion Policy period**:
  - Dytiki Makedonia and Severozápad implemented the highest number of total projects per inhabitant, while Dytiki Makedonia & Śląskie the largest amounts of total Cohesion Policy funds spent per capita.
  - Düsseldorf and Yugoiztochen had the highest share of potentially transition relevant projects, while Düsseldorf and Severozapad had the highest budget shares spent on potentially transition relevant projects as a share of total budget spent in the coal regions and Śląskie had the lowest.
  - The share of low carbon & climate resilient investments as a share of total projects is highest in Severozápad & lowest in Düsseldorf. The highest share of low-carbon & climate resilient investments as a share of total budget spent in the coal region highest in Yugoiztochen & lowest Dytiki Makedonia.
  - The share of transition relevant SOs under the 22 OPs analysed ranges from 25% to 88%. Transition relevant topics and SOs are diverse across the 22 OPs analysed, yet topics are similar across the overall case regions covered by multiple programmes. ERDF/CF programmes covered aspects of energy, R&I, SMEs, low-carbon infrastructure, as well as landscape revitalisation, and ESF/YEI programmes touched upon the social transition aspects, including employment, entrepreneurship and skills development and training. Environmental rehabilitation and transformation of carbon-intensive installations were only considered in some case study regions.
- **Within the 2021-2027 Cohesion Policy period:**
  - Compared with the previous programming period, the share of transition-relevant SOs under the analysed OPs has increased in all case study regions.
  - Transition policy is now more tailor-made for affected coal regions as dedicated transition focused OPs (Severozápad and Dytiki Makedonia) and multi-fund OPs with transition focused PAs (Düsseldorf, Śląskie and Yugoiztochen) have been approved.
  - OPs of the 2021-2027 period cover all relevant transition topics (including environmental rehabilitation and the transformation of carbon-intensive installations). Approved JTF-funded programmes cover most of these topics, local context dependent. Nevertheless, non-JTF funded programmes remain potentially transition-relevant as their coverage of transition-relevant topics remains in place.
  - The JTF and greater commitment to coal phase out have changed the way Member States drafted their new Cohesion Policy programmes, with an increase in both explicit and implicit planned investments into transition topics.
  - Differences between the regions regarding the extent of investments through Cohesion Policy into transition projects persist, due to differences in beneficiaries' absorption capacities, strategic project available, financial resource availability and differing commitments to coal phase out.

This section analyses the implementation of Cohesion Policy programmes (OPs) in the past funding period (2014-2020) and the current funding period (2021-2027) along the six selected case study regions outlined in Section 3. Section 4.1 and Section 4.2 focus on OPs of the 2014-2020 period and provide answers from a quantitative and qualitative perspective respectively. Section 4.1 provides answers on the number of projects and funds spent (and where available decided and planned) in coal regions through relevant OPs of the 2014-2020 period (see Annex V). Furthermore, an assessment is made on the number of projects and budget spent in the coal regions that are, on the one hand, low-carbon, and climate resilient investments, and on the other hand, transition-relevant investments. Section 4.2 provides a qualitative analysis of the key thematic focus of projects in the coal regions funded through Cohesion Policy and their expected results. A number of project examples are listed per case study region. Finally, a comparison is made across OPs and highlight the share of Priority Axis (PAs) and Specific Objectives (SOs) that could contribute to the transition.

Table 7: Coal related statistics of the six case study regions

Case study region	Programme	Level	Fund
Principado de Asturias (ES)	OP Asturias ERDF 2014-2020	regional	ERDF
	Asturias ESF 2014-2020	regional	ESF
	Multiregional OP for Spain ERDF 2014-2020	multiregional	ERDF
Śląskie (PL)	OP Digital Poland	national	ERDF
	OP Infrastructure and Environment	national	ERDF/CF
	OP Smart growth	national	ERDF
	Regional Operational Programme for Śląskie Voivodeship	regional	ERDF/ESF
	OP Knowledge Education Growth	national	ESF/YEI
Düsseldorf (DE))	OP Nordrhein-Westfalen ERDF 2014-2020	regional	ERDF
	Operational Programme ESF Nordrhein-Westfalen 2014-2020	regional	ESF
Severozápad (CZ)	OP Enterprise and Innovation for Competitiveness	national	ERDF
	OP Environment	national	ERDF/CF
	Integrated Regional Operational Programme	national	ERDF
	OP Research, Development and Education	national	ERDF/ESF
	OP Employment	national	ESF/YEI
Dytiki Makedonia (GR)	OP Transport Infrastructure, Environment and Sustainable Development	national	ERDF/CF
	Regional Operational Programme of West Macedonia	regional	ERDF/ESF
	OP Competitiveness, Entrepreneurship, and Innovation	national	ERDF/ESF
	OP Human Resources Development, Education and Lifelong Learning	national	ESF/YEI
Yugoiztochen (BU)	OP Innovations and Competitiveness	national	ERDF
	OP Regions in Growth	national	ERDF
	OP Human Resources Development	national	ESF/YEI

Source: Own elaboration based on case study fiches.

Under Section 4.3 the focus shifts to the current Cohesion Policy programmes designed for the period 2021-2027 where many are still in the process of being approved by the European Commission. Where programmes have not been approved yet, draft OPs or information gathered through desk research and interviews with MAs were used. Nevertheless, as for the 2014-2020 OPs, a qualitative analysis is made of the planned interventions in the coal region specifically and analyse their expected results. The analysis points to thematic alignments between the 'usual' Cohesion Policy programmes funded through ERDF, ESF+ and CF as well as the newly developed programmes (co-)funded by the JTF based on the approved TJTP. Again expressed in quantitative means, and for approved and draft OPs, it is highlighted the share of PAs and SOs that might contribute to the transition as a share of total PAs and OPs listed in relevant Cohesion Policy programmes for 2021-2027 and compare them with OPs of the same region and OPs of other case study regions.

Table 8: 2021-2027 Cohesion Policy programmes and 2021-2029 TJTPs analysed per case study region

Case study region	Information base	**Programme**	**Level**	**Fund**
Principado de Asturias (ES)	Desk research, interview	TJTP Asturias	subregional	-
	Desk research, interview	Asturias ESF+ 2021-2027 OP	regional	ESF+
	Draft OP	Asturias ERDF 2021-2027 OP	regional	ERDF
Śląskie (PL)	Draft OP	TJTP: The Territorial Just Transition Plan of the Silesian Province 2030	subregional	-
	Draft OP	European Funds for Digital Development	national	ERDF
	Approved OP	European Funds for a Smart Economy Programme	national	ERDF
	Approved OP	European Funds for Infrastructure, Climate, Environment	national	ERDF/CF
	Draft OP	European Funds for Social Development 2021-2027 [working translation].	national	ESF+
	Draft OP	European Funds for Silesia 2021-2027	regional	ERDF/ESF+/JTF
Düsseldorf (DE)	Approved OP	Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027	regional	ERDF/JTF
	Desk research	Multi Funds Programme ESF+/JTF North Rhine-Westphalia 2021-2027	regional	ESF+/JTF
	Approved OP	Territorialer Plan für einen gerechten Übergang - Rheinisches Revier. Plan für einen gerechten Übergang im Rheinischen Revier (3.0)	subregional	JTF
Severozápad (CZ)	Approved OP	TJTP: Plan spravedlive uzemni transformace (PSUT)	subregional	-

	Approved OP	Integrated Regional Operational Programme (IROP) 2021-2027	national	ERDF
	Approved OP	OP Technologies and Application for Competitiveness	national	ERDF
	Approved OP	OP Jan Amos Comenius (Education and Research)	national	ERDF/ESF+
	Approved OP	OP Environment	national	ERDF/CF
	Approved OP	OP Employment+	national	ESF+
	Approved OP	OP Just Transition	subregional	JTF
Dytiki Makedonia (GR)	Approved OP	Regional Operational Programme (ROP) West Macedonia	regional	ERDF/ESF+
	Approved OP	Just Development Transition Operational Programme	regional	ERDF/ESF+/CF /JTF
	Approved OP	Operational Programme Competitiveness	national	ERDF/ESF+
	Approved OP	OP Human Resources and Social Cohesion	national	ESF+
	Approved OP	OP Environment and Climate Change	national	ERDF/CF
	Approved OP	TJTP Western Macedonia	regional	-
Yugoiztochen (BU)	Desk research, interview	TJTP Stara Zagora	subregional	-
	Approved OP	OP Development of the Regions 2021-2027	national	ERDF/JTF
	Approved OP	OP Competitiveness and Innovation in Enterprises	national	ERDF
	Approved OP	Operational programme Human Resources Development 2021-2027	national	ESF+

Source: Own elaboration based on case study fiches.

In Section 4.4 conclusions are based on the comparison between the regions. These include conclusions on how Cohesion Policy – even though there were no explicit transition focus and dedicated funding instrument – could have set the basis for long-term transition in the 2014-2020 period. It then focusses on how the role of transition and coal phase out became more explicit in 2021-2027 OPs – in those covered by the JTF and those covered by regular instruments ERDF, ESF+ and CF. Main commonalities and differences between the case study regions are highlighted regarding their implementation priorities and conclusions are drawn on Cohesion Policy in coal regions in general.

Throughout the section and in the assessment as a whole (quantitative and qualitative), the European Parliament's definition is followed and with the understanding of transition policy (and interventions

within OPs) as '*policies that have been put in place to facilitate employment opportunities in new sectors and avoid economic disintegration. This means, for instance backing productive investments in small and medium-sized enterprises, the creation of new firms, research and innovation, environmental rehabilitation, clean energy, up- and reskilling of workers, job-search assistance and active inclusion of jobseekers programmes, as well as the transformation of existing carbon-intensive installations when these investments lead to substantial emission cuts and job protection*' (European Parliament, Terms of Reference Annex II, p.2). This logic has been applied to the quantitative analysis of Cohesion Policy programmes 2014-2020 (in the definition of transition-relevant intervention codes, see Section 4.1.3) as well as the analysis of implementation in the case studies (in the selection of transition-relevant PAs and SOs, see Section 4.2). However, since transition was not yet considered an explicit objective under 2014-2020 Cohesion Policy, '*tailor-made policies'* cannot be discussed as described in the ToR but rather generally about transition-relevant policies in the context of a smarter, greener, more connected, and more social Europe. Tailor-made OPs or PAs/SOs can only be found under 2021-2027 Cohesion Policy.

4.1. Overview of Cohesion Policy programmes 2014-2020 within six coal regions in regard to low-carbon and climate resilient investments and transition-relevant investments

This section of the report focusses on the Cohesion Policy programmes 2014-2020 across the six selected coal regions in relation to low-carbon and climate resilient investments and transition-relevant investments. The analysis includes quantitative information regarding the number of projects supported in each coal region and the total funds spent (decided/planned) per coal region and investment category (intervention field).

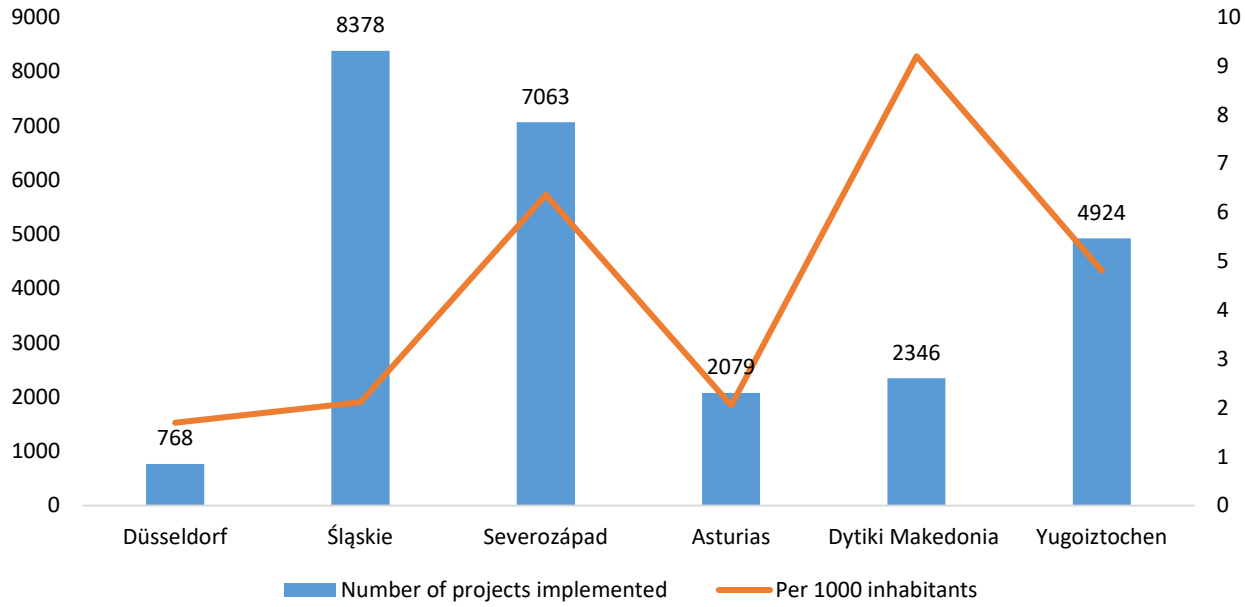
The data originates from the latest Annual Implementation Reports (AIRs) of each of the OPs assessed, in most cases the 2021 or 2020 version. It can therefore be assumed, that the number of projects and spending have meanwhile increased in all the coal regions. For four OPs[14], AIRs did not include data at regional level. In those cases, exports from the national/regional project databases have been used as a basis of assessment. Therefore, these contain more up to date information on projects implemented and budget spent (as of 2022). A detailed list of OPs and their corresponding AIRs can be found in Annex III. This provides a more granular and detailed understanding of interventions in coal regions than what would be possible with the cohesion data platform[15], as data is in this case available at NUTS3 or NUTS2 level and with intervention codes, in opposition to funds spent at programme level across thematic objectives.

4.1.1. Number of projects supported in coal regions through Cohesion Policy programmes 2014-2020

As can be seen on Figure 12, the number of supported projects varies across the case study regions and ranges from over 8,000 in Śląskie and over 7,000 in Severozápad to less than 800 in Düsseldorf. However, this is due to the considerably varying sizes of the coal regions assessed in the analysis of AIRs, see Section 3.1.

[14] From case study Yugoiztochen: OP Innovations and Competitiveness; OP Regions in Growth and OP Human Resources Development. From case study Düsseldorf: OP ESF Nordrhein-Westfalen 2014-2020.
[15] https://cohesiondata.ec.europa.eu/EU-Level/ESIF-Categorisation-Intervention-Fields-with-filte/8m22-gy44

Figure 11: Number of projects supported in coal regions through Cohesion Policy Programmes 2014-2020



Source: Own elaboration based on case study fiches.

An assessment relativised by the number of inhabitants per coal region provides more reliable results. Per 1000 inhabitants the number of projects implemented slightly shifts from 9.2 projects in Dytiki Makedonia and 6.4 in Severozápad to 1.7 in Düsseldorf. Overall, the German and Spanish coal regions have the lower number of projects supported by the Cohesion Policy programmes assessed. This is not illogical as the two are 'more developed' and 'transition' regions as opposed to the other four that are considered 'less developed regions' and have therefore received more structural and investment funds than the regions Düsseldorf and Asturias. What should also be considered is that, for some regions, data on projects implemented dates back to 2020 (Düsseldorf ERDF) whereas data for Śląskie, Severozápad and Dytiki Makedonia are one year ahead (2021 AIRs) and the others are two years ahead (2022 project database for Düsseldorf ESF and Yugoiztochen).

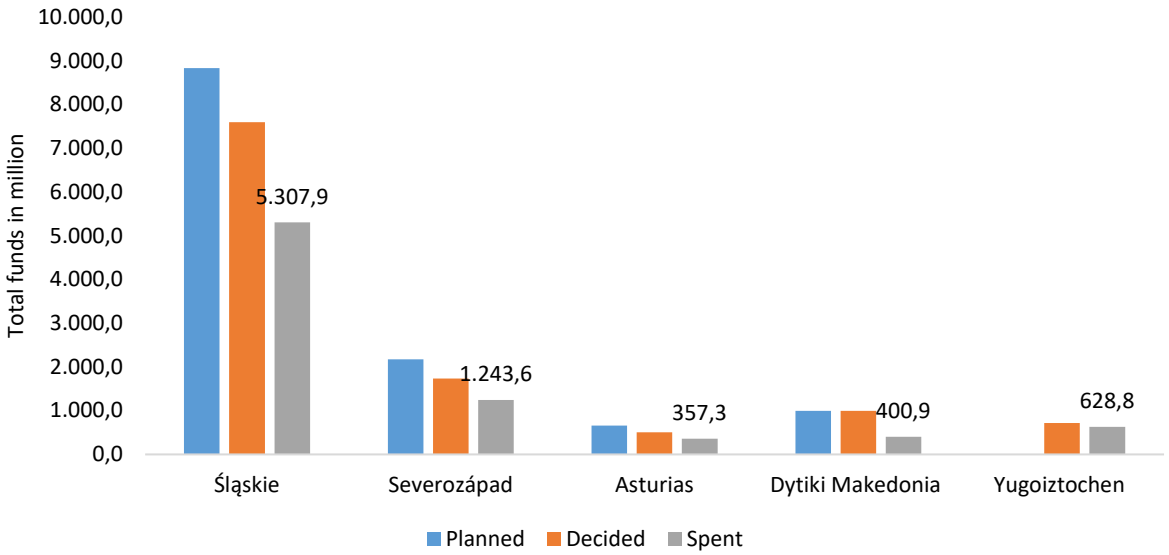
4.1.2. An overview of Cohesion Policy 2014-2020 funds in coal regions (amounts planned, decided and spent)

A similar analysis is conducted of ERDF/ESF/CF funds spent in the coal regions through the respective OPs – as well as the amounts planned[16] and decided where available[17]. As with the number of projects, the region of Śląskie leads the list of coal regions as the region is larger than the rest (as in number of inhabitants) and has more updated data (including 2021). Funds spent in the coal regions of Severozápad are the second highest with EUR 1.2 billion spent whereas funds range between EUR 630 million in Yugoiztochen and EUR 360 million in Asturias.

[16] Amounts decided are not available for the case study Yugoiztochen as data from the project database on the respective OP only included amounts spent and decided.

[17] The Düsseldorf coal region (limited to Rhein-Kreis Neuss) has been removed from the graph due to the fact that the budget spent in the region is only €10.9 million and hence, cannot be appreciated in the graph. According to the 2020 AIR, ERDF funds spent in Rhein-Kreis Neuss amount to €4.7 million (€10.7 million planned; €8.1 million decided) while ESF funds spent account for €6.2M (according to NRW project database, 2022). In total around €24 of ERDF/ESF funds were spent per inhabitant in the coal region.

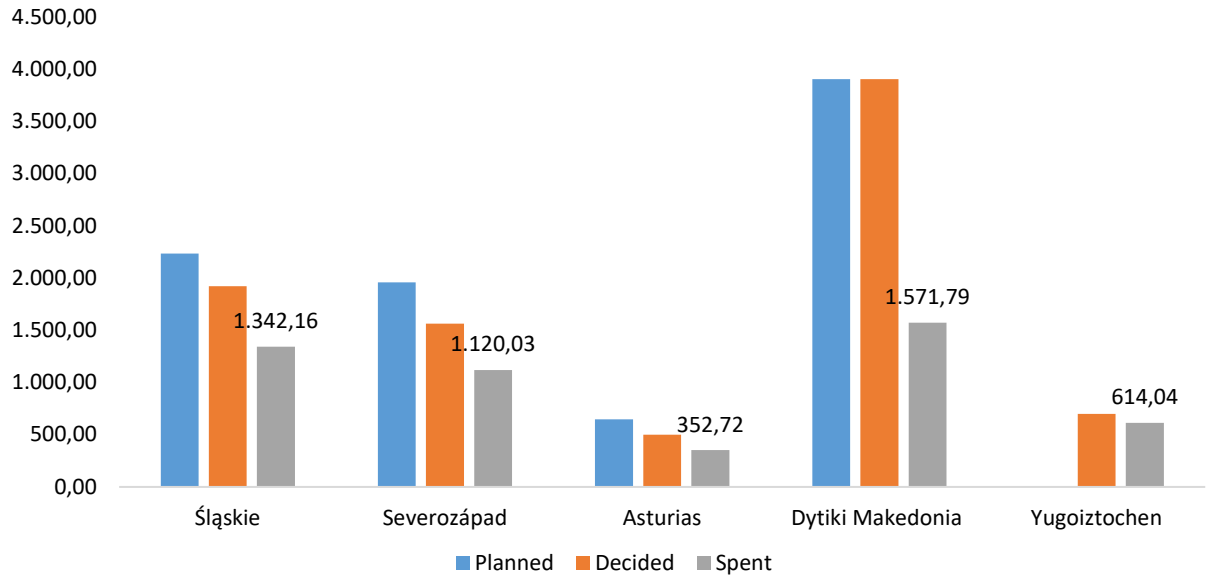
Figure 12: Total funds spent (decided and planned) in coal regions through Cohesion Policy programmes 2014-2020 (in EUR million)



Source: Own elaboration based on case study fiches.

Again, relativised by the number of inhabitants of the coal region, the ranking changes and Dytiki Makedonia (with EUR 1,571 spent per capita) surpasses Śląskie (with EUR 1,342 spent per capita).

Figure 13: Total funds spent (decided and planned) in coal regions through Cohesion Policy programmes 2014-2020 per inhabitant



Source: Own elaboration based on case study fiches.

Finally, all the regions have a similar distribution between planned, decided and spent funds – amounts spent is nearing the amount planned as regions find themselves at the end of the programming period – except in the case of Dytiki Makedonia which has a lower proportion of total funds spent in comparison to the other regions.

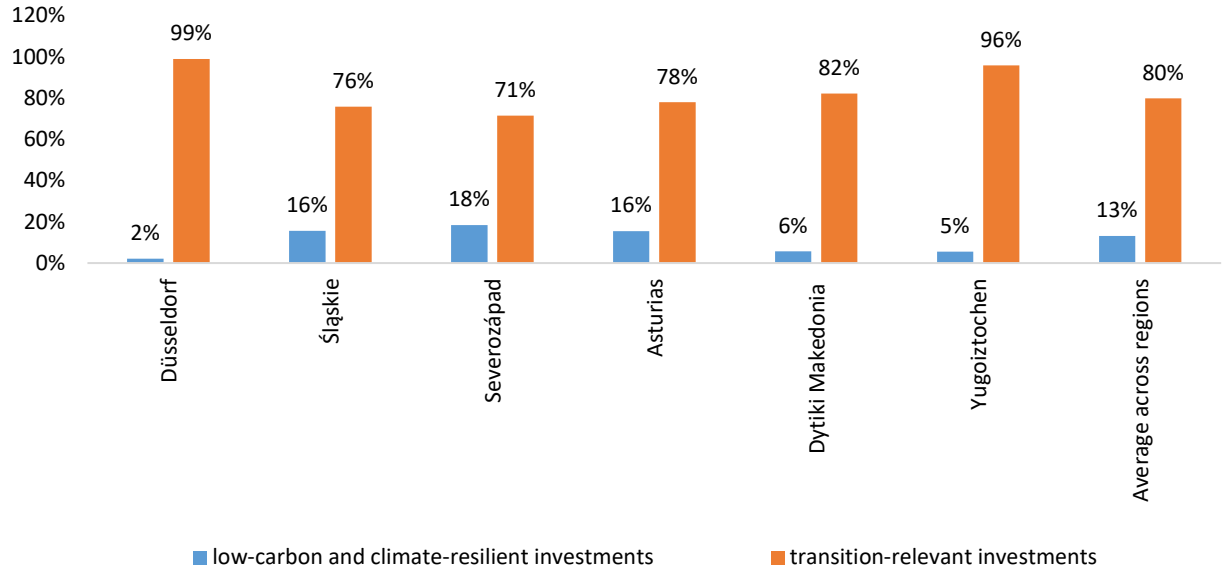
4.1.3. Description by intervention fields

The following section sheds light on the types of interventions supported in the coal regions again by the number of projects supported and by the funds spent in the regions.

a. Projects supported by intervention category

The vast majority of projects financed by Cohesion Policy programmes during 2014-2020 in coal regions can be considered transition-relevant investments (80%), while those related to low-carbon and climate resilient investments are fewer (13%)[18]. This applies to all coal regions analysed. Nonetheless, it should be highlighted that the regions of Düsseldorf and Yugoiztochen have the highest proportion of projects related to transition-relevant investments (over 96%), while Severozápad and Śląskie have the highest proportion of supported projects related to low-carbon and climate resilient investments (over 16%).

Figure 14: Proportion of projects supported out of the total number of projects, by intervention category and coal region



Source: Own elaboration based on case study fiches.

b. Budget spent by intervention category

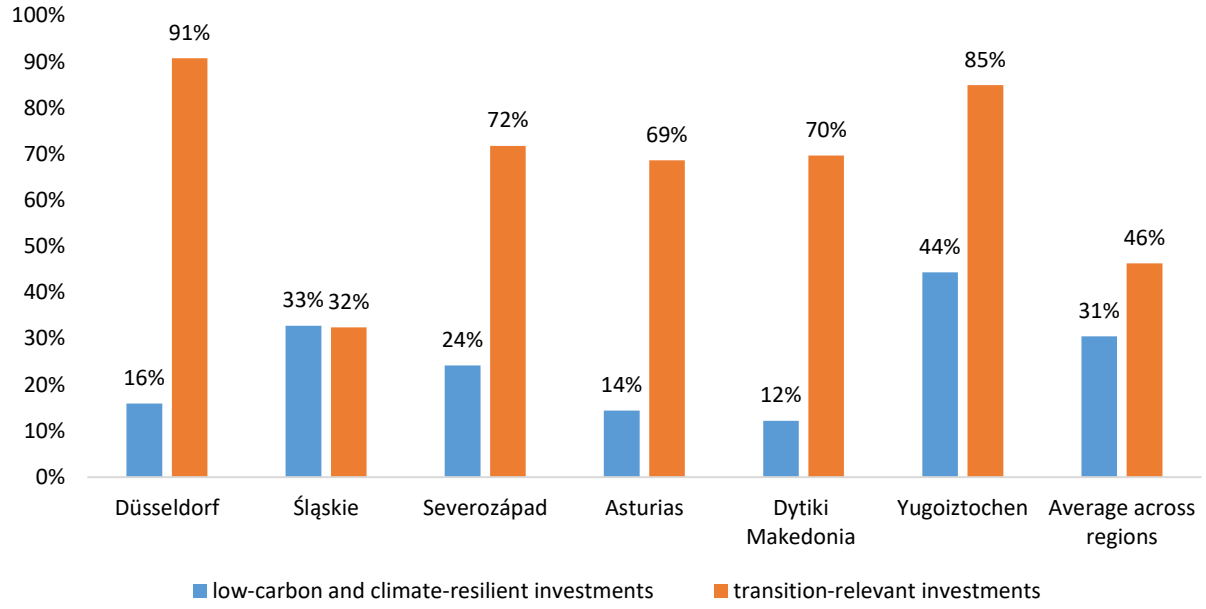
Similar to the number of projects, total funds spent for transition-relevant investments are higher than those devoted to low-carbon and climate resilient investments as the category of transition-relevant investments is much broader and often includes low-carbon and climate resilient investments. However, the difference is smaller (46% vs. 31%) which means that low-carbon and climate resilient investments likely came with higher project budgets (e.g., for energy infrastructure, carbon free transport and climate change mitigation/adaptation measures) whereas transition-relevant investments also included more small-scale investments (e.g., support to SMEs, educational and social integration type of investments). The only region that does not follow this trend is Śląskie where a similar proportion of Cohesion Policy funds was spent across the two different intervention categories.

As with the number of projects, Düsseldorf and Yugoiztochen lead the list with budget spent on transition-relevant projects. The regions Principado de Asturias, Dytiki Makedonia and Severozápad all

[18] Also, because the number of intervention fields considered low-carbon and climate resilient are much fewer than transition relevant ones (35 vs. 70 intervention fields), see Annex II.

invested around 70% of their funds into transition-relevant projects. Nonetheless, the difference between the two intervention categories is lower compared to the number of projects.

Figure 15: Proportion of funds spent out of total funds spent in each region, by intervention category



Source: Own elaboration based on case study fiches.

4.2. Analysis of implementation of 2014-2020 Cohesion Policy in six coal regions

The following section of the report focusses on the implementation of 2014-2020 Cohesion Policy programmes (OPs) in the six case study regions. A more in-depth overview is provided of the programmes under analysis and an assessment of potentially transition-relevant PAs/SOs as compared to the total number of PAs/SOs per programme. In the 2014-2020 period, transition was not yet an explicit focus within Cohesion Policy. Official commitments to phasing out coal were mostly made between 2016 and 2022[19] which sparked the development of national/regional transition strategies and dedicated policy. At the EU-level, only the establishment of the JTF (and Just Transition Mechanism (JTM)) instigated the explicit focus of Cohesion Policy programmes on transition (see section 4.3). Nevertheless, the section delineates potentially transition-relevant priorities already in the previous period.

Across the spectrum of case studies, potentially relevant PAs and SOs mostly focused on a multitude of transition-relevant aspects. ESF/YEI programmes covered more social transition aspects including the promotion of quality of employment, the support of lifelong learning, education, labour mobility and on investments for training and youth employment, particularly in less developed regions. ERDF/CF programmes, in contrast, cover a much broader scope. Commonly, these potentially transition-relevant measures were in the areas of energy efficiency/renewable energy, enhancement of research, technology and innovation, improvement of the competitiveness of start-ups and SMEs and investments into digitalisation. In most cases, SOs funded through REACT-EU have also been counted as potentially transition-relevant SOs if these supported the green and digital transition of the

[19] European Commission: https://energy.ec.europa.eu/topics/oil-gas-and-coal/eu-coal-regions/coal-regions-transition_en.

economy. Measures in the areas of ICT, transport, water and waste management as well as interventions at the urban level have not been counted as transition-relevant.

Despite no explicit transition focus in the 2014-2020 programming period and the lack of tailormade interventions for coal regions, it can be seen that there were still some highly transition-relevant projects funded already in the past programming period. These span across the case study regions and include for example:

- energy efficiency improvements in public buildings in Asturias;
- the construction of a PV farm in the area of a former thermal power plant in Śląskie;
- support to inter-company apprenticeship training programmes in companies in the coal mining sector, to develop less CO2-intensive technology in Düsseldorf;
- floating and aquaponic solar power plant with hydrogen storage being built in the coal region, providing 1000 new jobs in Severozápad;
- improvement of district heating infrastructure and other infrastructural investments in Dytiki Makedonia;
- investments and IT support to SMEs to increase their production capacity and technological modernisation projects in Yugoiztochen.

4.2.1. Findings per case study

Key insights are presented from the six selected case studies regarding the implementation of Cohesion Policy through 2014-2020 OPs, alongside examples of projects and interventions under the respective programmes that may have potentially facilitated the transition.

a. Principado de Asturias

The contribution of Cohesion Policy in Asturias during 2014-2020 to the coal transition can be characterised as one which has been largely focused on investments in employment, training and skills and (to a lesser extent) also actions related to energy efficiency and renovations. The contribution of Cohesion Policy in Asturias during 2014-2020 to the coal transition can be characterised as one which has been largely focused on investments in employment, training and skills and (to a lesser extent) also actions related to energy efficiency and renovations. In other words, the core contribution of Cohesion Policy has come through the means of the ESF. The ERDF has had a much less significant impact due to the presence and significance of instruments available at national level (the Miners Fund) which in a sense substituted regional investments more characteristic of those made by ERDF.

Three Cohesion Policy OPs relevant to Asturias were analysed. Within the **OP ERDF Asturias 2014-2020**, relevant projects focused on energy efficiency improvements in public buildings, building renovations, and the integration of logistical and industrial areas. 2014-2020 ERDF funds were not directly used to support the transition in Asturias, as the national designated 'Miners Fund' was used, providing EUR 250 million to coal mining regions to finance infrastructure projects and an additional EUR 150 million for business projects. By the end of 2020, 60 projects worth EUR 93.1 million had been funded in Asturias by the Miners Fund.

Interventions under the transition-relevant SOs within the **OP Asturias ESF 2014-2020** focused on employment – particularly of youth and women in rural areas – including the incentivisation of entrepreneurship as well as social inclusion. The ESF was important in supporting the region's population that was struggling with the transition and had faced unemployment as a consequence of the retreat of historically strong economic sectors, such as the iron and steel industry and mining.

Policies were not targeted on the phase out of coal, but generally contributed to a smarter, greener and more social Europe as Maa worked closely with city councils via so-called 'local itineraries' for the social and labour inclusion of people with disabilities. They also supported early school leavers without qualification nor work experience, with the programme facilitating employment, training and labour orientation. Additionally, it targeted long-term unemployed individuals to find jobs in private companies beyond the subsidised period. Another programmed named 'OCÚPATE' provided training and education for a nine month period in which young unemployed individuals acquired basic work skills to join the labour market. There was also a focus on internships in the city councils for young and qualified individuals. The PMAR programme has positively impacted Asturias, improving both learning and educative performance of young students to minimise the number of early school leavers.

Interventions under the **Multiregional OP for Spain ERDF 2014-2020** focused on housing stock energy rehabilitation, infrastructure and public buildings, the improved energy efficiency of companies (particularly SMEs), electricity sector investments, increased renewable energy consumption and increased share of renewable energies for thermal uses.

An exemplary transition-relevant project is shown in the box below.

Source: https://kohesio.ec.europa.eu/en/projects/Q3260788

Box 1: Project example Asturias 2014-2020 (ESF)

Actions to promote the use of renewable sources by companies, in particular SMEs

This specific project targeted at companies, in particular SMEs, aimed at increasing and incentivising investments to make greater use of renewable energy sources in order to reduce greenhouse gas emissions (according to the limitations resulting from Directive 2003/87/EC). It led to a consolidation of business models around renewable energy technologies and the generation of jobs through the service station 'La Nava de Huelva S.L.' – both highly relevant factors of transition. Focused on SMEs, the project paved the way for businesses to grow sustainably and at the same time created jobs within the region. Focused on SMEs, the project paved the way for businesses to grow sustainably and at the same time created jobs within the region.

Start date- end date: 22/05/2019-14/07/2020
Budget & EU percentage of co-financing: 23,758.98 EUR (80%)
Programme: Asturias ERDF 2014-20 OP (Regional)

Box 2: Project example Asturias 2014-2020 (ESF)

Youth Unemployment Programme

This specific project targeted youth individuals that were seeking employment in Asturias. Overall, the programme helped them obtaining additional training and higher chances of involvement in the labour market by provided them access to labour opportunities and a wide range of internships. This programme was especially relevant in formerly coal-intensive areas of Asturias, which are known to already suffered unemployment in part, and more specifically, from young unemployment. Therefore, this programme contributed to mitigating young unemployment in these areas.

Start date- end date: 2014-2020
Budget & EU percentage of co-financing: 23,758.98 (80%)
Budget & EU percentage of co-financing: 23,758.98 EUR (80%)
Budget & EU percentage of co-financing: N/A
Programme: OP European Social Fund Asturias 2014-2020 (Regional)

Source: Asturias Employment Service

b. Śląskie

Somewhat differently to Asturias, the contribution of Cohesion Policy to the coal transition in Śląskie has been much broader and more varied in terms of the interventions and impacts given the relevance of five (national and regional) OPs. Specifically, the contribution to the transition has been in the form of support of regional innovations and R&D&I (particularly on energy), enhancing high quality education and addressing labour market needs, promoting digitalisation and digital competences, land reclamation and revitalisation and the repurposing of mines. Śląskie was a case study region where 2012-2020 Cohesion Policy already made direct and intended references to coal-transition.

Within the **OP Smart Growth,** the main focus of projects in Śląskie was on the development of innovation and support for the implementation of energy innovations and on the overall improvement of the innovativeness of companies improving their competitive position and allowing them to be an alternative to mining. The programme supported green energy innovations and funded programmes aiming at improving the cooperation between science and business in energy R&D&I. Concrete project examples included the development of a mobile technology for disposal methods of mining waste to aid in the reclamation of degraded areas, and the development of coal shale recovery technology.

Projects funded through the OP Knowledge Education Growth aimed to improve access to high quality education tailored to labour market needs and the rehabilitation of employees with limited professional potential (e.g., the initiative 'Green Jobs Opportunities for NEETs). Within the coal region, these measures were expected to increase labour force participation and employment in Silesia and to improve the matching of workers' competences to labour market needs. In addition to the general skills-related projects under this OP, the **OP Digital Poland** funded training actions for the development of digital competences, the development of innovative solutions for digital activation and projects to facilitate better access to/wider use of the internet for education, work and leisure.

The **OP Infrastructure and Environment** funded interventions in energy (RES development, energy efficiency, energy transition, new technologies) as well as the increase of energy efficiency leading to a change/improvement in households' energy balances. The programme covered land reclamation interventions and funded projects combatting the negative consequences of mining (via site

revitalisation, safeguards from environmental disasters). An example of this is the project that constructed a PV farm in the area of the former Jaworzno III power plant in Mysłowice – Dziećkowice[20].

Transition-relevant projects funded under the **Regional Operational Programme for Śląskie** Voivodeship focused on the strengthening of R&D&I in the energy and green economy (RISs for Silesia) and that of SMEs to stimulate alternative jobs development. Additional focuses included improving energy efficiency and development of RES, revitalising and repurposing efforts, and strengthening education quality and relevance to labour market needs.

Box 3: Project example Śląskie 2014-2020 (ESF)

Mine of ECO-Qualifications

The main objective of the project was to adapt qualifications and skills of employees of SMEs to the needs of the labour market and towards more sustainable approaches ('ECO-qualifications'). It included employees who were subject to companies' restructuring processes, and themselves suffering from the negative effects of economic and structural change, situated in a crisis situation, or threatened by (potential) dismissal. Priority was given to employees or former employees of organisational units of coal companies from the province of Śląskie, and indirectly transition affected enterprises from the Silesian Voivodeship , as well as to women and people with disabilities. This is an example of direct social support to redundant workers affected by coal phase out and evidence that OPs of the 2014-2020 period were already directly transition-relevant.

Start - End date: 01/09/2016 - 30/06/2017
Total budget & rate of EU co-financing: 213,846.21 EUR (85%)
Programme: OP for Śląskie Voivodeship (Regional)

Source: https://mapadotacji.gov.pl/projekty/768462/

c. Düsseldorf

The contribution of Cohesion Policy to the coal transition in Düsseldorf is mostly characterised as being indirect and non-focused to the transition with the exception of some support under the ESF programme to support/training to existing workers in the coal mining and carbon-intensive sectors on less CO2-intensive technologies. Other potentially relevant actions were identified including universal training programmes and jobless services (under ESF) and generally improving innovation conditions, competencies and electricity networks.

The regional analysis of Düsseldorf covered two regional Cohesion Policy OPs. The key thematic focus of projects funded under **OP Nordrhein-Westfalen ERDF 2014-2020** was the improvement of companies' innovation potential via research support and competence centres, and networks. An additional focus included coaching and mentoring programmes for young entrepreneurs. Around 860

[20] https://mapadotacji.gov.pl/projekty/1486872/

projects were funded under the area "Advisory Programme Business" and the "Master Founding Premium" in the Rhenish Revier which could have cushioned structural change.

Other coal region investments focused on resource efficiency and sustainability of SMEs, worker training/retraining investments (alongside the ESF), and the development of a CSR competence centre. Investments were made into R&D projects supporting the market launch of renewable energy and energy efficiency technology, as well as other implementation-oriented cooperation projects between companies and science to the support the same technologies. The OP also supported the development of GHG reduction strategies for Niederrhein. ERDF funded projects in this period did not have an explicit focus on coal phase out, as the national date had not yet been decided, although the programme may have had an indirect effect on the transition.

Box 4: Project example Düsseldorf 2014-2020 (ERDF)

ElCiN — Electric City Neuss

This project presents a concept for the city area of Neuss (in the coal region of Rhein-Kreis Neuss) to bring together and integrate the ever-increasing number of renewable energies into one optimised grid. Considering the four energy sectors of electricity, gas, heat and mobility and using the sector coupling technologies, such as power-to-gas, power-to-heat and electromobility, the concept was designed to create further flexibilities in the electrical network in order to ensure better integration of renewable energies. Plans from the different districts of the city of Neuss were combined and an intelligent power grid and control system installed in parallel with the development of the controller.

This project enabled the city of Neuss to transition further away from the thermal power plant used in the coal region and more towards optimized renewable energy systems. This strategic project can be seen as a demonstration for other parts of the coal region in the years of transition to come.

Start - End date: 01/06/218 - 31/10/2021
Total budget & rate of EU co-financing: 161,648.85 EUR (50%)
Programme: OP Nordrhein-Westfalen EFRE 2014-2020 (Regional)

Source: https://kohesio.ec.europa.eu/en/projects/Q3311779; https://www.evt.uni wuppertal.de/de/forschung/forschungsgruppe-betriebskonzepte-und-sektorenkopplung/elcin-electric-city-neuss/

Within the **Operational Programme ESF Nordrhein-Westfalen 2014-2020** the main thematic focus of projects in the coal region was on training programmes and the promotion of in-company training of workers. Other interventions focused on the promotion of unemployment advice centres and unemployment centres and on youth employment (programme 'Jugend in Arbeit plus'[21]). An ESF-co-funded programme worth highlighting is the inter-company apprenticeship training (see below) that has provided support to companies to reduce GHG emissions through in-company training. Finally, there have been ESF-funded counselling services and career entry support on professional

[21] https://www.gib.nrw.de/service/downloaddatenbank/jugend-in-arbeit-plus-1

development for unemployed workers as well as competence development of employees through education check procedures.

Box 5: Project example Düsseldorf 2014-2020 -– (ESF)

Inter-company apprenticeship training in coal mining companies

An ESF-co-funded programme worth highlighting is the inter-company apprenticeship training (Überbetriebliche Unterweisung, ÜLU) that provides support to companies by supplementing the training provided by the company with additional horizontal training elements on the latest technologies and processes tailored to the needs of the workers. This transfer of technological knowledge contributes to the long-term training sustainability of the companies and its workers. It is worth highlighting because the programme also offers this service to companies in the coal mining sector and steel industry, providing workers training on processes and technologies to develop away from CO2-intensive approaches. As part of the ÜLU, resource-saving work is taught to workers and the shift toward cleaner energies is facilitated.

Start-End date: NA
Total budget & rate of EU co-financing: NA
Programme: OP ESF Nordrhein-Westfalen 2014-2020 (Regional)

Source: https://www.lgh.nrw/index.php/foerderung-der-uelu

d. Severozápad

Despite the parallels with Śląskie region in terms of having a broad variety of national and regional OPs, the contribution of Cohesion Policy in Severozápad to the coal transition cannot be characterised as being as equally tailored or concrete. This can be attributed firstly to the fact that several national OPs did not dedicate funding to coal regions. Moreover, a lack of administrative and political cooperation was a key obstacle for the complete deployment of Cohesion funds to fully contribute towards the coal transition.

For the Czechia case study, five Cohesion Policy OPs were analysed in their interventions in the coal region of Severozápad. As part of the **Integrated Regional Operational Programme**, investments focused on support of a low-carbon economy (sustainable public transport, including zero-emission vehicles), increased energy efficiency (particularly in housing), protection of the regional heritage (e.g., Cheb castle, Karlovy Vary theatre, Terezin, and Osek monastery), the modernisation of education infrastructure (elementary and secondary schools) and social services development. IROP helped, including the special calls for coal regions, but the impact was limited to the original scale of allocation from 2014 which has not been reflected in the coal transition yet. After joining the European Commission's Initiative for Coal Regions in Transition, several calls were opened within the OP to support coal regions in Czechia. The two-three launched calls focused particularly on education and sustainable mobility topics, however with financial support restricted by existing IROP allocations, no additional sources were allocated. Due to its low absorption capacity, low project budgets and absence of strategic projects, the Karlovy Vary region was not very successful in its applications. In the Ustecky

region several projects received funding – however the most successful was the Moravian-Silesian region (the third Czech coal region outside NUTS2-Severozápad). The presumed reasons for the lack of success in Karlovy Vary relate to the discordance among regional representations, relics from the past, a low cooperation of key regional stakeholders, lack of (personal) capacities, and experience in strategic project governance and management.

The **OP Environment** has potentially contributed to the improvement of the environment in the region though no special budget has been allocated to coal regions. Generally, however, interventions focused on environment protection and resource efficiency (landscape revitalisation, air quality, water quality, waste treatment) as well as the support to a low-carbon economy through energy efficiency measures in public and private buildings, as well as renewable energy.

The **OP Research, Development and Education** had limited impacts on the region as no specific coal transition measures were included. However, the support linked to the national Education Action Plan have supported the development of high quality and inclusive education and advanced vocational training. Furthermore, it facilitated the development of an innovative environment in line with regional RIS3 Strategy. In line with this OP, the **OP Employment** gave assistance and training to increase employability of young people and low-qualified persons and to the development of social services and strengthened inclusion, particularly to vulnerable social groups. Overall, projects aimed to increase employment and employability potential.

Finally, the **OP Enterprise and Innovation for Competitiveness** supported the modernisation of companies, advanced management and innovative products and services. Projects supported aimed at energy savings in companies and decarbonisation as well as SME sector development and enhanced competition of regional companies.

Box 6: Project example Severozápad 2014-2020 (CF)

Support for the Exchange of Heat Sources to solid Fuels in Family houses in the Karlovy Vary Region – KOTLÍKOVÉ GRANTS II

The objective of this project was to provide financial support to households or individuals who own a family house in the territory of the Karlovy Vary Region, for the exchange of existing heat sources based on solid fuels with manual loading with more environmentally friendly sources (gas condensation boiler or heat pump). This has enabled households in the coal region to become more independent from heat from thermal power plants, increased energy efficiency and decreased GHG emissions in the territory of the Karlovy Vary Region.

Start - End date: 31/05/2017 - 31/12/2019
Total budget & rate of EU co-financing: 2,668,000.00 EUR (100%)
Programme: OP Environment (National)

Source: https://kohesio.ec.europa.eu/en/projects/Q62007

e. Dytiki Makedonia

Dytiki Makedonia is another exemplary region where a broad variety of OPs (both national and regional) are of relevance. However, the contribution of Cohesion Policy to the coal transition in Dytiki Makedonia again lacks specificity. A key common feature of the contribution of Cohesion funds has been to combat energy poverty by improving district heating as well as improving energy efficiency for public buildings and for SMEs. Cohesion funds have also contributed to addressing the particularly high youth unemployment rate of the region through various employments measures.

Further insights for Dytiki Makedonia are provided along the four Cohesion Policies analysed. Firstly, the **OP Transport Infrastructure, Environment and Sustainable Development** funded projects in the area of district heating infrastructure, resulting in the equipping of households with reliable district heating connections, contributing to tackling energy poverty. Further investments were made into the management of biowaste, sewage and water networks and local roads, improving the quality of life in coal mining areas.

Secondly, the **OP Competitiveness, Entrepreneurship, and Innovation** provided support to SMEs (grants to implement business plans, loans with subsidised interest rates, guarantee funds, seed capital for start-ups, digital transformation, etc), particularly also during/after the COVID-19 pandemic. Further SME support focused on the strengthening of export and production capacity of local SMEs and the support of the technological competitiveness of local SMEs. These potentially led to increased local employment in the region. Furthermore, the OP provided support for energy refurbishment of buildings and to reconnect from petroleum boilers to natural gas, leading to energy savings in private buildings.

Thirdly, the **OP Human Resources Development, Education and Lifelong Learning** targeted the high share of unemployed youth (up to 29 years) in job-seeking activities on the one hand and active employment measures (training and upskilling) for all unemployed on the other hand. It supported projects facilitating lifelong learning, NEET employment and improved the relevance of education and training systems for the labour market. This potentially led to increased employment in the coal region, providing particular assistance to and social inclusion for marginalised groups.

Fourthly, the **Regional Operational Programme of West Makedonia** shows a wide range of tangible results for the region through projects rehabilitating the local road network, improving school, health and other social facilities (public library, two public hospitals) as well as infrastructure (water networks, wastewater management, environmental infrastructure, etc.). Energy-related interventions have also been part of the OP, including the energy rehabilitation in public buildings (energy saving), development of natural gas and expansion of district heating networks. Finally, support has been provided to SMEs (grants to implement business plans) and new building infrastructure was funded for the University of West Macedonia. These interventions supported the improvement of local infrastructure and of Dytiki Makedonia's business environment. Investments potentially also led to energy savings.

Box 7: Project example Dytiki Makedonia 2014-2020 (ERDF)

Extension of the distribution network of Ptolemaida I,II,III,IV,V to the new heart settlement of the public

This project includes the extension of the Ptolemaida district heating network to areas in Dytiki Makedonia that were not yet connected. Furthermore, it covers the installation of district heating infrastructure and substations for consumers that do not use thermal heat as a source. Residents living in Nea Kardia, settlement of the Municipality of Eordaia, and the Workers' Houses I, II, III, IV and V of the city of Ptolemaida could be supplied with heat at a low cost to residents.
This project contributes to alleviate energy poverty and increases energy efficiency in the coal region. It is also highly transition-relevant as it symbolises a reduction of GHG emissions as thermal power plants are no longer used to provide heat for consumers.

Start - End date: 01/04/2020 - 31/12/2021
Total budget & rate of EU co-financing: 4,109,439.00 EUR (NA)
Programme: Transport, Infrastructure, Environment and Sustainable Development OP (National)

Source: https://kohesio.ec.europa.eu/en/projects/Q2778278

f. Yugoiztochen

Finally, the contribution of Cohesion Policy in relation to the coal transition in Yugoiztochen is again characterised by being indirect and non-regionally focused given the absence of any regional OPs. Finally, the contribution of Cohesion Policy in relation to the coal transition in Yugoiztochen is again characterised by being indirect and non-regionally focused given the absence of any regional OPs. Nonetheless, the contribution of Cohesion funds in the region have been particularly focused on energy efficiency measures in both public and residential buildings, modernization and technological support to SMEs and general employment support, such as the promotion of entrepreneurship and skills development.

In the regions of Yugoiztochen, the analysis covered three OPs. The **OP Regions in Growth** has no specific measures planned for the coal regions. However, the programme potentially impacted the coal region through energy efficiency measures in public and residential buildings leading to energy savings, through the reconstruction of educational infrastructure, social housing and urban development. The **OP Innovations and Competitiveness** does not make explicit reference to the coal transition, as all measures are horizontal, implemented at the national level. Nevertheless, projects in the area of energy efficiency in SMEs, increase of production capacity and IT support to SMEs and overall technological modernisation projects could have had an impact on the coal region. Other ERDF-funds increased the productivity of SMEs and the share of innovative enterprises and made a contribution to reducing the energy intensity of the economy.

Finally, the **OP Human Resources Development** focused on improving access to/subsidise employment and provided a youth guarantee programme. Furthermore, it facilitated job creation, entrepreneurship and skills development as well as good and safe working conditions in the region. Even though this national programme also did not include any specific or tailormade measures for the coal regions, it should have improved access to employment and social services for workers.

Box 8: Project example Yugoiztochen 2014-2020 (ERDF)

Improving energy efficiency "Doroslava stroy" Ltd. Burgas

The project foresees the renovation and improvement of manufacturing (construction) equipment, in order to increase the company's energy efficiency and competitiveness, achieving lower production costs and reducing GHG emissions. The project also foresees investments for the implementation and certification of the Energy Management System ISO 50001:2011, in order to improve the energy performance of the processes, including energy efficiency, use and consumption.
This project clearly leads to the decarbonisation of companies and facilitates the transition of the coal region to cleaner energy sources and more efficient energy systems.
Start date - End date: 06/12/2017 - 04/09/2019

Total budget & Percentage of EU co-financing: 1,212,165.00 BGN (85%)

Programme: OP Innovations and Competitiveness 2014-2020 (National)

Programme: OP competitiveness (National)

Source:
http://2020.eufunds.bg/en/5/0/Project/BasicDataActivities?contractId=XKwMmgs4fh0O%2BFNWBzHMxg0HCg5Is4bL6LdRPAUdoy1w%3D%3D&isHistoric=False

4.3. Analysis of programming for implementation of 2021-2027 Cohesion Policy (including JTF programmes and TJTPs) in six coal regions

The following section of the report focusses on the design of the new Cohesion Policy of 2021-2027 in the six case study regions, both the OPs and TJTPs – some of which are already approved at this point and others for which only the draft version or general information is available. An in-depth overview of the programmes under analysis is provided, as is again an assessment of potentially transition-relevant PAs/SOs as compared to the total number of PAs/SOs per programme (in absolute numbers and percentages). Conclusions are drawn on the relevance of transition as compared to the 2014-2020 OPs where the topic was not yet discussed (explicitly) and changes at policy-level that could have come with the announcement of coal-phase out dates by the Member States and availability of EU and national funding to support the transition.

Table 11 shows the OPs analysed for this study and the number and share of transition-relevant PAs and SOs, where an assessment was possible through either approved or draft OPs.

Across the spectrum of analysed OPs, relevant PAs and SOs again focused on a multitude of transition-relevant aspects. Non-JTF-funded OPs implicitly include transition-relevant interventions through SOs focused on green infrastructure (incl. energy efficiency and renewables, district heating and circular economy), research and innovation (incl. smart specialisation and industrial transition), SME support (incl. low -carbon economy) and digitalisation and in ERDF/CF programmes and inclusive education, training, lifelong learning and reskilling in ESF+ programmes. These could indirectly contribute to the transition in the context of a smarter, greener, more connected, and a more social Europe even though they are not tailor-made for coal regions specifically. OPs (or PAs/SOs within multi-fund OPs) that channel JTF funding[22], however, make explicit references to transition and can be regarded as tailor-

[22] i.e., OP Programme Regions in Growth 2021-2027 covering Severozapad, Just Development Transition Operational Programme covering Dytiki Makedonia; OP Just Transition covering Severozápad; Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027 covering Düsseldorf; and European Funds for Silesia 2021-202 (draft version) covering Silesia.

made policies for transition. Across the different case studies these OPs or designated PAs within multi-fund OPs provide funding exclusively for coal regions and focus on aspects such as[23]:

- Support of the business sector (SMEs and start-ups) through productive investments, digitalisation and other innovation processes and technology transfer
- Establishment of educational/training centers
- Development of R&I capacities, including technology centers
- Strengthening the circular economy
- Development of new renewable energy resources and investments into energy efficiency and storage
- Restoration and reuse of land after brown/black coal mining
- Creation of and preservation of employment in enterprises
- Investments into education, up-skilling and re-skilling programmes
- Strengthening social stability

4.3.1. Findings per case study

Below more detailed insights are provided from each of the six selected case studies regarding the programming of Cohesion Policy through the respective 2021-2027 OPs and TJTPs. Transition-relevant interventions are examined, those covered by each OP and, where possible, on specific projects supporting the transition that are planned to be implemented over the coming years. Expected results of (approved) programmes are also examined and provide the most important facts from approved TJTPs that provided the basis for Cohesion Policy programmes. It is to be noted that not all the conclusions can be taken as confirmed as some programmes are still in draft stage and for others only basic information gathered through desk research and interviews with MAs was used.

a. Principado de Asturias

Two programmes for Asturias are in the draft phase, set to be approved by the end of 2022. The **Asturias ERDF 2021-2027** OP aims for the region to be smarter and more efficient via advancements in the ecological and energy transition and being better prepared against potential climate change threats, particularly natural disasters and wildfires. This programme focusses on innovation, improvement of the competitiveness and sustainable growth of SME's, promotion of innovation, and includes the component of digitalisation. In addition, a PA has been included in this programme on the promotion of an ecological transition through the development of investments which contribute to energy efficiency and mitigation of the effects of climate change, guaranteeing a more efficient use of natural resources. Finally, this programme also highlights the promotion of sustainable management of hydrological sources. The other draft OP, **European Social Fund + Asturias,** focusses on youth employment, proposing inclusion programmes, especially for disabled individuals. The programme aims to reinforce labour orientation and young student support and guidance through professional online training. Successful projects include the provision of support to entrepreneur projects, the provision of aid to support women in small municipalities, the provision of work experience opportunities for young people and the testing of new housing proposals. The expected results are the improved situation for women in rural areas, the unemployed, entrepreneurs and young people. In addition, the managing authority is aware that due to the energy crisis, certain modifications might be needed in order to refocus priorities.

The **TJTP for Asturias** has not yet been approved and no draft is publicly available. However, during an interview, the managing authority highlighted that funds will be prioritised to address the high volume of jobs at risk in industries that are more challenging to decarbonise, in part due to the high

[23] The coal region that is part of the case studies and other transition regions in the country.

investment costs associated with the relevant technologies. Furthermore, it intends to address the risk of large companies that could relocate outside the region. Support to larger companies will be intended to secure existing jobs and to promote employment creation and generate new opportunities for SMEs. The support will be focused on interventions to promote new energy sources (mainly associated with green hydrogen), renewable energy supply and use, together with strengthening the region's position in related supply chains (especially onshore and offshore wind), and ecological transformation of the region. It was clarified that these are subject to changing geopolitical considerations and their implications on energy security and supply.

After analysing the new programmes for Asturias, there is thematic alignment between the TJTP and the draft ERDF programme that already includes some transition-related interventions, especially regarding energy efficiency and climate change mitigation. Even though these are not tailor-made to the coal region of Asturias, ERDF/ESF+ OPs are complimentary to JTF investments, as they indirectly tackle societal issues that are a consequence of coal mine closure, especially activities focused on the engagement of the unemployed in the labour market, and the enhancement of SMEs proposals and projects. Though not yet approved, it can be assumed that the **TJTP** will be highly relevant and tailor-made for ensuring a just transition in coal mining areas, since it will provide social assistance to working populations affected by mine closures, promoting business development and activities, encouraging the energy transition and its industrial value chain, and supporting infrastructure and environmental restoration projects.

b. Śląskie

The national **European Funds for Infrastructure, Climate, Environment OP** (approved) focusses on providing support to the energy and environment sectors through CF and ERDF. The programme is not specifically dedicated to Silesia but is a national support instrument regarding the promotion of energy efficiency and use of renewable energies, development of intelligent energy systems and networks, as well as energy storage systems, supporting climate change adaptation and disaster risk prevention. It also focusses on enhancing conservation of nature, biodiversity and green infrastructure and supports sustainable multi-modal urban mobility as part of the transition towards a zero-carbon economy. The national **European Funds for a Smart Economy OP** (approved) focusses on the support for entrepreneurs and greening of infrastructures. It also promotes the development of innovative energy solutions by enhancing energy efficiency and the development of smart energy and energy storage systems. The national **European Funds for Digital Development OP** (draft) focusses on the support of digital services and digital skills, which contributes to the better and wider access of internet for education, work and leisure within the coal region. Finally, the national **European Funds for Social Development OP** (draft) focusses on supporting the adaptation of workers, enterprises and entrepreneurs to change as part of better policies for social development. This aims to improve the quality of human capital within the region.

Though the above-mentioned programmes are also transition-relevant and might indirectly affect coal regions in Śląskie, it is the regional multi-fund programme **European Funds for Silesia 2021-2027 OP** (draft) that is tailored to enable the region to mitigate social, economic and environmental impacts of the transition. The expected result is a holistic energy transformation of the region taking into account these social, economic and environmental criteria. Specifically, the single SO funded through JTF builds on the **TJTP of the Silesian Province 2030** that focused on seven out of eight NUTS3 sub-regions in Śląskie[24] and covers several objectives such as the efficient use of mining sub-regions' brownfield sites

[24] Częstochowski is not considered a coal region

for economic, environmental and social purposes, and innovative economy of mining sub-regions by diversifying and making it energy efficient. Some interventions planned include: Planned interventions include the construction of a Silesian Centre for Experimental Energy Technologies, the retraining of staff and adaptation of the machinery park to diversify the offer for non-mining industries and the creation of a training centre with equipment and IT applications for the re-training of employees to work in non-mining industries. The TJTP is the basis for the distribution of JTF and other European funds to ensure a just transition tailored to the needs of Śląskie. Along with ERDF and ESF+ funds, the JTF will be implemented through dedicated PAs (substantive and technical assistance) within the regional program European Funds for Silesia 2021-2027 OP. There is also compatibility with the National Reconstruction Plan, the Modernisation Fund and national OPs that will support complementary projects based on the demarcation line between the national and regional levels, such as large-scale energy infrastructure.

The analysis shows that there is significant thematic alignment between all programmes, including the national ones that use mainly ERDF, CF and ESF+ funds and are not specific for the coal region. Nevertheless, these programmes have expected positive impacts to the coal region since they contribute indirectly on different aspects of the transition, such as reducing GHGs through energy efficiency, but also contributing the social aspect by supporting education and re-skilling for all affected citizens. The regional programme for Silesia 2021-2027 is most in line with recommendations made through the TJTP and includes tailor-made policy to tackle, among other objectives, all negative impacts of the carbon transition, taking into account all aspects: social, economic and environmental. Through the programme JTF/ERDF/ESF+ funds will be available to Śląskie to achieve a successful just transition.

c. Düsseldorf

For Düsseldorf, the analysis covers two multi-fund OPs which are both based on the conclusions on the regional TJTP for the 'Rheinisches Revier'. While the ERDF/JTF OP is already approved, the ESF+/JTF OP is still under discussion between the Managing Authority and the European Commission with only little information publicly available.

According to the website of the Managing Authority[25] on the **OP ESF+/JTF North Rhine-Westphalia 2021-2027,** it will be focussing on the 'soft social aspects' of transition with a dedicated PA on further qualification and retraining of employees and job seekers, assistance for and active inclusion of job seekers and other educational and social inclusion activities. The ESF+/JTF will be highly integrated with the ERDF/JTF programme which will provide the 'harder' infrastructural measures such as the investments in equipment, as well as modernisation and energy-related refurbishment of buildings for vocational training. These will go along with 'softer' ESF+/JTF projects on retraining and re-employment.

The **Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027** combines the 'usual' ERDF measures under five PA which are indirectly relevant for transition with one tailor-made and dedicated PA focused on 'Sustainable Coal Regions' (PA6). The programme combines EUR 1.3 billion of ERDF funds for all regions within NRW with EUR 560 million of JTF funds for coal regions only (including Rhein Kreis Neuss[26]). Under the 'usual' ERDF Pas, transition-relevant Sos cover the development and expansion of R&I capacities and the introduction of advanced technologies, digitalisation of companies and research institutions, sustainable growth, competitiveness and job creating in SMEs. Furthermore,

[25] https://www.mags.nrw/esf-2021-2027-just-transition-fund
[26] And other coal regions in NRW: Düren, Rhein-Erft, Heinsberg, Aachen and Mönchengladbach.

there are Sos facilitating the development of skills for smart specialisation, industrial change and entrepreneurship, promoting energy efficiency and reduction of GHG emissions and circular economy, and developing intelligent energy systems, grids and storage systems. However, there are no explicit references under these Sos on transition. As coal regions already receive support through the dedicated PA6 and considerable national funds (through the coal phase out law, Strukturstärkungsgesetz), ERDF funds will rather focus on structural change in other parts of NRW. The region will therefore be targeted through the transition focused PA6 that will facilitate SME innovation processes and technology transfers, start-up, technology and education centres and land restoration. Measures are currently vaguely described with not specific priority projects defined. Calls/funding guidelines under these measures will be further developed to attract projects that bring the intended consequence of levelling off the foreseeable economic, social and ecological consequences of the energy transition.

What is to be noted is that JTF funds will also be used to fund projects that are not eligible for national funds (of which there are considerably more available, EUR 15 billion for the Rheinisches Revier), specifically for: i) Direct promotion of companies (green and digital transformation of business models through so-called future vouchers); ii) Water management measures (construction and renovation of mine wastewater treatment plants, water body and floodplain restauration measures); iii) Measures in the field of further training and qualification (under ESF+/JTF programme).

This guarantees that JTF-funded projects cannot receive double funding through calls distributing national funds (from the coal phase out law) and other territorial strategies (Economic and structural programme for the Rhenish future area, Innovation strategy of the state of North Rhine-Westphalia and national and regional climate protection plans) but rather make the funding landscape more flexible for beneficiaries.

The **TJTP Rheinisches Revier** that provided the basis for both 2021-2027 Cohesion Policy programmes[27] was developed in collaboration with responsible authorities for national funding programmes as well as other economic and social partners in the region. It sets out the general objectives to be achieved through the multi-fund programmes, the interventions to be funded and the expected result of projects in the coal regions.

The analysis shows that tailor-made policies for just transition have been integrated into both multi-fund programmes with clear differences in focus on the social aspects of transition in the ESF+/JTF programme and more infrastructural, economic/environmental aspects of transition in the ERDF/JTF programme. The focus of general ERDF and ESF+ funded PAs/SOs is on NRW as a whole with no direct reference to coal regions while JTF funded PAs/SOs will be dedicated to coal regions alone. Funding under EU programmes is also well aligned with (much larger) national funding streams available in Germany. To avoid double funding, the calls have been designed not to duplicate support but rather to provide more flexibility to beneficiaries in funding their projects – with funding for e.g., direct promotion of companies, water management measures and specific training and qualification schemes only available under EU programmes.

d. Severozápad

As in its previous version, the **Integrated Regional Operational Programme (IROP) 2021-2027** channels ERDF funds into all Czech regions. In the coal region Severozápad it will potentially focus on the sustainable mobility, education and social assistance infrastructure, e-government and local

[27] There are separate TJTPs for the other transition areas in Germany 'Nördliches Ruhrgebiet' (also covered by the same Managing authority and JTP programme) as well as 'Lausitz' and 'Mitteldeutsches Revier' in the East of Germany.

development. However, it does not provide funding for energy efficiency measures anymore as these have been fully incorporated into the OP Environment which is considered the second most transition-relevant OP after the Just Transition OP. The **OP Technologies and Application for Competitiveness** focusses on the strengthening of research and innovation capacities, digitisation and on enhancing the sustainable growth and competitiveness of SMEs and the creation of jobs in SMEs, including through productive investments. There are also measures mentioned to support the low-carbon economy (energy efficiency and renewable energies and a transition to a resource-efficient circular economy), however, there is no clear indication how these will impact coal regions. The **OP Jan Amos Comenius** (on Education and Research) could impact the coal regions of Severozápad by providing up-skilling and re-skilling opportunities for unemployed workers and through the implementation of the regional action plan in education. The **OP Employment+** could support the transition by improving access to employment and activation measures for all jobseekers, especially young people, and through projects implemented under calls to promote the adaptation of workers, businesses and entrepreneurs to change or to provide support in matching labour market supply and demand. Finally, the **OP Environment** will reinforce the effect of the Just Transition OP by supporting projects addressing all environmental challenges and opportunities in the Czechia. Though there is no specific budget allocated to coal regions, measures related to air quality (replacement or reconstruction of stationary sources of air pollution), energy efficiency and renewable energies will presumably have additional impact on the transition of coal-dependent territories. A strategic project to highlight here was the preparation of the Green Mine project, a giant floating and aquaponic solar power plant with hydrogen storage being built in Mosteck that will also provide 1000 new jobs in the region[28].

The JTF-focused OP, the **OP Just Transition**, is fully dedicated to coal phase out and builds on the **TJTP** designed for all three coal regions, Karlovy Vary and Ustecky in Severozápad, as well as the Morvian-Silesian region in the East of the Czechia. The OP fully supports transition actions across ten SOs through dedicated thematic calls and will fund integrated strategic projects corresponding to the needs of Severozápad, defined at the regional level. For Karlovy Vary and Ustecky, eleven strategic projects have been defined each, covering economic, social and environmental themes and include among others the Green Mine area, a gigafactory on car batteries, hydrogen mobility projects in Usti and Labem, the POZATR project to support employment transformation, Karlovy Vary Innovation Centre and Science-Technology Park and support to the cultural and creative industry through a CCI Office. The TJTP was based on bottom-up approach, is aligned with Green Deal objectives and has been developed in consultation and alignment with other MAs leading OPs.

The analysis shows that there is considerable thematic alignment between all programmes and that transition-related interventions are not limited to the separate Just Transition OP, exclusively. Although the other ERDF/ESF+/CF funded programmes are broader and not directly designed to fund the transition, they could reinforce the actions intended by the Just Transition OP. For example, the IROP is in line with the needs defined in TJTP in the mentioned sectors. The Managing Authorities of the programmes cooperated already in the design phase and agreed on not duplicating financing for projects (e.g., in education or sustainable mobility). The objectives under the Employment+ and Environment OP align with the objectives set in the Just Transition OP but do not duplicate the areas in which JTF funds will be used to finance projects.

[28] https://www.solarninovinky.cz/projekt-green-mine-na-mostecku-vznikne-obri-plovouci-a-akvaponicka-solarni-elektrarna-s-akumulaci-ve-vodiku/

e. Dytiki Makedonia

In Dytiki Makedonia, there are three national OPs and two regional ones that have been analysed for the period 2021-2027 (all approved). One of them, the Just Development Transition OP builds on the approved TJTP – the first from all the Member States.

The national **Operational Programme Competitiveness** (ERDF/ESF+) has horizontal interventions for the entire country. It includes SME support, employment, and skills development measures which are of great importance for Dytiki Makedonia which is suffering from low competitiveness of SMEs, low export capacity and lack of skills pluralism. It also focusses on the assistance of existing SMEs for the implementation of innovative business plans, and investment in production, technological innovation, digitalisation, and exports. For instance, companies related to coal use can get assistance to diversify their services and products. In addition, employees at risk can get retraining and upskilling and support throughout the programme, as well assistance for their own entrepreneurship plans. The national **OP Human Resources and Social Cohesion** (ESF+) focusses on lifelong reskilling and upskilling opportunities for all citizens. As Dytiki Makedonia has the second highest unemployment rate in the country, these measures and actions that enhance employment, support entrepreneurship and reskilling/upskilling of the unemployed are of particular interest for this region. In addition, at this early stage of planning, the programme includes provision for 'special actions to create new employment in the areas that suffer from high unemployment', being of special importance for Dytiki Makedonia to mitigate the effects for decarbonisation. The **OP Environment and Climate Change** (ERDF/CF) focusses on the promotion of energy efficiency and adaptation to climate change. This programme has a specific project which involves natural gas infrastructure to divert district heating networks from the closed TPPs to the Ptolemaida V TPP. Therefore, investments in RES and other energy related infrastructure in these regions are of great importance as long as they provide long-term employment and have a high multiplier effect in the area.

The **Regional Operational Programme of West Macedonia** (ERDF/ESF+) has several measures planned for coal regions regarding the enhancement of sustainable development and competitiveness of SMEs, as well as promotion of energy efficiency measures, the improvement of access to employment for all jobseekers (in particular of youth) and the promotion of the adaptation of workers, enterprises and entrepreneurs to change. This programme covers the entire area of Dytiki Makedonia, including projects of regional significance like the Road Connection Kastoria-Ptolemaida, which is beneficial for the coal region specifically. The same applies to university, research centre and hospital projects that will benefit the SMEs and the local citizens of the coal region. The district heating project in Florina is of great importance for the area since it has extremely heavy winters, and therefore heating needs are quite elevated. This project will specifically mitigate potential energy poverty in Florina.

Finally, the **Just Development Transition Operational Programme** (combining ERDF, ESF+, CF and JTF) is tailored to the needs of Greek coal regions and has as priority to maintain the local economic activity within affected areas while avoiding phasing out coal mining activities. It aims also to enhance and promote entrepreneurship, encourage climate neutrality, redesign current land use and circular economy, improve just employment transition and human capital, among others. The OP is based on the TJTP for Western Macedonia (see below), but also covers two other transition-affected regions: Crete and the Aegean Islands (North and South). The support of the local population and avoidance of the internal migration to other regions is of great importance since currently the population of transition regions is declining. Diversification of the economic activity within the area to a multi-economical profile is an important goal that will allow for local growth, as well as reskilling and upskilling of the currently specialised labour force and avoidance of the energy poverty in the area. Some planned interventions are included in the areas of: 1) research, innovation and advanced

technologies (e.g. strengthening research infrastructure, creation of co-working spaces, etc.), 2) competitiveness of SMEs, including digital transformation of enterprises (e.g. supporting upgrading, diversification and conversion of existing businesses of all sizes – except large enterprises, promoting digital orientation, etc.), 3) entrepreneurship infrastructure and mechanisms (e.g. improvement of existing and creation of new business parks, etc.), 4) significant scale investments by non-SME enterprises, 5) energy upgrade of major public buildings, private houses or private offices, 6) clean energy, 7) smart energy, 8) interventions within the rehabilitated lignite mine areas, 9) circular economy, 10) active employment measures for the unemployed areas, and 11) upgrade and rehabilitation of archaeological sites and cultural points of tourist interest.

The **TJTP for Western Macedonia** covers the NUTS 3 regions Grevena-Kozani, Kastoria and Florina[29] and has indicative actions related to the restructuring of the region's production system, support to human capital and the communities that affected the decarbonisation process and the mitigation of negative effects on the environment, health and safety from lignite mining. It has a strong thematic alignment with the OP for Just Development Transition, as it is a strategic study that feeds into the design of priorities/projects for the region of Dytiki Makedonia. Also, it has a strong alignment with the Regional Operational Programme of West Macedonia and the Operational Programmes of Environment and Climate Change, Human Resources and Social Cohesion, and Competitiveness. During the design of the programme there was an extensive collaboration with the MAs of these programmes, as well as with the RRF.

Even though they are not tailor-made, the national OPs have synergies with the TJTP, as most of them are based in the same national strategy and have been designed in coordination among MAs. This includes SME support, enhancement of employment, skills development, which are thematic areas that the TJTP is also supporting in the area of West Macedonia. Regarding the Regional Operational Programme of West Macedonia, there is a close collaboration with the managing authority TJTP (ESPA-DAM) for avoidance of duplication of the actions. The SME support actions, and the employment actions that both programmes are financing in the area are complementing each other thematically. In addition, the ROP West Macedonia has included preparatory actions (maturity studies) for the implementation of projects funded by TJTP such as the Green Hydrogen project. The energy rehabilitation projects that Regional Operational Programme of West Macedonia will be financing are limited to small public buildings where other programmes are targeting bigger ones with high energy consumption like hospitals. The **Just Transition Operational Programme** has a strong interrelation with other programmes, and its differentiation is: a) it will support investments from non-SMEs, b) the support to SMEs that will provide is not horizontal, but geographically located and sectorial differentiated, c) it supports energy saving rehabilitation in specific groups of buildings that are not funded by the ROP or Energy and Climate Change programme, and d) it supports specific energy related interventions that are not supported by other programmes. Therefore, where the OP Competitiveness is providing support to SMEs for Greece, and the Regional Operational Programme of West Macedonia is doing the same for the region, the Operational Programme of Just Transition is differentiating supporting SMEs affected by the decarbonisation, or SMEs that can increase the employment of people affected by the transition (in the coal region). The cooperation between the programmes through the MAs ensures that the calls will diversify chronologically, but also, they may be merged with common funding within one call.

[29] Other TJTPs have been designed and tailored to Megalopolis, and to the North/South Aegean islands + Crete

f. Yugoiztochen

Finally, the analysis in Yugoiztochen covered two approved and one draft 2021-2027 Cohesion Policy programme as well as the TJTP for Stara Zagora (within Yugoiztochen) that will create the base for the upcoming JTF programme for the coal region.

Amongst the approved 2021-2027 OPs the ERDF **OP Competitiveness and Innovation in Enterprises** could impact the coal region through support of SMEs and through investments to facilitate knowledge transfer, environmental friendliness and digitalisation, clean technologies, and a circular and low-carbon economy. Furthermore, it should create jobs through productive investments, and into energy transition measures. Even though there is now specific budget allocated to coal regions[30] calls under the different SOs would be available for beneficiaries from coal regions to amongst others implement digital technologies, develop innovative products, processes, and business models, fund the more efficient use of natural resources in production and implement energy efficiency measures in enterprises. Also, the **OP Human Resources Development 2021-2027** is not explicitly dedicated to funding the transition. Still, ESF+ funds will be available for the coal region to promote innovation and the creation of new business models in the field of entrepreneurship, provide support to unemployed persons to start their own business and facilitate training for the acquisition of entrepreneurial, management and business skills. It will potentially create incentives for employers also outside the coal region to hire people from coal regions as incentives for work mobility are created. Incentives are also created for employees to participate in programmes for acquiring postgraduate qualifications.

The **Programme Development of the Regions 2021-2027** will combine funds from ERDF (EUR 1.2 billion) for all Bulgarian regions and JTF (EUR 1.5 billion) for the Yugoiztochen (i.e. Stara Zagora) and two other coal regions in the country Kustendil and Pernik. A dedicated and tailor-made PA on Just Energy Transition will be used to support coal regions with coping with changes in the employment landscape, the economy and environment prompted by the transition to achieve the EU's climate and energy goals for 2030 and 2050. Planned interventions will be funded through calls, amongst others in the area of productive investments in SMEs, investments in the creation of new companies, research and innovation activities, implementation of technologies as well as systems and infrastructures for affordable clean energy, rehabilitation and modernisation of district heating networks investments in regeneration and decontamination of abandoned sites, increasing the qualification and retraining of workers and job seekers, and providing job search assistance for seekers. JTF funds are expected to open jobs for the unemployed and ensure better development of economic potentials to help address the problem of demographic imbalances as well as the serious consequences of structural transition and crisis caused by the spread of COVID-19.

The planned investments under the **Programme Development of the Regions** 2021-2027 are based on the not yet approved **TJTP** for the coal regions of Bulgaria. It is the base for the measures described thereunder and sets out the objectives of JTF funds and outlines the integrated territorial investments to be dedicated to the Yugoiztochen region. The TJTP also feeds into the other two OPs outlined above as transition-relevant thematic areas and are also covered therein, i.e. investments in SMEs, business development and innovation under the Competitiveness and Innovation of Enterprises OP and training and skills development, employment, CLLD measures for active inclusion in the labour market of unemployed and inactive persons in the Human Resources Development OP.

Conclusions for the Yugoiztochen need to be treated with caution as the TJTP and the JTF-(ERDF) OP are not yet approved. Nevertheless, there is strong thematic alignment between all 2021-2027

[30] Though 10% of the programme budget is allocated to Integrated territorial investments of the 6 NUTS regions in Bulgaria among which is Yugoiztochen region.

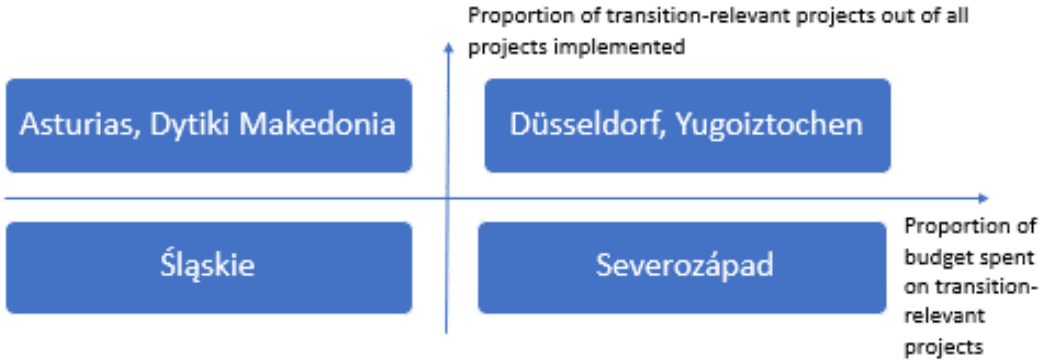
programmes with indirectly transition-relevant measures for all regions of Bulgaria included in the ERDF/ESF+ programmes and a dedicated PA with tailor-made policies included under the OP Development of the Regions 2021-2027.

4.4. Cross-case study comparison

Triangulating the findings from both the quantitative (section 4.1) and qualitative results from Cohesion Policy programmes of 2014-2020 (4.2) and 2021-2027 (section 4.3), conclusions can be drawn on noticeable similarities and consistencies between the case study regions in both periods and the differences between programmes of the last and current programming period. Conclusions are made on if and how Cohesion Policy is setting the base for transition and whether priorities within the programmes have changed.

4.4.1. Case study comparison between 2014-2020 OPs

Figure 16: Comparison of transition-relevant projects/budget in case study regions



Source: own elaboration

After the analysis of each case study, individually, draw cross-case study comparisons are made on:

- *The relevance of transition in Cohesion Policy programmes:* What can be seen is a categorisation (gradient) of regions depending on the proportion of transition-relevant projects out of all projects financed and the budget spent on transition-relevant projects compared to the total budget spent. Düsseldorf and Yugoiztochen are the regions in which both the proportions of transition-relevant projects and spending were highest, whereas they were the lowest in the coal region of Śląskie. In Asturias and Dytiki Makedonia, it seems that even though the proportion of projects was high, spending was lower, pointing to many projects with a smaller budget size. Finally, Severozápad seems to be the coal region in which project budgets were comparatively higher but fewer in number.

- *The share of relevant SOs under each Cohesion Policy programme:* Although 2014-2020 OPs do not include any specific tailor-made policies for coal regions and do not make explicit reference to transition, there are still numerous SOs under the programmes that likely had positive indirect effects on transition. The OP with the highest share of transition-relevant SOs is the Asturias ESF programme (88%), followed by the Operational Programme Human Resources Development (ESF) for Yugoiztochen (83%) and the Regional Operational Programme of West Macedonia (ERDF/ESF, 75%) – all regions in which the number of projects was also high. The programmes and regions in which the transition-relevant SOs were abundant were also the regions in which the number of projects implemented have a transition-relevant impact. On the other hand, the least transition-relevant programmes are the OP Digital Poland (10%) and OP Knowledge Education Growth (20%) in Śląskie, which is also the region in which the number of transition-relevant projects and budget spent was the least.

- *The thematic areas covered by Cohesion policy programmes:* the transition-relevant thematic areas which the analysed programmes covered implicitly are diverse across the OPs, yet are rather similar across the overall case regions covered by multiple programmes. While ERDF/CF programmes covered aspects of energy (efficiency and renewable energies), research and innovation, investments into SMEs and infrastructure, as well as environment protection and landscape revitalisation, ESF/YEI programmes touched upon the social aspects of transition including employment (particularly youth, women and rural communities), entrepreneurship and skills development, training programmes and the promotion of in-company training of workers. As shown in **Error! Reference source not found.** 12, the few transition-relevant topics that were not considered in all case study regions are, however, environmental rehabilitation (only in Śląskie and Severozápad) as well as the transformation of carbon-intensive installations in Düsseldorf.

- *Unique and explicit transition-related measures found under the OPs:* though not all are to be considered tailored policy for transition, there are at least some examples of projects found under Cohesion Policy programmes that explicitly refer to coal transition:
  - A land reclamation/revitalisation project in Śląskie to prevent the negative consequences of abandoned mining sites.
  - Inter-company apprenticeship training in Düsseldorf that offers this service also to companies in the coal mining sector and steel industry, providing workers training on processes and technologies to develop away from CO2-intensive approaches.

4.4.2. Case study comparison between 2021-2027 OPs

In the 2021-2027 period, the focus is no longer simply transition-relevant interventions but about tailor-made transition policies, with several case study regions having prepared dedicated transition-focused OPs (Severozápad and Dytiki Makedonia) and others having published multi-fund programmes with transition-focused PAs (Düsseldorf, Śląskie and Yugoiztochen. Building on the analysis of each case study, individually, the following cross-case study comparisons can be drawn on:

- *The share of relevant SOs under each Cohesion Policy programme:* from Annex VI the exclusively transition-focused OPs[31] cover only transition-relevant aspects – therefore PAs and SOs therein are 100% transition-relevant. Where JTF is only one of multiple funds covered by the programme, also other non-transition-relevant interventions are covered and therefore the share of transition-relevant SOs is lower. Nevertheless, the transition-focused PA within these OPs covers many of the important factors for transition. Non-JTF funded programmes remain potentially transition-relevant as their coverage of transition-relevant themes is still there. The non-JTF funded OP with the highest share of transition-relevant SOs in the 2021-2027 period[32] is the Greek Operational Programme Competitiveness (83%), followed by the OP Competitiveness and Innovation in Enterprises for Yugoiztochen (80%) and the Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027 (75%) – it remains to be seen whether the number of funded transition-relevant projects will be high. On the other hand, the least transition-relevant programmes in the 2021-2027 period seem to be the Polish European Funds for Digital Development (17%) [33]and Regional Operational Programme West Macedonia (30%).

- *The thematic areas covered by Cohesion Policy programmes*: the SOs and PA covered by the OPs, both the JTF and non-JTF funded ones, are again specific to each programme (ESF+/JTF

[31] Severozápad's OP Just Transition and Dytiki Makedonia's Just Development Transition Operational Programme
[32] To be noted that not all programmes have been approved.
[33] Still in draft stage

programmes/PAs more focused on the social dimensions while ERDF/CF/JTF programmes/PAs rather touch upon the topics of SMEs, R&I, environmental rehabilitation, clean energy and the transformation of carbon-intensive installations. Nevertheless, it can be observed in Table 11 that through the combination of all OPs covering the coal regions, most coal regions now cover all aspects of transition, also ones where there were gaps in the previous programming period (i.e. environmental rehabilitation and the transformation of carbon-intensive installations). JTF funded programmes even do so explicitly for coal regions, while other Cohesion Policy OPs remain with their potential availability to coal regions.

- *The alignment between OPs and TJTPs:* across all the case studies, JTF- and non JTF-funded programmes remain aligned. This has been assured through MAs collaborating in the drafting phase of the programmes and not only JTF- but also other programmes have considered findings from the respective TJTPs and overarching national/regional strategies (incl. RIS and NECP). Nevertheless, they have made sure that thematic areas do not overlap completely, avoiding potential duplication of calls resulting in double funding and confusion among beneficiaries. For example, in Dytiki Makedonia, the SME support actions and the employment actions financed by the Regional Operational Programme (ROP) West Macedonia and the Just Development Transition Operational Programme (JDTOP) complement each other thematically. The ROP focusses solely on preparatory actions (maturity studies) for the implementation of projects, while the JDTOP will fund their actual implementation (e.g. a green hydrogen project). Another example is Düsseldorf, where the ERDF/JTF and ESF+/JTF programmes both cover investments in new training and employment facilities but are differentiated by their coverage of 'hard'/infrastructural investments and 'soft'/training programmes.

4.4.3. Changes from 2014-2020 to 2021-2027 period

The establishment of the JTM and the dedicated EU funding instrument, the JTF, brought changes to the way Member States programmed their Cohesion Policy programmes in the new period. Not only did they develop exclusive OPs/PAs that focused on transition of coal- and carbon intensive regions specifically but the design of TJTPs (a requirement to receive JTF funds) also impacted other non-JTF programmes in the design phase.

Nevertheless, it would not be correct to assume the just transition of the regions began only with the establishment of the JTF and the 2021-2027 programmes. The case study regions show that Cohesion Policy of the 2014-2020 period already paved the way by incorporating a multitude of transition-relevant SOs into their programmes and eventually through investing considerable funds into the respective fields. As seen from the analysis, on average (across the six case study regions) already 80% of projects financed in the 2014-2020 period can be considered transition-relevant as well as 46% of ERDF-, ESF- and CF-funds invested. The extent of investment varies between coal regions with different reasons for more/less investments. Some of these pertinent reasons are:

- **Low absorption capacities in coal regions**: stakeholders in coal regions have sometimes not been very successful in their applications even though the funding for projects was available. Presumed reasons for the lack of success in some coal regions include: discordance among regional representations, a low cooperation of key regional stakeholders, lack of (personal) capacities, and experience in strategic project governance and management in comparison to more urban areas.
- **Absence of (strategic) projects:** strategic and large-scale projects can lead the way in the transition of a given coal region as it draws in increased attention and interest, also from private investors. In some regions, such flagship projects have brought other stakeholders on board

with the transition movement, sparked follow-up project ideas and inspired other stakeholders in the region to follow the lead.

- **Availability of other national financial resources to fund a transition:** in several Member States (in which coal phase out is typically more advanced) there are also other (and more substantial) financial resources available as compared to the JTF. For example, tailored transition-focused policy and actions have for many years been implemented through the national 'Miners Fund' in Asturias rather than Cohesion Policy programmes. In the coal regions of Düsseldorf (Rheinisches Revier), communities receive much larger and more easily accessible financial allocations for the transition through the EUR 40 billion made available through the coal phase out law. Nevertheless, it is ensured that Cohesion Policy programmes cover different projects that cannot be financed through these national funds.

- **Lack of commitment to phase out**: related to the above, several EU Member States have not yet committed to phase out coal by a specific date (see section 2). Such a lack of official commitment of the national government hinders MAs to design programmes and local and regional stakeholders to invest into projects facilitating such a transition. Setting an official end to coal mining and coal use would likely further increase the number of project proposals supporting just transition.

Now that official dedicated funding streams for transition exist, another question is whether the focus of non-JTF funded OPs in the 2021-2027 period are now less (implicitly) transition-relevant than programmes from the 2014-2020 period. The answer is likely no[34] as the average share of potentially transition relevant SOs remain high. Just because the JTF-programmes now exist, potentially transition-relevant investment opportunities under non-JTF funded OPs have not significantly decreased.

Overall, the average share of transition-relevant SOs across the analysed OPs (both JTF- and non-JTF-programmes) has increased from the 2014-2020 period to the 2021-2027 period in all case study regions.

The most apparent reason for the increase of importance of transition in the 2021-2027 OPs is the establishment of the JTF and overarching JTM. Accessing funding from this new instrument necessitated the development of TJTPs (for directly affected regions) and JTF programmes (independent or integrated into other Cohesion Policy OPs) to channel the funding. However, the official commitment to coal phase out and accompanying strategies to ease the transition could have also impacted the design of 2021-2027 OPs, as well as the non JTF-funded ones.

[34] Confirmation not yet possible as some OPs are still not approved.

Table 9: Comparison of on average transition-relevant SOs between 2014-2020 OPs and 2021-2027 OPs

Case study region	Average of share of relevant SOs 2014-2021 OPs	Average of share of relevant SOs 2021-2027 OPs
Düsseldorf (DE)	**2014-2020 (both programmes)**	**2021-2027 (ERDF/JTF North Rhine-Westphalia)**
	55,0%	75%
Dytiki Makedonia (GR)	**2014-2020 (all programmes)**	**2021-2027 (all programmes)**
	49,2%	58,2%
Principado de Asturias (ES)	**2014-2020 (three programmes)**	**2021-2027 (Asturias ERDF OP)**
	68,5%	71%
Severozápad (CZ)	**2014-2020 (all programmes)**	**2021-2027 (all programmes)**
	40,4%	58,7%
Śląskie (PL)	**2014-2020 (all programmes)**	**2021-2027 (all programmes)**
	32,8%	45,6%
Yugoitztochen (BU)	**2014-2020 (all programmes)**	**2021-2027 (all programmes)**
	65,0%	69,7%

Source: Own elaboration based on case study fiches.

4.5. Impact of COVID-19 for implementation and programming of EU Cohesion Policy & Recovery Funds in six coal regions

Following the COVID-19 pandemic, the EU adopted a set of policy measures relevant for and directly affecting Cohesion Policy. The Coronavirus Response Investment Initiative package (CRII and CRII+) established respectively in March and April 2020 provided Member States with greater flexibility and simplification to mobilise and reallocate swiftly funding within their Cohesion Policy programmes and respond to the impacts of the pandemic.[35] Amendments to the Common Provisions Regulation which are governing eight EU funds, including the ERDF, ESF+ and Cohesion Fund allowed for example to transfer up to 8% of the allocation of a priority to another one under the same programme. In addition to this package, the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) adopted in December 2020 provided additional funding in 2021 and 2022 (EUR 50.6 billion in total) to the 2014-2020 programmes and cohesion allocations for 2021-2027. These funds specifically aimed to enable investments supporting health services, SMEs and sectors most affected by the crisis as well as to support short-time work schemes, self-employed workers and job creation for the most vulnerable.

Evidence collected through interviews with managing authorities in the studied coal regions indicate similar findings as those identified in previous studies conducted on the impact of COVID-19 on the EU

[35] Coronavirus Response Investment Initiative package, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2020.099.01.0005.01.ENG&toc=OJ:L:2020:099:TOC
Coronavirus Response Investment Initiative package plus, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588165247288&uri=CELEX:32020R0558

Cohesion Policy: Cohesion Policy has been used swiftly in these regions as a short-term tool to mitigate the impacts of the pandemic (Böhme & Lüer 2020), and the greater flexibility provided by CRII, CRII+ allowed for the redeployment of funding across the programmes in some regions (Böhmer et al. 2022) as well as to support the uptake of health, economic and social measures urgently needed during the pandemic (Böhmer et al. 2022). Cohesion policy in the studied coal regions was therefore mainly impacted in two ways. First, Cohesion Policy was used as one of the crisis tools to react to and mitigate the impacts of the pandemic in the short term. Secondly, the pandemic induced some changes in the priorities of actions supported by the policies in the regions. Additionally, the national recovery and resilience plans as foreseen will also contribute to strengthen the objectives pursued by other Cohesion Policy programmes in the coal regions.

4.5.1. Cohesion Policy was used by the regions as a short-term crisis tool to mitigate the impacts of the COVID-19 pandemic

Cohesion Policy was used in the six studied regions to support sanitary and socio-economic measures. Three main areas that were more specifically prioritised in the short-term policies conducted were health, employment and education. Such policy measures notably translate the immediate response to the impacts of COVID-19 observed in section 3.4.

Several projects were implemented under Cohesion Policies to support health issues such as in the region of Severozápad in Czechia, where EUR 1.1 billion (CZK 27 billion) was dedicated under the Czech funding allocation of REACT-EU as part of the Integrated Regional Operational Programme. Similarly, projects were funded in the region of Dytiki Makedonia in Greece for hospitals, as a response to the impacts of the pandemics and structural challenges observed for the region in section 3.4 (i.e., lower availability of hospital beds and a decrease in the number of doctors available in 2020). In the region of Silesia in Poland, the Operational Programme Infrastructure and Environment was used to supply safety and emergency equipment in hospitals. In addition, projects totalling EUR 63.9 million (PLN 300 million) were supported in Poland through REACT-EU and provided special post-pandemic support to integrate primary health care e-services into the e-health system.

As the pandemic strongly impacted economic activities with an increase in unemployment rates and a downward trend in regional GDP across all regions in 2020, Cohesion Policy was also used to maintain the employment of workers during this period. The region of Yugoiztochen in Bulgaria made use of its Human Resources Development operational programme to implement a short-term employment procedure in July 2020, responding to challenges faced by companies to maintain the employment of their workers, despite the slowdown in their activities. Through this measure, employees and self-employed people working in hotels, restaurants, or the tourist industry - sectors particularly affected by the pandemic - could benefit from a compensation of EUR 148 (BGN 290) per employee per month. In Dytiki Makedonia, employment support measures targeted SMEs specifically.

On education, a project to provide ICT equipment for teleworking and remote education was funded in the region of Dytiki Makedonia to reply to the challenges imposed by lockdown restrictions and online education settings. In the region of Asturias, in Spain the REACT-EU funds contributed to support education in the region. Only in Severozapád the share of early school leavers increased with the start of the COVID-19 pandemic. In four of the other regions observed out of the six regions the share decreased while in Dytiki Makedonia it remained stable.

Such adjustments to the policy notably led some authorities to a reallocation of unused funds under the previous programming period, as allowed by the flexibility provided with the Coronavirus Response Investment Initiative package (CRII and CRII+). This was for example the case in Bulgaria

where unallocated funds until March 2020 of the Human Resources Development (HDR) operational programme were reallocated towards measures supporting employment.

4.5.2. COVID-19 led some regions to make adjustments in their next Cohesion Policy programming period (2021-2027)

While Cohesion Policy was used as a first response tool to mitigate the impacts of COVID-19, the pandemic also led to some changes in the next Cohesion Policy programming. The pandemic reinforced specific priorities of the Cohesion Policy in some of the regions, with a stronger focus on specific areas such as the labour market, social protection and healthcare. The next programming period of the Human Resources Development operational programme in Bulgaria will notably aim to fight against social exclusion, poverty risk, and promote social protection for vulnerable groups. As the country and the Yugoiztochen region both saw an increase in at-risk poverty rate by respectively 5.2% and 1.2% in 2020, some emphasis on youth action is also foreseen through the programme which will most notably promote youth employment and aim to tackle child poverty. This, together with the dedication of some of the ESF+ resources will aim to achieve high levels of employment, fair social protection and a skilled workforce in the region. In Asturias, where more than 20% of the population is considered at risk of poverty, specific attention will continue to be paid to education and employment, particularly of students and people with disabilities, through the ESF+ during the next programming period. Support will for example be provided for students with disabilities to avoid delays in their school year or by reinforcing existing links between schools and businesses to ensure a better integration of students into the labour market. In addition, the new programming period of the ERDF will focus on modernising hospitals and make healthcare services more efficient in the region, notably through increased efforts in digitalisation.

If addressing the effects of COVID-19 partly contributed to reshape and adjust Cohesion Policy programmes in some regions, managing authorities from other regions (Dytiki Makedonia, Severozápad, Düsseldorf) do not report a significant impact of COVID-19 in the design of their cohesion programmes. Instead, they stress that the existing structural economic difficulties faced by their regions remain the main driver and focus area of the policy conducted (Dytiki Makedonia) and that the structural changes brought by the pandemic are minimal compared to others due to the phase out of coal in these regions (Düsseldorf).

4.5.3. Post-COVID-19 recovery policies in the specific coal regions

The EU Recovery and Resilience Facility established to mitigate the economic and social impacts of the pandemic and foster the recovery of Member States will also contribute to support the transition of coal regions. Managing authorities interviewed report a few specific measures foreseen for these regions in the national recovery plans. The Dytiki Makedonia region should notably benefit from the Greek recovery plan through investments to restore and transition from the lignite mines in the region in light of the target to phase out lignite by 2028. In this regard, the development of digital infrastructure and networks in the region is seen as a necessary condition for the socioeconomic revitalisation of the area. Moreover, the Asturias region should benefit from a set of energy-efficiency measures foreseen in the national recovery plan. These will notably cover improvements on the efficiency of heating and buildings through the transition from coal to gas boilers. The fair and inclusive dimension of the country's energy transition as well as the modernisation and digitalisation of the industrial fabric are detailed as two key policy levers in the national recovery plan for coal regions and will complement the objectives pursued through the Just Transition Programme in the region.

Limited references to the six regions specifically can be found in the national recovery plans. However, additional measures are reported for coal regions more generally. This is notably the case of the Bulgarian recovery plan which foresees a project to phase out the use of coal for electricity generation in thermal power plants. The project will aim to design and build new infrastructure that are adequate for the use of hydrogen and gas in the power stations of the country's coal regions. Finally, other measures foreseen in the Cohesion Policy programmes of the regions that are aiming to strengthen the economy, innovation and energy efficiency are also expected to contribute indirectly to the recovery of the regions concerned.

5. RELATIONSHIP BETWEEN COHESION POLICY & OTHER INITIATIVES ON JUST TRANSITION

KEY FINDINGS

The exchange EU programme is a mechanism to overcome regional level information gaps by identifying appropriate partners. It has influenced Cohesion Policy (2021-2027 JTF-OPs and TJTPs specifically) through the identification of social impacts that can be included therein, the exchange of experiences between stakeholders involved in the drafting process of TJTPs/JTF-OPs and by the more advanced regions serving as an example to less advanced regions.

The TARGET programme supports EU coal, peat and oil shale regions with the identification and preparation of clean energy and energy efficiency projects to support a just transition. It has influenced Cohesion Policy as it helped beneficiaries to identify the proper source of funding for different projects (incl. Cohesion Policy instruments), supported capacity building of beneficiaries to better prepare subsequent projects and helped beneficiaries to improve the design for transition projects (especially innovative and complex ones) and prepare funding strategies and proposal that meet the standards of Cohesion Policy funds.

5.1. Introduction to the TARGET and the exchangeEU programmes

Two EU initiatives are of particular relevance to the scope of this study that support EU coal regions in their transition. Although other notable ones exist[36] this section focuses on the benefits of the programmes TARGET, a 'classical' technical assistance (TA) instrument that provides specialist expertise on a project basis, and exchangeEU, a rather 'new' instrument that revolves around the sharing of experience between peers, with Cohesion Policy.

TARGET[37] is a Joint European Commission-European Investment Bank (EIB) TA facility aimed at assisting EU coal, peat and oil shale regions with the identification and preparation of clean energy and energy efficiency projects to support a just transition. To date (December 2022), TARGET has served four beneficiaries from the following countries: Czechia, Slovenia, Estonia and Slovakia.

Specifically, TARGET support is reserved to projects that contribute to a just transition away from coal, peat, or shale activities and that foresee investments in clean energy or energy efficiency. Services offered under TARGET include:

- Support in the identification and preparation of individual projects
- Guidance to bring potential projects to a mature level
- Guidance on improving project quality and alignment to the relevant EU objectives
- Guidance on potential sources of funding
- Capacity building of beneficiaries
- Preparation of projects for support from other initiatives and support programmes
- Support for public authorities in project pipeline development.

[36] START Technical Assistance; DG REFORM's Technical Support Instrument (TSI); European Local Energy Assistance (ELENA); Joint Assistance to Support Projects in European Regions (JASPERS); InvestEU Advisory Hub; TAIEX-REGIO Peer2Peer
[37] https://www.eib.org/en/products/advisory-services/target/index.htm

ExchangeEU[38] is the exchange programme for coal, lignite, peat and oil shale regions (coal+) in transition in the EU. It provides an opportunity for peer-to-peer encounters with the goal to establish long-term connections that can accelerate the clean energy transition across different regions in the EU. The exchange programme is part of the Initiative for Coal Regions in Transition that provides other services to the coal+ regions of Europe. ExchangeEU brings together selected partner regions, with the aim of establishing meaningful that enable the regions to work together and exchange lessons learnt relating to the just transition. The exchanges are designed to set a foundation on which the participating regions can build cooperations in order to foster a just energy transition. In addition, it is a demand-driven programme design tailored to the participating regions, where they have hands-on learning opportunities and tangible results to take meaningful actions with other participants. It aims to create a community and network of practitioners with a lasting impact and benefits from other experiences and results, providing innovative and customised solutions for every participating region.

To date (December 2022), the exchangeEU programme has brought together 18 coal+ regions in eight exchanges, including four pair of regions and four triangles of regions. The participating regions represent a total of 12 countries: Bulgaria, Czechia, Estonia, Germany, Greece, Hungary, Ireland, Poland, Romania, Slovakia, Slovenia and Spain. The second implementation period of exchanges will occur between January and May 2023.

5.2. Analysis of benefits and impacts of TARGET and exchange EU

Several positive impacts were identified by the beneficiaries interviewed. It is important to mention that since both of these initiatives have been only recently introduced, the information presented for this analysis is mostly anecdotal.

According to a beneficiary, there are several identified impacts of the TARGET programme, specifically referring to the support provided for the design of transition projects (those being especially innovative and/or complex), as well as for securing funding in coal regions where there is a lack of technical knowledge and capacity. A specific example within a beneficiary region was a project supporting the stabilisation of the regional energy market via energy efficiency and clean energy measures. There is potential for a national expansion of the stabilisation, demonstrating the project's ambition. The beneficiary also indicated that another important impact was the identification of the right funding source for project implementation (e.g., regional, national, EU, private funds, bank loans) and the support for the preparation of a high-quality funding proposal ready for submission once the right thematic call for funding is launched (likely through the JTF). TARGET has helped to overcome constraints such as regions being unable to make the most effective use of Cohesion Funds, and has had positive outcomes in terms of securing funds, developing innovative projects that are better in line with the regional needs and their development ambitions. In addition, the beneficiary highlighted that the programme is facilitating the transition of the region based on this specific project, since its goal is to safely connect renewables to the grid. Once implemented, the transition will be smoother, allowing cooperation with the regional authority supporting the project as well.

Regarding the exchangeEU programme, the beneficiaries underlined usefulness of the the pre-exchange event of match-making that were organised for interested regions to find an exchange partner. This event was carried out with the aim of matching regions with shared interests, which was identified as an appropriate mechanism to overcome regional-level information and knowledge gaps. In general, several regions are interested in such an exchange of experiences, however, it becomes

[38] https://energy.ec.europa.eu/topics/oil-gas-and-coal/eu-coal-regions/eu-coal-regions-exchange-programme_en

challenging to identify partners. Based on this, the beneficiary highlighted how this event created a base for fruitful cooperation between regions and gave a chance to have an exchange on experiences, learnings, best practices and possible shortcomings. In addition, the beneficiaries underlined that participation in the programme has triggered significant changes, especially since the delegations involved from each side includes a variety of actors involved in transition. The exchanges gave them the opportunity to learn from the partner region (and in this specific case to understand the social problem of transition, going beyond the economic one, which is usually the main focus of the transition). Also, since in the delegations involved in the exchangeEU programme were high-level political authorities, the experience leveraged their understanding of the (social) impacts of transition on the actual citizens, recognising the practical side of their different decisions taken. Through the exchangeEU programme beneficiaries voiced that they had found a partner with whom they can exchange experiences and best practices, as well as beyond the end of the exchange programme, leaving a long-lasting effect on the authorities that participated. In addition, they highlighted how the programme has aided them to further collaborate with different stakeholders involved in the transition as well as (local) stakeholders excluded in the past.

5.2.1. Indirect and direct links with Cohesion Policy

In terms of indirect and direct links of the TARGET programme with Cohesion Policy, the beneficiary mentioned that the programme has helped to identify the most appropriate (Cohesion Policy) funding instrument for the TARGET supported project and other projects as well. The support through EIB experts has enabled the beneficiary to write high standard proposals and/or applications for funding that should meet the standards of the European Commission/Managing Authority. In addition, the beneficiary has been able to prepare applications for two other projects for ERDF and ESF funds, and two more for JTF. It was also pointed out that the TA provided by TARGET has played a crucial role in knowledge transfer and capacity building through the preparation of high-quality proposals, even for other types of funding. For instance, public authorities and other project promoters have been able to build on the experience of TARGET support by identifying projects within their region which may be of national interest and proposing them for inclusion in national level transition strategies and plans. This has also resulted in the better preparation of later projects and the better identification of potential funding opportunities. This project has been suggested for inclusion in the national TJTP as a project of strategic relevance, demonstrating that the regional government and MA are actively recognising the positive regional impacts of TARGET support.

The beneficiaries of exchangeEU also underlined several links with Cohesion Policy, for example the administration board is anticipating the enhancement of the Transition Plan's objectives and activities. Beneficiaries are expecting a substantial contribution from the exchangeEU in the plan's implementation phase due to the large involvement of the government in the exchange process. It was pointed out that it was possible to draft substantial recommendations from the submitted plan, covering topics discussed during the exchange programme and enhancing it further with robust data.

5.2.2. Synergies between programmes and Cohesion Policy

Several synergies were pointed out by the TARGET interviewees. For instance, the facilitator emphasised that there is a strong alignment between TARGET's focus on clean energy and energy efficiency projects and the EU's approach and funding for Just Transition, alongside a more general alignment to classical Cohesion Policy support (e.g., through ERDF and CF) for energy transition in the different EU regions. Therefore, the TARGET programme is one of the instruments supporting the transition. In addition, the facilitator pointed out that taking into account the context of multiple potential funding opportunities that may not be well known and understood at a regional level, the

specialist knowledge and expertise available through TARGET is of particular assistance in identifying the most appropriate funding sources, as well as the corresponding strategical development of suitable financial plans for transition-related projects. Therefore, since the funding landscape is becoming more complex due to the arrival and introduction of new programmes, the demand for TA provided by TARGET (or similar programmes) is expected to grow. Such TA initiatives can be considered as an important means to ensure that coal regions (and other regions facing similar knowledge and capacity constraints) are able to effectively integrate Cohesion Policy instruments in the design and implementation of their transition plans and projects.

The exchangeEU programme facilitator underlined the programme's focus on synergies across the different regional jurisdictions. The programme provided the opportunity to for the exchange of best practices on the correct use of the JTF in carrying out the transition and in identifying strategies for stakeholder engagement. In several exchanges, the focus has also been on other classical Cohesion Policy instruments such as ERDF, ESF, CF and to evaluate how these funds could be used to support the transition – a discussion topic that is expected to become even more pertinent in the second round of exchanges to take place in 2023, when most programmes have been approved. Finally, they concluded that exchangeEU has helped beneficiaries to reflect on the holistic nature of the just transition, diving into a variety of topics picked up by Cohesion Policy programmes (e.g., reskilling and education, research and innovation, SME development, rehabilitation and reconversion, etc.). It remains to be seen how the broad variety of Cohesion Policy instruments will be used to cover all the previously mentioned topics.

6. CONCLUSIONS & RECOMMENDATIONS

This section reflects on the key findings and conclusions of the Study. Where practically relevant, this section also develops specific recommendations for the REGI Committee that can help to guide its members in relation to their work on coal regions and Cohesion Policy. These recommendations are also mindful of and complementary to those made by the European Court of Auditors special report on EU Support to coal regions (2022).

Conclusion 1:

Socio-economic and territorial analysis of all EU coal regions show they exhibit differences and have unique characteristics, each with their own distinct timelines of transition, needs and opportunities

This study analysed the socioeconomic characteristics of coal regions with the latest available data points and special attention was given to the labour market contribution in terms of employment. As such it was shown that, on average, EU coal regions have a lower GDP per capita (EUR 23 286) than the European average (EUR 29 900). It was, however, explained that this is not a set rule and that there are also some coal regions which are above the national average of their respective countries.

Most coal regions have unemployment rates below the EU average, with approximately half of them also having unemployment rates below their national average. Coal regions display, on average, higher rates of social exclusion than their national averages and EU averages, with the general exception of Spanish and some Polish regions.

This study also demonstrated how the current relative weight of the coal industry in the economy is rather varied. The highest number of directly coal related jobs in Europe are currently in Poland, Germany, Czechia, Bulgaria, and Romania. This analysis needs to bear in mind the timeline and transition path followed in each of the coal regions. For instance, the Spanish regions have almost completed the phasing out of coal extraction.

This study also provided an in-depth individual assessment as well as a comparative analysis of the six case study coal regions. This considered key coal statistics, transition challenges and opportunities, the priorities of their transition policies, future policy considerations, and the impact of COVID-19. This identified differences with the methods and types of coal mining, suggesting that the transition considerations amongst the regions differ when it comes to environmental degradation, infrastructure, and the skills and specialisations of the workforce.

In sum, there are strong differences in the socioeconomic characteristics of coal regions and consequently there is no one-size fits all territorial and socio-economic classification for their characteristics and needs. Addressing their future needs in the transition process will be different in each region. For example, there is also a need for case-by-case regional assessments on the appropriateness and significance of the shift towards new and clean energy sources. While there may be potential for some coal regions to become important players in renewable energy generation and storage, this will depend on their suitability and climate conditions (e.g., wind and solar potential) and their ability to generate employment and offer reskilling opportunities to the workforce previously employed in the coal sector.

Recommendation:

Policies and instruments to support the just transition should accommodate the specific characteristics of each coal region, which may require the strengthening of regional-level inputs into their design.

An example of this would be for regions to assess or 'audit' workers' existing skills. One of the main challenges facing regions in transition is the reskilling and upskilling of workers in "obsolete" jobs as well as those unemployed. Auditing skills of existing workers will actively support workers in transferring these skills to new employment, or to develop and acquire new skills.

An alternative example would be to establish local innovation hubs in coal regions which are specifically designed to support SMEs (particularly those which were formerly coal-sector related) in developing new products, services, and technologies. This could be done through mentoring, training, and other resources to ensure SMEs can innovate in a manner which is complementary to desired regional economic changes.

Conclusion 2:

In parallel to the divergences across regions explained above, differences persist in terms of policy and political commitments to coal phase-out, with no common approach on whether just transition policies are stand-alone or integrated into broader initiatives

Differences in coal related statistics across EU coal regions demonstrate how data on coal mining and related employment can be used to elucidate key differences between coal regions in relation to their industry specificities and political commitment to coal phase out. The case study regions share many transition challenges and opportunities relating to environmental, social and economic concerns, while also diverging on certain aspects due to their own geographical, historical and industry differences. Divergences between the regions seem to be reflected in the priorities of their just transition policies, with key considerations to be drawn from them as to the future priorities of policies and available funding.

In examining the regional and national transition policies and Cohesion Policy programmes, it becomes clear that priorities and the extent of deployment of funds differ across the regions. Several Member States opted for broader approaches, addressing different aspects of the transition through national policies and strategies as well as Cohesion Policy programmes implemented at the national level like Bulgaria and Czechia. Meanwhile, other countries integrate Cohesion Policy funds into regional programmes encompassing multiple considerations, as is the case for Germany, Greece and Spain. Alternative funds are sometimes used instead of Cohesion Funds, for example the Miners' Fund in Spain, or the Structural Strengthening Act in Germany.

Indeed, Cohesion Policy is seen as adequately flexible and suitable to accommodate the differing needs across coal regions with diverse characteristics, especially now with the JTM available for truly transition-focused investments. Nevertheless, these interventions to address these needs must be aligned across different Cohesion Policy programmes as well as relevant national and regional strategies/programmes.

Conclusions 3:

There has been a highly varied contribution of 2014-2020 Cohesion Policy to the support of transition-related activities and the transition to carbon and climate resilient activities

This study also provided an assessment on the number of projects and budget spent in six case study regions that are, on the one hand, low-carbon and climate resilient investments, and on the other hand, transition-relevant investments.

The share of potentially transition-relevant projects as a share of total projects is highest in Düsseldorf (99%) and Yugoiztochen (96%) and lowest in Śląskie (76%) and Severozápad (71%). The highest budget shares spent on potentially transition-relevant projects as a share of total budget spent in the coal region is highest again in Düsseldorf (91%) and Severozapad (85%) and lowest in Śląskie (31%).

The share of low-carbon and climate resilient investments as a share of total projects is highest in Severozápad (18%), Asturias and Śląskie (both 16%) and lowest in Yugoiztochen (5%) and Düsseldorf (2%). The highest share of low-carbon and climate resilient investments as a share of total budget spent in the coal region is highest again in Yugoiztochen (44%) and Śląskie (33%) and lowest in Dytiki Makedonia (12%).

Conclusion 4:

Despite no explicit references to coal phase out, transition-relevant investments have already been financed extensively in the 2014-2020 programming period, contributing to a smarter, greener, and more connected Europe.

This study provided a quantitative and qualitative analysis of the key thematic focus of projects in the coal regions funded through Cohesion Policy and their expected results. In doing so, a comparison was made across OPs and the share of PAs and SOs that could contribute to transition were highlighted.

Although 2014-2020 OPs do not include any tailor-made policies for coal regions specifically and do not explicitly refer to the transition, numerous SOs under the programmes had strong positive effects on the transition. The OP with the highest share of transition-relevant SOs is the Asturias ESF programme (88%), followed by the Operational Programme Human Resources Development (ESF) for Yugoiztochen (83%) and the Regional Operational Programme of West Macedonia (ERDF/ESF, 75%) – all regions in which the number of projects (in terms of transition-relevant projects) was also high. From this it is possible to deduce that the programmes and regions in which the transition-relevant SOs were abundant were also the regions with the highest proportion of implemented projects. On the other hand, it is observed that the least transition-relevant programmes are the OP Digital Poland (10%) and OP Knowledge Education Growth (20%) in Śląskie which is also the region in which the number of transition-relevant projects and budget spent were the least.

In sum, the case study regions show that Cohesion Policy of the 2014-2020 period already paved the way for the transition by incorporating a multitude of transition-relevant SOs into their programmes and eventually also investing considerable funds into the respective fields. While most social transition-relevant aspects (up-skilling, re-skilling, training) were covered in all coal regions through ESF-programmes, SOs to allow the environmental rehabilitation and revitalisation and the transformation of carbon-intensive installations were occasionally missing in ERDF/CF programmes in some case study regions. Furthermore, an analysis of the size of projects funded in EU coal regions demonstrates very few larger flagship projects. In the instances where flagship projects have been funded, they have brought stakeholders on board of the transition movement, sparked follow-up project ideas, and inspired other stakeholders in the region to follow the lead.

Recommendation:

The REGI Committee could ensure that the programming and implementation of Cohesion Policy programmes for 2021-2027 recognise the multidimensional aspects of transition, including environmental rehabilitation and revitalisation of mining sites, and the transformation of carbon-intensive installations, together with variable scales of projects from small to large.

Conclusions 5:

Delays persist in the approval of some Cohesion Policy and TJTP programmes across Europe

Both within the selected case study regions examined and across EU coal regions more broadly, many Operational Programmes as well as Territorial Just Transition Plans remain to be approved by regional / national authorities and the European Commission. This creates problems not only for the alignment and the implementation within Member States (despite efforts of managing authorities collaborating in the drafting phase) but also to ensure alignment and comparability across Europe. It makes cross-comparisons more difficult and prevents the exchange of outcomes and sharing of lessons learnt. As such, going forward in the 2021-2027 period, there must be significant efforts and pressure at the EU-level to harmonise processes and timing concerning implementation and evaluation across EU coal regions.

Recommendation:

The REGI Committee could encourage the European Commission, as well as relevant national and regional administrations, to monitor and evaluate the implementation of Cohesion Policy for the 2021-2027 programming period, including with regard to strict observance of procedures and timelines. For example, the REGI Committee can encourage that midterm evaluations of OPs are done in close synchronisation. Moreover, overall monitoring of coal transition indicators prior to the evaluation needs to be prioritised and strengthened (including specific monitoring on how much is spent on coal transition).

Conclusion 6:

The establishment of the JTM and dedicated EU funding instrument, the JTF, has brought changes to the way Member States programmed their Cohesion programmes in the new period, with more specific focus on transition.

Based on draft or already published OPs, as well as from insights gathered directly from managing authority interviews, this study shows that the JTF as well as increased commitment to coal phase out have brought some changes to the way Member States programmed their Cohesion Policy programmes in the new period. Both the explicitly and implicitly planned investments into transition topics have increased as compared to the previous period, at least by the share of SOs fostering transition. Not only did they develop exclusive OPs/PAs that focused on the transition of coal- and carbon intensive regions specifically but the design of TJTPs (a requirement to receive JTF funds) but they also impacted other non-JTF programmes in the design phase.

Moreover, based on the information available on the 2021-2027 Cohesion Policy period, it was demonstrated that the share of transition-relevant SOs under the 23 OPs analysed ranges from 100% (dedicated JTF-programmes) and 83% (non-JTF programme) to 17%. OPs of the 2021-2027 period cover all relevant transition topics (also environmental rehabilitation and the transformation of carbon-

intensive installations which were still considered as gaps before). Approved JTF-funded programmes cover most of these transition-relevant topics, depending on the local context. Nevertheless, non-JTF funded programmes remain potentially transition-relevant as their coverage of transition-relevant topics remains in place.

Recommendation:

The REGI Committee could emphasize the fundamental importance and need to strengthen alignment, coordination and cooperation among managing authorities for ERDF, ESF, CF and JFT, with the purpose of creating synergies, avoiding duplication of project funding instruments, and enhancing flexibility and availability for beneficiaries. This could, for example, be achieved by requiring Member States/regions to provide a report on the complementarities and synergies developed between the different Cohesion Funds and the TJTP that are aimed at supporting the coal transition.

Recommendation:

The REGI Committee should be aware of the fact that the JTF is currently scheduled to finish in 2029 and that, therefore, there is no guarantee that JTF programmes will continue to support the coal-transition beyond that date. As such, it is essential to ensure that there are transition-relevant considerations in the planning for future OPs.

Conclusion 7:

Programmes for coal regions (exchangeEU & TARGET) have demonstrated successful outcomes and synergies have been/are being reaped with Cohesion Policy Instruments

The exchangeEU programme is a mechanism to overcome regional-level information gaps by identifying appropriate partners. It has influenced Cohesion Policy (2021-2027 JTF-OPs and TJTPs specifically) through the identification of social impacts that can be included therein, the exchange of experiences between stakeholders involved in the drafting process of TJTPs/JTF-OPs and by the more advanced regions serving as an example to less advanced regions.

The TARGET programme supports EU coal, peat and oil shale regions with the identification and preparation of clean energy and energy efficiency projects to support a just transition. It has influenced Cohesion Policy as it helped beneficiaries to identify the proper source of funding for different projects (including Cohesion Policy instruments), supported capacity building of beneficiaries to better prepare subsequent projects and helped beneficiaries to improve the design for transition projects (especially innovative and complex ones) and prepare funding strategies and proposals that meet the standards of Cohesion Policy funds. Also in the future, TARGET aims to continue this support to other regions and beneficiaries. An increase in demand is expected as Cohesion Policy funding for the 2021-2027 period becomes available.

Recommendation:

The REGI Committee should ensure that EU coal regions are better informed about the considerable body of good practice examples and lessons for achieving the transition in a socially acceptable way, together with informing them of available technical assistance and capacity building instruments supporting the just transition, including recently launched facilities such as exchangeEU and TARGET.

Conclusion 8:

Covid-19 impact had a varied impact on six case study regions, with some being impacted more than others. In response, Cohesion Policy was used as both a short-term response and the pandemic also induced some long-term changes in 2021-27 programming.

This study provided an analysis of the impacts of the COVID-19 on health, social, economic and sectoral matters in the six coal regions case studies and presented the changes in trends of key indicators that will have implications for the just transition.

For example, in-relation health-related indicators, the incidence of COVID-19 was not uniform across coal regions. The pandemic evolved differently across the regions, with substantial changes to the availability of healthcare personnel and equipment. Certain regions may have handled the impacts of the pandemic more effectively with a higher availability of hospital beds, thus being able to stabilise higher numbers of patients. As concerns unemployment, the main conclusions that can be elucidated from the analysis of unemployment rate across the coal regions is that it generally increased in 2020 and 2021. The only exception amongst the case study regions is that of Dytiki Macedonia. Moreover, the sectoral trends across regions between 2018 and 2021 are quite diverse. There is no clear trend of one sector increasing or decreasing across all regions.

This study also provided an analysis on how the aftermaths of the Covid-19 pandemic impacted the implementation of EU Cohesion Policy in the coal regions. Cohesion Policy has been used swiftly in these regions as a short-term tool to mitigate the impacts of the pandemic. In the studied coal regions, Cohesion Policy instruments were primarily used in two ways to respond to the Covid-19 pandemic. First, Cohesion Policy was used as one of the crisis tools to react to and mitigate the impacts of the pandemic in the short term. Three main areas more specifically were prioritised in the short-term policies conducted: health, employment and education. Secondly, the pandemic induced some changes in the priorities of actions supported by the policies in the regions for 2021-2027. The pandemic reinforced specific priorities of the Cohesion Policy in some of the regions, with a stronger focus on specific areas such as labour market, social protection and healthcare.

Additionally, the national recovery and resilience plans as foreseen will also contribute to strengthen the objectives pursued by other Cohesion Policy programmes in the coal regions. Limited references to the six regions specifically can be found in the national recovery plans. However, additional measures are reported for coal regions more generally.

Recommendation:

In the context of the evaluation of ex-post 2014-2020 & mid-term 2021-2027 programmes, the REGI Committee could underline that specific attention ought to be given to the assessment of how Cohesion funds were used to respond to the COVID-19 pandemic.

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ANNEXES

ANNEX I – KEY TRANSITION CHALLENGES AND OPPORTUNITIES OF THE SIX CASE STUDY REGIONS

Region (MS)	Key transition challenges			Key transition opportunities		
	Social	**Environmental**	**Economic**	**Social**	**Environmental**	**Economic**
Principado de Asturias (ES)	Loss of employment; 57/78 municipalities affected, 21 severely	Environmental degradation Pollution affecting environment and health	Rising energy prices from war Switch from regional net exporter to net importer of electricity Impacts for significant and diverse electricity-intensive industries	Reskilling and upskilling workforce Workforce with high degree of specialisation Strong infrastructure for logistics.	Restoration and repurposing of former mining sites	Renewable energy production and storage potential; photovoltaic, thermal, offshore and onshore wind Industrial waste heat recovery Tourism centres promoting regional history well-established network of research centres Multiple industry sectors for diversification Location provides export/logistic centre opportunities
Śląskie (PL)	Most coal-dependent region in EU Loss of employment	Environmental degradation Pollution affecting environment and health	Rising energy prices from war Loss of economic position Failure to adapt labour market needs	Reskilling and upskilling workforce Increased acceptance of transition needs and slogan of "Green Silesia"	Energy and the Green Economy are part of the Regional Innovation Strategy (RIS), significant concentration of funding for their development	Renewable energy production and storage potential; photovoltaic, geothermal

	Low labour force participation; negative migration Accelerated retirement Distrust and resistance to change	Highest percentage of degraded land in the country				Good economic situation as a starting point;
Düsseldorf (DE)	Loss of employment Loss in wider value chain with many coal dependent energy-intensive industries	Environmental degradation Pollution affecting environment and health	Rising energy prices from war	Reskilling and upskilling workforce Strong stakeholder collaboration to develop a vision for the region and implement concrete projects	Restoration and repurposing of former mining sites	Renewable energy production and storage potential; photovoltaic, wind Regional promotion and investment in economic sustainability
Severozápad (CZ)	Loss of employment High rates of low income High rates of low education Fast growth of old age index and low birth rate Outflow of young population Mining sector dependence	Environmental degradation Pollution affecting environment and health	Underdeveloped SME sector and large company dependence Rising energy prices from war Lack of research and development support	Reskilling and upskilling workforce	Restoration and repurposing of former mining sites	Renewable energy production and storage potential; hydrogen, geothermal Decentralised energy production and energy communities Support to SMEs and research and development support Potential for smart specialisation and digitalisation Application of circular economy principles
Dytiki Makedonia (GR)	Loss of employment	Environmental degradation	Rising energy prices from war	Reskilling and upskilling workforce	Restoration and repurposing of former mining sites	Renewable energy production and storage potential;

	Loss of longstanding energy security and independence Mono-specialised labour skills	Pollution affecting environment and health	High economic dependence with low productivity diversification and competitiveness	Previous investments in local university and research centre		photovoltaic, biomass, hydrogen Location provides export/logistic centre opportunities
Yugoitztochen (BU)	Loss of employment Aging population, depopulation Lack of constructure stakeholder dialogue Poor qualifications of workforce	Environmental degradation Pollution affecting environment and health	SME dominant economy Rising energy prices from war	Reskilling and upskilling workforce	Restoration and repurposing of former mining sites Waste and wastewater treatment measures	Renewable energy production and storage potential; photovoltaic, hydrogen, wind, biomethane, geothermal

ANNEX II – RELEVANT JUST TRANSITION POLICIES PRIORITIES OF THE CASE STUDY REGIONS

Region (MS)	**Just Transition Policies Priorities**				
	Cohesion Policy 2014-2020		Cohesion Policy 2021-2027		
	ERDF	ESF	ERDF	ESF	JTF
Principado de Asturias (ES)	Strengthening research, technological development and innovation Enhancing the competitiveness of SMEs Protecting the environment and promoting resource efficiency To strengthen research, technological development and innovation Improving the competitiveness of SMEs Fostering the shift to a low-carbon economy in all sectors Conserving and protecting the environment and promoting resource efficiency Support crisis repair in the context of the COVID-19 pandemic and its social consequences and prepare for a green, digital and resilient recovery of the economy.	Promote the sustainability and quality of employment and support to labour mobility Invest in education, training and professional training for the acquisition of capacities and permanent learning in less developed regions with a co-financing rate of 80%.	Promote technological exchange between knowledgeable agents and businesses, encouraging the creation of innovative enterprises. Favour the digital transformation of the Asturian economy by incorporating new technologies. Improve the competitiveness of Asturian SMEs. Promote the ecological transition through the development of investments that contribute towards energetic efficiency, reduce, and mitigate the effects of climate change. Guarantee a more efficient use of natural resources.	Youth unemployment .	Tackling unemployment in industries slow and difficult to decarbonise Promote employment and new opportunities for SMEs

Śląskie (PL)	Reduction of the emission intensity of the economy Environmental protection, including adaptation to climate change Improving energy security Support for conducting R&D works by enterprises Support for environment and potential of enterprises to conduct R&D&I activity Support for innovation in enterprises Enhancing the capacity of enterprises and preparing for the digital transformation in the context of the COVID-19 pandemic Digital Competence for Society Modern economy Competitiveness of SMEs Energy efficiency, renewable energy sources and low-carbon economy Environmental protection and resource efficiency Regional labour market Regional knowledge economy Recovery from the COVID-19 pandemic - REACT-EU	Labour market open for all Effective public policies for the labour market, economy and education	Support to energy and environment sectors from the ERDF Support for entrepreneurs Greening of enterprises Advanced digital services	Better policies for social development Higher education and science	*Joint ERDF, ESF & JTF Intelligent Silesia Ecological Silesia Silesia in transformation Economy Environment Society
Düsseldorf (DE)	Strengthening research, technological development and innovation (39% of funds)	Promoting employment and supporting labour mobility	*Integrated ERDF, JTF & ESF Innovative NRW SME-friendly NRW		Objectives: Mitigating the direct impact on value creation and employment

	Increase the competitiveness of SMEs Reduction of CO2 emissions	Investing in education, skills and lifelong learning	Sustainable NRW Sustainable Coal Regions		Compensation for lost value creation and employment through diversification and modernisation of the regional economy Guarantee the necessary energy supply through renewable energies
Severozápad (CZ)	Enhancing public services and living conditions for the inhabitants of regions Community-led local development Improving the quality of air in human settlements Waste and material flows, ecological burdens and risks Conservation and care of nature and landscape Energy savings Promotion of research and development for innovation Development of SMEs' entrepreneurship and competitiveness Efficient energy management, development of energy infrastructure and renewable energy sources, support for the introduction of new technologies in the management of energy and secondary raw materials Strengthening capacity for high-quality research	Promoting employment and workforce adaptability Social inclusion and combating poverty Social innovation and transnational cooperation Strengthening the performance of enterprises in the field of research, development and innovation and their digital transformation Business development and competitiveness of SMEs Development of digital infrastructure Shifting to a low-carbon economy	Green infrastructure of cities and municipalities and protection of the population Development of transport infrastructure Improving the quality and availability of social and health services, educational infrastructure, and the development of cultural heritage Community-led local development Strengthening the performance of enterprises in the field of research, development and innovation and their digital transformation PA 2: Business development and competitiveness of SMEs Development of digital infrastructure Shifting to a low-carbon economy Research and development Education Environment	The future of work Social inclusion Social innovation	Karlovy Vary Region Ustecky Region Moravian-Silesian Region

	Development of universities and human resources for research and development Equal access to high-quality pre-school, primary and secondary education				
Dytiki Makedonia (GR)	Implementation of climate change adaptation strategies, prevention and risk management- Cohesion Fund Preserving and protecting the environment- promoting efficient use of resources- Cohesion Fund Enhancement of research, technological development, and innovation Improvement of competitiveness of small and medium-sized enterprises Transition support to an economy with low carbon emissions in all sectors Promoting climate change adaptation, prevention, and risk management Preservation and protection of the environment and promotion of resource efficiency	*Integrated ERDF & ESF Development of Entrepreneurship in national sectoral priority areas Adaptation of employees, enterprises, and the business environment to the new development requirements Development of entrepreneurship support mechanisms Improving employment prospects and developing human resources' skills Facilitating Employment Access for Youth up to 29 years old Developing Lifelong Learning and Improving relevance of education and training to the labour market	Energy Efficiency – Promotion of RES – Energy Infrastructure Adaptation to Climate Change	Employment and Labour Market: interventions to tackle unemployment, equal access to the labour market, promotion of gender balance in the labour market and enhancement of the the employability and social inclusion of vulnerable groups. Education and Lifelong Learning: interventions to upgrade the quality and enhancement the extroversion and relevance of education at all levels, lifelong learning in the labour market, promotion of equal access to quality and inclusive education and training, as well as promotion of lifelong learning.	Enhancement and Promotion of Entrepreneurship Energy Transition – Climate Neutrality Redesign of current land use, and circular economy Just Employment Transition and Enhancement of Human Capital Small Scale interventions Restoration, rehabilitation and upgrading of lignite zones in Western Macedonia Social Cohesion and economic transformation of the area (Transition to a new production model) Governance
Yugoitztochen (BU)	Support for energy efficiency in peripheral regions Regional educational infrastructure Regional Social Infrastructure	Improving the access to employment and the quality of jobs Modernising the institutions in the area of social inclusion, healthcare, equal opportunities	Just Energy Transition Innovation and growth; Circular economy;	Promoting employment and skills development Social inclusion and equal opportunities Promotion of youth employment	Industry for sustainable energy solutions Social support and employment support - supports the social transition.

	Technological development and innovation Entrepreneurship and capacity for growth of SMEs Energy and resource efficiency of the enterprises	and non-discrimination and working conditions Support to overcome the effects of the crisis caused by the COVID-19 outbreak and preparation for ecological, digital and resilient recovery of the economy			Diversification of the local economy Horizontal Axis: Capacity building

ANNEX III – LIST OF OPERATIONAL PROGRAMMES ANALYSED

OPs analysed under the 2014-2020 Cohesion Policy period, including Annual Implementation Reports (AIR) and other sources

Case study region	Programme	Level	Fund	General Link	Source of project data (AIR / database of projects), YEAR	Link to source of project data (AIR / database of projects)	Data available at level
Principado de Asturias (ES)	Asturias ERDF 2014-20 OP	regional	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/spain/2014es16rfop005	Informe de Ejecución 2014-2020 programa operativo del Principado de Asturias FEDER-Espana, 2020	https://www.fondoseuropeos.hacienda.gob.es/sitios/dgfc/es-ES/ipr/fcp1420/gs/feder/cs/Documents/Informe_Ejecucion_Anual_2020_PO_FEDER_Asturias_2014-2020.pdf	NUTS3
	Multiregional OP for Spain ERDF 2014-20	multiregional	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/spain/2014es16rfop002	Informe de Ejecución 2014-2020 programa operativo Plurirreginal de Espana FEDER-Espana, 2020	https://www.fondoseuropeos.hacienda.gob.es/sitios/dgfc/es-ES/ipr/fcp1420/gs/feder/cs/Documents/POPE-Informe_de_ejecucion_anual_2020-aprobado.pdf	NUTS3
	Asturias ESF 2014-20 OP	regional	ESF	https://ec.europa.eu/regional_policy/opempl/detail.cfm?cci=2014ES05SFOP004&lan=en	Informe anual de ejecución para el objetivo de inversión para el crecimiento y el empleo, 2020	https://www.mites.gob.es/uafse/ficheros/properativos/regionales/asturias/iae/iae2020_asturias.pdf	NUTS3
Śląskie (PL)	OP Digital Poland	national	ERDF	https://ec.europa.eu/regional_policy/pl/atlas/programmes/2014-2020/poland/2014pl16rfop002	Report on the implementation of the Digital Poland Program, 2021	https://www.polskacyfrowa.gov.pl/strony/o-programie/raporty/sprawozdania/#/domyslne=1	NUTS2
	OP Infrastructure and Environment	national	ERDF/CF	https://ec.europa.eu/regional_policy/pl/atlas/programmes/2014-2020/poland/2014pl16m1op001	Report on the implementation of the Infrastructure and Environment Operational Programme 2014-2020, 2021	https://www.pois.gov.pl/strony/o-programie/raporty/sprawozdania/#/domyslne=1	NUTS2
	OP Smart growth	national	ERDF	https://ec.europa.eu/regional_policy/pl/atlas/programmes/2014-2020/poland/2014pl16rfop001	Sprawozdanie z realizacji Programu Inteligentny Rozwój za 2021 rok, 2021	https://www.poir.gov.pl/strony/o-programie/raporty/sprawozdania-z-realizacji-programu/#/domyslne=1	NUTS2
	ROP 12 Regional Operational Programme for Śląskie Voivodeship	regional	ERDF/ESF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/poland/2014pl16m2op012	Annual report on the implementation of the ROP WSL 2014-2020, 2021	https://rpo.slaskie.pl/czytaj/sprawozdania	NUTS2

Case study region	Programme	Level	Fund	General Link	Source of project data (AIR / database of projects), YEAR	Link to source of project data (AIR / database of projects)	Data available at level
	OP Knowledge Education Growth	national	ESF/YEI	https://ec.europa.eu/regional_policy/opempl/detail.cfm?cci=2014PL05M9OP001&lan=en	Sprawozdanie z realizacji Programu Wiedza Edukacja Rozwój w 2021 roku, 2021	https://www.power.gov.pl/strony/o-programie/raporty/sprawozdania/#/domyslne=1	NUTS2
Düsseldorf (DE)	OP Nordrhein-Westfalen ERDF 2014-2020	regional	ERDF	https://ec.europa.eu/regional_policy/de/atlas/programmes/2014-2020/germany/2014de16rfop009	Jährlicher Durchführungsbericht im Rahmen des Ziels "Investitionen in Wachstum und Beschäftigung", 2020	https://www.efre.nrw.de/fileadmin/user_upload/Durchfuehrungsbericht_2020.pdf	NUTS3
	Operational Programme ESF Nordrhein-Westfalen 2014-2020	regional	ESF	https://ec.europa.eu/regional_policy/opempl/detail.cfm?cci=2014DE05SFOP010&lan=en	Liste der Vorhaben (Database of projects), 2022	https://www.mags.nrw/esf-oeffentlichkeitsarbeit-2014-2020	NUTS3
Severozápad (CZ)	OP Enterprise and Innovation for Competitiveness	national	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/czechia/2014cz16rfop001	Výroční zpráva o implementaci programu Operační programme Podnikání a inovace pro konkurenceschopnost 2014 – 2020, 2021	https://www.mpo.cz/assets/cz/podnikani/dotace-a-podpora-podnikani/oppik-2014-2020/operacni-program-podnikani-a-inovace-pro-konkurenceschopnost/2022/7/Vyrocni-zprava-OP-PIK-2021.pdf	NUTS3
	OP Environment	national	ERDF/CF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/czechia/2014cz16m1op002	Výroční zpráva o implementaci programu Operační programme Životní prostředí za rok 2021, 2021	https://2014-2020.opzp.cz/files/documents/storage/2022/07/15/1657874465_V%C3%BDro%C4%8Dn%C3%AD%20zpr%C3%A1va%20za%20rok%202021%20v%C4%8D.%20p%C5%99%C3%ADloh.pdf	NUTS3
	Integrated Regional Operational Programme	national	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/czechia/2014cz16rfop002	Vyrocni-zprava-o-implementaci-programu-IROP-2020, 2020	https://irop.mmr.cz/cs/zadatele-a-prijemci/dokumenty/ostatni-dokumenty-v-irop/vyrocni-zpravy-irop	NUTS3
	OP Research, Development and Education	national	ERDF/ESF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/czechia/2014cz05m2op001	Výroční zpráva o provádění Operačního programu Výzkum, vývoj a vzdělávání za rok 2021, 2020	https://opvvv.msmt.cz/download/file6167.pdf	NUTS3
	OP Employment	national	ESF/YEI	https://ec.europa.eu/esf/main.jsp?catId=576&langId=en	Výroční zpráva o implementaci programu 03 Operační programme Zaměstnanost za rok 2021, 2020	https://www.esfcr.cz/operacni-program-zamestnanost/-/dokument/18871581	NUTS3

Case study region	Programme	Level	Fund	General Link	Source of project data (AIR / database of projects), YEAR	Link to source of project data (AIR / database of projects)	Data available at level
Dytiki Makedonia (GR)	Transport Infrastructure, Environment and Sustainable	national	ERDF/CF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/greece/2014gr16m1op001	Υποδομές Μεταφορών, Περιβάλλον και Αειφόρος Ανάπτυξη, 2021	https://www.espa.gr/elibrary/EP_YMEPERAA_Implementation%20report_2015.pdf	NUTS2
	Regional Operational Programme of West Macedonia	regional	ERDF/ESF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/greece/2014gr16m2op006	ΠΡΟΣΔΙΟΡΙΣΜΟΣ ΤΗΣ ΕΤΗΣΙΑΣ ΕΚΘΕΣΗΣ ΥΛΟΠΟΙΗΣΗΣ Δυτική Μακεδονία, 2021	https://www.pepdym.gr/images/Wb/A5PEP/240/2019EE.pdf	NUTS2
	Competitiveness, Entrepreneurship, and Innovation OP	national	ERDF/ESF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/greece/2014gr16m2op001	ΠΡΟΣΔΙΟΡΙΣΜΟΣ ΤΗΣ ΕΤΗΣΙΑΣ ΕΚΘΕΣΗΣ ΥΛΟΠΟΙΗΣΗΣ Ανταγωνιστικότητα Επιχειρηματικότητα και Καινοτομία, 2021	https://www.eydpelop.gr/2014-2020/wp-content/uploads/2022/05/%CE%95%CF%84%CE%AE%CF%83%CE%B9%CE%B1-%CE%88%CE%BA%CE%B8%CE%B5%CF%83%CE%B7-%CE%A5%CE%BB%CE%BF%CF%80%CE%BF%CE%AF%CE%B7%CF%83%CE%B7%CF%82-2020.pdf	NUTS2
	OP Human Resources Development, Education and Lifelong Learning	national	ESF/YEI	https://ec.europa.eu/regional_policy/opempl/detail.cfm?cci=2014GR05M9OP001&lan=en	Ανάπτυξη Ανθρώπινου Δυναμικού, Εκπαίδευση και Δια Βίου Μάθηση, 2021	https://empedu.gov.gr/wp-content/uploads/2022/07/Implementation-report_2014GR05M9OP001_2021_0_el.%CE%91%CE%94%CE%91.pdf	NUTS2
Yugoitztochen (BU)	Operational programme Innovations and Competitiveness	national	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/bulgaria/2014bg16rfop002	Information system for management and monitoring of EU funds in Bulgaria – OPRG, 2022	https://2020.eufunds.bg/en/0/0	NUTS2
	Operational programme Regions in Growth	national	ERDF	https://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/bulgaria/2014bg16rfop001	Information system for management and monitoring of EU funds in Bulgaria – OPHRD, 2022	https://2020.eufunds.bg/en/0/0	NUTS2
	Operational Programme Human Resources Development	national	ESF/YEI	https://ec.europa.eu/regional_policy/opempl/detail.cfm?cci=2014BG05M9OP001&lan=en	Information system for management and monitoring of EU funds in Bulgaria – OPIC, 2022	https://2020.eufunds.bg/en/0/0	NUTS2

OPs and TJTPs analysed under the 2021-2027 Cohesion Policy

Case study region	Programme/TJTP	Level	Fund	Link to approved/draft programme
Principado de Asturias (ES)	TJTP Asturias	subregional	-	(no draft available)
	Asturias ESF+ 2021-2027 OP	regional	ESF+	(no draft available)
	Asturias ERDF 2021-2027 OP (draft version)	regional	ERDF	https://www.asturias.es/documents/217090/1605933/Borrador+del+PO+FEDER+Asturias+2021-2027+%28pdf%29.pdf/c6700dc3-de72-58fa-3166-e77eafdd7db9?t=1653465295948
Śląskie (PL)	TJTP: The Territorial Just Transition Plan of the Silesian Province 2030 (draft)	subregional	-	https://transformacja.slaskie.pl/images/Dokumenty/1646921120_terytorialny_plan_spr.04.pdf
	European Funds for Digital Development (draft)	national	ERDF	https://www.polskacyfrowa.gov.pl/strony/o-programie/fundusze-europejskie-na-rozwoj-cyfrowy-2021-2027/zalozenia-do-nowego-programu/
	European Funds for a Smart Economy Programme	national	ERDF	https://www.poir.gov.pl/strony/o-programie/fe-dla-nowoczesnej-gospodarki/zalozenia-programu-feng/
	European Funds for Infrastructure, Climate, Environment	national	ERDF/CF	https://www.pois.gov.pl/strony/o-programie/fundusze-europejskie-na-infrastrukture-klimat-srodowisko/zalozenia-programu/
	European Funds for Social Development 2021-2027 (draft)	national	ESF+	https://www.power.gov.pl/strony/o-programie/fundusze-europejskie-dla-rozwoju-spolecznego/zalozenia-nowego-programu/
	European Funds for Silesia 2021-2027 (draft)	regional	ERDF/ESF+/JTF	https://rpo.slaskie.pl/dokument/fesl_2021_2027_projekt_110322
Düsseldorf (DE)	Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027	regional	ERDF/JTF	https://www.efre.nrw.de/europaeische-kohaesionspolitik-ab-2021/efre/jtf-programm-nrw-2021-2027/
	Multi Funds Programme ESF+/JTF North Rhine-Westphalia 2021-2027	regional	ESF+/JTF	(no draft available)
	Territorialer Plan für einen gerechten Übergang - Rheinisches Revier	subregional	JTF	https://www.efre.nrw.de/fileadmin/user_upload/sfc2021-PRG-2021DE16FFPR002-1.3.pdf
Severozápad (CZ)	TJTP: Plan spravedlive uzemni transformace (PSUT)	subregional	-	https://dotaceeu.cz/cs/evropske-fondy-v-cr/kohezni-politika-po-roce-2020/uhelne-regiony/plan-spravedlive-uzemni-transformace-(psut)
	Integrated Regional Operational Programme (IROP) 2021-2027	national	ERDF	https://irop.mmr.cz/getmedia/5ceac12e-2a74-41cf-aeaa-d297091d5358/PD-IROP-2021-2027_20220701.pdf.aspx?ext=.pdf
	OP Technologies and Application for Competitiveness	national	ERDF	https://www.mpo.cz/assets/cz/podnikani/dotace-a-podpora-podnikani/optak-2021-2027/aktualni-informace/2022/6/Programovy-dokument-OP-TAK-_2021-2027_.pdf

	OP Jan Amos Comenius (Education and Research)	national	ERDF/ESF+	https://opjak.cz/wp-content/uploads/2022/08/P_JAC_v2.7.pdf
	OP Environment	national	ERDF/CF	https://opzp.cz/files/documents/storage/2022/07/21/1658392579_PD OP%C5%BDP 2021-2027_verze_1.1.pdf
	OP Employment+	national	ESF+	https://www.esfcr.cz/documents/21802/18372496/Opera%C4%8Dn%C3%AD+program+Zam%C4%9Bstnanost+plus/18b06e76-40f6-4f70-a00a-44759c376ae8
	OP Just Transition	subregional	JTF	https://www.mmr.cz/cs/microsites/restart-regionu/aktuality/ceska-republika-ma-schvaleny-vsechny-evropske-prog
Dytiki Makedonia (GR)	Regional Operational Programme (ROP) West Macedonia	regional	ERDF/ESF+	https://pepdym.gr/images/Wb/A5PEP/050/11/1.2%20Apof%20EE-1.2.pdf
	Just Development Transition Operational Programme	regional	ERDF/ESF+/ CF/JTF	https://www.sdam.gr/sites/default/files/2022-06/%CE%A0%CE%A1%CE%9F%CE%93%CE%A1%CE%91%CE%9C%CE%9C%CE%91%20%CE%94%CE%99%CE%9A%CE%91%CE%99%CE%97%CE%A3%20%CE%91%CE%9D%CE%91%CE%A0%CE%A4%CE%A5%CE%9E%CE%99%CE%91%CE%9A%CE%97%CE%A3%20%CE%9C%CE%95%CE%A4%CE%91%CE%92%CE%91%CE%A3%CE%97%CE%A3.pdf
	Operational Programme Competitiveness	national	ERDF/ESF+	http://newsletter.antagonistikotita.gr/epanek/wp-content/uploads/2022/06/%CE%91%CE%9D%CE%91%CE%9B%CE%A5%CE%A4%CE%99%CE%9A%CE%9F_%CE%A0%CE%A1%CE%9F%CE%93%CE%A1%CE%91%CE%9C%CE%9C%CE%91_%CE%91%CE%9D%CE%A4%CE%91%CE%93%CE%A9%CE%9D%CE%99%CE%A3%CE%A4%CE%99%CE%9A%CE%9F%CE%A4%CE%97%CE%A4%CE%91_2021EL16FFPR001_1.2_el.pdf
	OP Human Resources and Social Cohesion	national	ESF+	https://empedu.gov.gr/wp-content/uploads/2022/06/C_2022_4464_F1_EC_IMPLEMENTING_DECISION_EL_V2_P1_2075529.pdf
	OP Environment and Climate Change	national	ERDF/CF	https://ymeperaa.gr/images/diavouleusi_perivallon_2021-2027/C_2022_6045_1_EL_ACT_part1_v2_apofasi.pdf
	TJTP Western Macedonia	regional	-	https://www.sdam.gr/sites/default/files/2022-06/%CE%95%CE%94%CE%91%CE%A6%CE%99%CE%9A%CE%9F%20%CE%A3%CE%A7%CE%95%CE%94%CE%99%CE%9F%20%CE%94%CE%A5%CE%A4%CE%99%CE%9A%CE%97%CE%A3%20%CE%9C%CE%91%CE%9A%CE%95%CE%94%CE%9F%CE%9D%CE%99%CE%91%CE%A3.pdf
Yugoitzto chen (BU)	TJTP Stara Zagora	subregional	-	(no draft available)
Yugoitzto chen (BU)	OP Development of the Regions 2021-2027	national	ERDF/JTF	http://www.bgregio.eu/media/Programirane/PDR_JTF%20Priority%203%20+%20TA36.pdf
Yugoitzto chen (BU)	OP Competitiveness and Innovation in Enterprises	national	ERDF	https://opic.bg/uploads/2022/09/nov-programen-period-2021-2027-g-29.pdf
Yugoitzto chen (BU)	Operational programme Human Resources Development 2021-2027	national	ESF+	https://esf.bg/informatsiya/

ANNEX IV – INTERVENTION FIELDS ANALYSE

The table below presents the logic behind the categorisation of intervention codes. Low-carbon and climate resilient investments are defined in the 2014-2020 CPR (European Commission, 2013; including a coefficient of 40% or 100% to support climate change objectives) and apply to 35 intervention codes mostly situated under thematic objective 4, 5 and 6. The assessment of transition-relevant investments was based on the definition of the European Parliament. This applied to 70 intervention fields across the thematic objectives.

Intervention code	Intervention field	low-carbon and climate resilient investments	transition-relevant investments
001	Generic productive investment in small and medium – sized enterprises ('SMEs')		X
002	Research and innovation processes in large enterprises		X
003	Productive investment in large enterprises linked to the low-carbon economy	X	
004	Productive investment linked to the cooperation between large enterprises and SMEs for developing information and communication technology ('ICT') products and services, e-commerce and enhancing demand for ICT		no
005	Electricity (storage and transmission)		X
006	Electricity (TEN-E storage and transmission)		X
007	Natural gas		
008	Natural gas (TEN-E)		
009	Renewable energy: wind	X	X
010	Renewable energy: solar	X	X
011	Renewable energy: biomass	X	X
012	Other renewable energy (including hydroelectric, geothermal and marine energy) and renewable energy integration (including storage, power to gas and renewable hydrogen infrastructure)	X	X
013	Energy efficiency renovation of public infrastructure, demonstration projects and supporting measures	X	X
014	Energy efficiency renovation of existing housing stock, demonstration projects and supporting measures	X	X
015	Intelligent Energy Distribution Systems at medium and low voltage levels (including smart grids and ICT systems)	X	X
016	High efficiency co-generation and district heating	X	X
017	Household waste management (including minimisation, sorting, recycling measures)		X
018	Household waste management (including mechanical biological treatment, thermal treatment, incineration and landfill measures)		
019	Commercial, industrial or hazardous waste management		
020	Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure)		
021	Water management and drinking water conservation (including river basin management, water supply, specific climate change adaptation measures, district and consumer metering, charging systems and leak reduction)	X	
022	Waste water treatment		
023	Environmental measures aimed at reducing and / or avoiding greenhouse gas emissions (including treatment and storage of methane gas and composting)	X	X

024	Railways (TEN-T Core)	X	
025	Railways (TEN-T comprehensive)	X	
026	Other Railways	X	
027	Mobile rail assets	X	
028	TEN-T motorways and roads — core network (new build)		
029	TEN-T motorways and roads — comprehensive network (new build)		
030	Secondary road links to TEN-T road network and nodes (new build)		
031	Other national and regional roads (new build)		
032	Local access roads (new build)		
033	TEN-T reconstructed or improved road		
034	Other reconstructed or improved road (motorway, national, regional or local)		
035	Multimodal transport (TEN-T)	X	
036	Multimodal transport	X	
037	Airports (TEN-T)[2]		
038	Other airports[3]		
039	Seaports (TEN-T)	X	
040	Other seaports	X	
041	Inland waterways and ports (TEN-T)	X	
042	Inland waterways and ports (regional and local)	X	
043	Clean urban transport infrastructure and promotion (including equipment and rolling stock)	X	
044	Intelligent transport systems (including the introduction of demand management, tolling systems, IT monitoring, control and information systems)	X	
045	ICT: Backbone/backhaul network		
046	ICT: High-speed broadband network (access/local loop; >/= 30 Mbps)		
047	ICT: Very high-speed broadband network (access/local loop; >/= 100 Mbps)		
048	ICT: Other types of ICT infrastructure/large-scale computer resources/equipment (including e-infrastructure, data centres and sensors; also where embedded in other infrastructure such as research facilities, environmental and social infrastructure)		X
049	Education infrastructure for tertiary education		X
050	Education infrastructure for vocational education and training and adult learning		X
051	Education infrastructure for school education (primary and general secondary education)		X
052	Infrastructure for early childhood education and care		X
053	Health infrastructure		
054	Housing infrastructure		X
055	Other social infrastructure contributing to regional and local development		X
056	Investment in infrastructure, capacities and equipment in SMEs directly linked to research and innovation activities		X
057	Investment in infrastructure, capacities and equipment in large companies directly linked to research and innovation activities		X
058	Research and innovation infrastructure (public)		X
059	Research and innovation infrastructure (private, including science parks)		X
060	Research and innovation activities in public research centres and centres of competence including networking		X

061	Research and innovation activities in private research centres including networking		X
062	Technology transfer and university-enterprise cooperation primarily benefiting SMEs		X
063	Cluster support and business networks primarily benefiting SMEs		X
064	Research and innovation processes in SMEs (including voucher schemes, process, design, service and social innovation)		X
065	Research and innovation infrastructure, processes, technology transfer and cooperation in enterprises focusing on the low carbon economy and on resilience to climate change	X	X
066	Advanced support services for SMEs and groups of SMEs (including management, marketing and design services)		X
067	SME business development, support to entrepreneurship and incubation (including support to spin offs and spin outs)		X
068	Energy efficiency and demonstration projects in SMEs and supporting measures	X	X
069	Support to environmentally-friendly production processes and resource efficiency in SMEs	X	X
070	Promotion of energy efficiency in large enterprises	X	X
071	Development and promotion of enterprises specialised in providing services contributing to the low carbon economy and to resilience to climate change (including support to such services)	X	X
072	Business infrastructure for SMEs (including industrial parks and sites)		X
073	Support to social enterprises (SMEs)		X
074	Development and promotion of commercial tourism assets in SMEs		X
075	Development and promotion of commercial tourism services in or for SMEs		X
076	Development and promotion of cultural and creative assets in SMEs		X
077	Development and promotion of cultural and creative services in or for SMEs		X
078	e-Government services and applications (including e-Procurement, ICT measures supporting the reform of public administration, cyber-security, trust and privacy measures, e-Justice and e-Democracy)		
079	Access to public sector information (including open data e-Culture, digital libraries, e-Content and e-Tourism)		
080	e-Inclusion, e-Accessibility, e-Learning and e-Education services and applications, digital literacy		X
081	ICT solutions addressing the healthy active ageing challenge and e-Health services and applications (including e-Care and ambient assisted living)		X
082	ICT Services and applications for SMEs (including e-Commerce, e-Business and networked business processes), living labs, web entrepreneurs and ICT start-ups)		X
083	Air quality measures	X	X
084	Integrated pollution prevention and control (IPPC)	X	X
085	Protection and enhancement of biodiversity, nature protection and green infrastructure	X	X
086	Protection, restoration and sustainable use of Natura 2000 sites	X	
087	Adaptation to climate change measures and prevention and management of climate related risks e.g. erosion, fires,	X	

	flooding, storms and drought, including awareness raising, civil protection and disaster management systems and infrastructures		
088	Risk prevention and management of non-climate related natural risks (i.e. earthquakes) and risks linked to human activities (e.g. technological accidents), including awareness raising, civil protection and disaster management systems and infrastructures		
089	Rehabilitation of industrial sites and contaminated land		X
090	Cycle tracks and footpaths	X	
091	Development and promotion of the tourism potential of natural areas		X
092	Protection, development and promotion of public tourism assets		X
093	Development and promotion of public tourism services		X
094	Protection, development and promotion of public cultural and heritage assets		X
095	Development and promotion of public cultural and heritage services		X
096	Institutional capacity of public administrations and public services related to implementation of the ERDF or actions supporting ESF institutional capacity initiatives		
097	Community-led local development initiatives in urban and rural areas		X
098	Outermost regions: compensation of any additional costs due to accessibility deficit and territorial fragmentation		
099	Outermost regions: specific action to compensate additional costs due to size market factors		
100	Outermost regions: support to compensate additional costs due to climate conditions and relief difficulties	X	
101	Cross-financing under the ERDF (support to ESF-type actions necessary for the satisfactory implementation of the ERDF part of the operation and directly linked to it)		
102	Access to employment for job-seekers and inactive people, including the long-term unemployed and people far from the labour market, also through local employment initiatives and support for labour mobility		X
103	Sustainable integration into the labour market of young people, in particular those not in employment, education or training, including young people at risk of social exclusion and young people from marginalised communities, including through the implementation of the Youth Guarantee		X
104	Self-employment, entrepreneurship and business creation including innovative micro, small and medium sized enterprises		X
105	Equality between men and women in all areas, including in access to employment, career progression, reconciliation of work and private life and promotion of equal pay for equal work		X
106	Adaptation of workers, enterprises and entrepreneurs to change		X
107	Active and healthy ageing		
108	Modernisation of labour market institutions, such as public and private employment services, and improving the matching of labour market needs, including through actions that enhance transnational labour mobility as well as through mobility schemes and better cooperation between institutions and relevant stakeholders		X

109	Active inclusion, including with a view to promoting equal opportunities and active participation, and improving employability		X
110	Socio-economic integration of marginalised communities such as the Roma		
111	Combating all forms of discrimination and promoting equal opportunities		
112	Enhancing access to affordable, sustainable and high-quality services, including health care and social services of general interest		
113	Promoting social entrepreneurship and vocational integration in social enterprises and the social and solidarity economy in order to facilitate access to employment		X
114	Community-led local development strategies		X
115	Reducing and preventing early school-leaving and promoting equal access to good quality early-childhood, primary and secondary education including formal, non-formal and informal learning pathways for reintegrating into education and training		X
116	Improving the quality and efficiency of, and access to, tertiary and equivalent education with a view to increasing participation and attainment levels, especially for disadvantaged groups		X
117	Enhancing equal access to lifelong learning for all age groups in formal, non-formal and informal settings, upgrading the knowledge, skills and competences of the workforce, and promoting flexible learning pathways including through career guidance and validation of acquired competences		X
118	Improving the labour market relevance of education and training systems, facilitating the transition from education to work, and strengthening vocational education and training systems and their quality, including through mechanisms for skills anticipation, adaptation of curricula and the establishment and development of work-based learning systems, including dual learning systems and apprenticeship schemes		X
119	Investment in institutional capacity and in the efficiency of public administrations and public services at the national, regional and local levels with a view to reforms, better regulation and good governance		
120	Capacity building for all stakeholders delivering education, lifelong learning, training and employment and social policies, including through sectoral and territorial pacts to mobilise for reform at the national, regional and local levels		X
121	Preparation, implementation, monitoring and inspection		
122	Evaluation and studies		
123	Information and communication		

ANNEX V – TRANSITION RELEVANT PAS AND SOS IN 2014-2020 COHESION POLICY PROGRAMMES

Case study region	Programme	Level	Fund	Total programme budget (in EUR million)	PA total	PA transition-relevant	Share of relevant PAs	SO Total	SO transition-relevant	Share of relevant SOs
Principado de Asturias (ES)	Asturias ERDF 2014-20 OP	regional	ERDF	399	3	2	67%	8	5	63%
	Asturias ESF 2014-20 OP	regional	ESF	226	4	2	50%	8	7	88%
	Multiregional OP for Spain ERDF 2014-20	multiregional	ERDF	15,620	9	5	56%	9	5	56%
Śląskie (PL)	OP Digital Poland	national	ERDF	2,873	6	1	17%	10	1	10%
	OP Infrastructure and Environment	national	ERDF/CF	33,037	12	3	25%	20	9	45%
	OP Smart growth	national	ERDF	10,508	7	4	57%	12	4	33%
	ROP 12 Regional Operational Programme for Śląskie Voivodeship [PL]	regional	ERDF/ESF	4,143	15	7	47%	49	23	47%
	OP Knowledge Education Growth	national	ESF/YEI	5,533	8	2	25%	20	4	20%
Düsseldorf (DE)	OP Nordrhein-Westfalen ERDF 2014-2020	regional	ERDF	2,751	7	3	43%	18	10	56%
	Operational Programme ESF Nordrhein-Westfalen 2014-2020	regional	ESF	1,404	4	2	50%	12	5	42%
Severozápad (CZ)	OP Enterprise and Innovation for Competitiveness	national	ERDF	7,275	5	3	60%	16	11	69%
	OP Environment	national	ERDF/CF	3,281	6	4	67%	22	8	36%
	Integrated Regional Operational Programme	national	ERDF	6,723	7	2	29%	16	5	31%
	OP Research, Development and Education	national	ERDF/ESF	3,438	4	3	75%	19	9	47%
	OP Employment	national	ESF/YEI	2,896	5	3	60%	17	9	53%
Dytiki Makedonia (GR)	Transport Infrastructure, Environment and Sustainable	national	ERDF/CF	4,652	16	2	13%	8	2	25%
	Regional Operational Programme of West Macedonia	regional	ERDF/ESF	294	12	7	58%	4	3	75%
	Competitiveness, Entrepreneurship, and Innovation OP	national	ERDF/ESF	8,020	5	3	60%	9	6	67%

	OP Human Resources Development, Education and Lifelong Learning	national	ESF/YEI	3,314	12	3	25%	10	3	30%
Yugoiztochen (BU)	Operational programme Innovations and Competitiveness	national	ERDF	1,646	5	3	60%	9	6	67%
	Operational programme Regions in Growth	national	ERDF	1,609	9	3	33%	20	9	45%
	Operational Programme Human Resources Development	national	ESF/YEI	1,371	6	3	50%	18	15	83%

ANNEX VI – TRANSITION RELEVANT PAS AND SOS IN 2021-2027 COHESION POLICY PROGRAMMES

Case study region	**Programme**	**Level**	**Fund**	**Total programme budget (in EUR million)**	PA **total**	PA **transition-relevant**	**Share of relevant**	SO **Total**	SO **transition-relevant**	**Share of relevant**
Principado de Asturias (ES)	Asturias ESF 2021-2027 OP	regional	ESF+	NA as no draft available						
	Asturias ERDF 2021-2027 OP (draft version)	regional	ERDF	445	6	5	83%	7	5	71%
Śląskie (PL)	European Funds for Digital Development (draft version)	national	ERDF	2,494	3	1	33%	6	1	17%
	European Funds for a Smart Economy Programme	national	ERDF	10,003	4	2	50%	5	3	60%
	European Funds for Infrastructure, Climate, Environment	national	ERDF/CF	29,293	8	2	25%	12	8	67%
	European Funds for Social Development 2021-2027 (draft version)	national	ESF+	5,040	7	2	29%	12	5	42%
	European Funds for Silesia 2021-202 (draft version)	regional	ERDF/ESF+ /JTF	5,930	11	3	27%	28	12	43%
Düsseldorf (DE)	Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027	regional	ERDF/JTF	1,862	6	4	67%	12	9	75%
	Multi Funds Programme ESF+/JTF North Rhine-Westphalia 2021-2027	regional	ESF+/JTF	NA as no draft available						
Severozápad (CZ)	Integrated Regional Operational Programme (IROP) 2021-2027	national	ERDF	6,334	7	3	43%	11	4	36%
	OP Technologies and Application for Competitiveness	national	ERDF	4,106	7	4	57%	10	6	60%
	OP Jan Amos Comenius (Education and Research)	national	ERDF/ESF+	3,575	4	1	25%	9	5	56%
	OP Environment	national	ERDF/CF	2,860	2	1	50%	6	4	67%
	OP Employment+	national	ESF+	1,885	5	3	60%	9	3	33%

	OP Just Transition	subregional	JTF	1,931	3	2	67%	10	10	100%
Dytiki Makedonia (GR)	Regional Operational Programme (ROP) West Macedonia	regional	ERDF/ ESF+	394	6	5	83%	20	6	30%
	Just Development Transition Operational Programme	regional	ERDF/ESF+/ CF/JTF	1,629	6	5	83%	1	1	100%
	Operational Programme Competitiveness	national	ERDF/ESF+	3,885	5	2	40%	6	5	83%
	OP Human Resources and Social Cohesion	national	ESF+	4,161	7	2	29%	10	4	40%
	OP Environment and Climate Change	national	ERDF/CF	2,922	8	2	25%	8	3	38%
Yugoitztochen (BU)	OP Development of the Regions 2021-2027	national	ERDF/JTF	3,367	4	1	25%	3	2	67%
	OP Competitiveness and Innovation in Enterprises	national	ERDF	1,500	3	2	67%	5	4	80%
	Operational programme Human Resources Development 2021-2027	national	ESF+	1,968	5	3	60%	8	5	63%

Source: Own elaboration based on case study fiches.

ANNEX VII – TRANSITION RELEVANT TOPICS IMPLICITLY COVERED EPR OP 2014-2020 [NOT COVERED IN CASE STUDY REGION]

Case study region	Programme	Level	Fund	Investments in SMEs	New firms	R&I	Environmental rehabilitation	Clean energy[39]	Labour market[40]	Active inclusion of jobseekers	Transformation of carbon-intensive installations[41]
Principado de Asturias (ES)	Asturias ERDF 2014-20 OP	regional	ERDF	x	x	x		x			x
	Asturias ESF 2014-20 OP	regional	ESF						x	x	
	Multiregional OP for Spain ERDF 2014-20	multiregional	ERDF	x				x			x
Śląskie (PL)	OP Digital Poland	national	ERDF						x		
	OP Infrastructure and Environment	national	ERDF/CF				x	x			x
	OP Smart growth	national	ERDF	x	x	x		x	x		
	ROP 12 Regional Operational Programme for Śląskie Voivodeship	regional	ERDF/ESF	x	x	x		x	x	x	x
	OP Knowledge Education Growth	national	ESF/YEI						x	x	
Düsseldorf (DE)	OP Nordrhein-Westfalen ERDF 2014-2020	regional	ERDF	x	x	x	x	x	x		
	Operational Programme ESF Nordrhein-Westfalen 2014-2020	regional	ESF						x	x	
Severozápad (CZ)	OP Enterprise and Innovation for Competitiveness	national	ERDF	x		x		x			
	OP Environment	national	ERDF/CF				x	x			x

[39] Incl. renewable energies, energy efficiency
[40] Incl. up- and re-skilling and education
[41] Incl. buildings and transport and district heating

Case study region	Programme	Level	Fund	Investments in SMEs	New firms	R&I	Environmental rehabilitation	Clean energy[39]	Labour market[40]	Active inclusion of jobseekers	Transformation of carbon-intensive installations[41]
	Integrated Regional Operational Programme	national	ERDF		x			x	x		x
	OP Research, Development and Education	national	ERDF/ESF			x			x		
	OP Employment	national	ESF/YEI						x	x	
Dytiki Makedonia (GR)	Transport Infrastructure, Environment and Sustainable Development OP	national	ERDF/CF					x			x
	Regional Operational Programme of West Macedonia	regional	ERDF/ESF	x	x	x		x	x	x	x
	Competitiveness, Entrepreneurship, and Innovation OP	national	ERDF/ESF	x	x	x		x	x		x
	OP Human Resources Development, Education and Lifelong Learning	national	ESF/YEI						x	x	
Yugoiztochen (BU)	Operational programme Innovations and Competitiveness	national	ERDF	x	x	x		x			
	Operational programme Regions in Growth	national	ERDF					x			x
	Operational Programme Human Resources Development	national	ESF/YEI						x	x	

ANNEX VIII – TRANSITION RELEVANT TOPICS COVERED IMPLICITLY AND EXPLICITLY PER OP 2021-2027

[(x)=not confirmed as OP not approved; not covered in case study region]

Case study region	Programme	Level	Fund	Investments in SMEs	new firms	R&I	Environmental rehabilitation	Clean energy[42]	Labour market[43]	Active inclusion of jobseekers	Transformation of carbon-intensive installations[44]
Principado de Asturias (ES)	Asturias ESF 2021-2027 OP	regional	ESF+	x	x	x		x	x		x
	Asturias ERDF 2021-2027 OP (draft version)	regional	ERDF	(x)	(x)	(x)	(x)		(x)	(x)	
Śląskie (PL)	European Funds for Digital Development (draft version)	national	ERDF			(x)			(x)		(x)
	European Funds for a Smart Economy Programme	national	ERDF	x	x	x		x	x	x	x
	European Funds for Infrastructure, Climate, Environment	national	ERDF/CF				x	x			x
	European Funds for Social Development 2021-2027 (draft version)	national	ESF+						x()	(x)	
	European Funds for Silesia 2021-202 (draft version)	regional	ERDF/ESF+ /JTF	(x)	(x)	(x)	(x)	(x)	(x)	(x)	(x)
Düsseldorf (DE)	Multi Funds Programme ERDF/JTF North Rhine-Westphalia 2021-2027	regional	ERDF/JTF	x	x	x	x	x	x	x	x
	Multi Funds Programme ESF+/JTF North Rhine-Westphalia 2021-2027	regional	ESF+/JTF						(x)	(x)	
Severozápad (CZ)	Integrated Regional Operational Programme (IROP) 2021-2027	national	ERDF				x		x	x	

[42] Incl. renewable energies, energy efficiency
[43] Incl. up- and re-skilling and education
[44] Incl. buildings and transport and district heating and circular economy

Case study region	Programme	Level	Fund	Investments in SMEs	new firms	R&I	Environmental rehabilitation	Clean energy[42]	Labour market[43]	Active inclusion of jobseekers	Transformation of carbon-intensive installations[44]
	OP Technologies and Application for Competitiveness	national	ERDF	x	x	x		x	x		x
	OP Jan Amos Comenius (Education and Research)	national	ERDF/ESF+			x			x	x	
	OP Environment	national	ERDF/CF				x	x			x
	OP Employment+	national	ESF+						x	x	
	OP Just Transition	subregional	JTF	x	x	x	x	x	x	x	x
Dytiki Makedonia (GR)	Regional Operational Programme (ROP) West Macedonia	regional	ERDF/ ESF+	x	x	x		x	x	x	x
	Just Development Transition Operational Programme	regional	ERDF/ESF+/ CF/JTF	x	x	x	x	x	x	x	x
	Operational Programme Competitiveness	national	ERDF/ESF+	x	x	x			x	x	
	OP Human Resources and Social Cohesion	national	ESF+						x	x	
	OP Environment and Climate Change	national	ERDF/CF				x	x			x
Yugoitztochen (BU)	OP Development of the Regions 2021-2027	national	ERDF/JTF	x	x	x	x	x	x	x	x
	OP Competitiveness and Innovation in Enterprises	national	ERDF	x	x	x		x			x
	Operational programme Human Resources Development 2021-2027	national	ESF+		x				x	x	

Source: Own elaboration based on case study fiches.

Decarbonisation brings both significant challenges and opportunities for coal regions. This study analyses the implementation and impact of Cohesion Policy, including Just Transition Funds, in EU coal regions. Looking retrospectively at the 2014-2020 programming period and forward to the 2021-27 period, the study concludes that Cohesion Policy has made, and is likely to continue to make a real contribution to achieving smarter, greener and more socially connected development of EU coal regions.

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