

ENERGY TRANSITION IN EUROPE'S COAL REGIONS: ISSUES FOR REGIONAL POLICY

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EXECUTIVE SUMMARY

Climate change is generating new pressures for transition in coal intensive regions. The 2016 Paris Climate Agreement has led to new strategies and targets for reducing climate emissions at EU and national levels. Decarbonisation of the energy sector is a vital component of these strategies. The EU aims to reduce climate emissions from the energy sector by at least 54 percent by 2030 (compared to 1990) and at least 93 percent by 2050. These targets imply a shift out of coal-mining and coal-fired power in coming decades.

Coal transition requires regional policy intervention. Coal production and power stations are inevitably concentrated in particular places, and also typically become linked into other regional sectors and supply chains, as well as political, social and cultural networks, which support economic development but can also inhibit economic transition.

Coal production in the Europe-30 is concentrated in specific regions in Poland, Germany, the Czech Republic, Bulgaria and Romania. Germany and Poland together account for 54 percent of the EU's coal-related climate emissions.

EU Cohesion policy 2021-27 is expected to include a focus on the carbon-free economy, including energy transition. This could include support for coal transition

regions e.g. through an Energy Transition Fund. Wider EU support is seen in the Coal Regions in Transition Platform, as well as in INTERREG and HORIZON projects.

National regional policies are also targeting coal regions. Poland's coal sector has seen major restructuring since 1990 but it remains an important regional employer. Poland is committed to meeting international targets on climate emissions and energy transition but also faces the need to ensure energy supply and regional employment. The Programme for Silesia supports a shift from traditional sectors such as coal towards future-oriented sectors.

Germany is committed to the phasing-out of coal-fired power in order to meet climate targets. In 2019, the federal government agreed an ambitious programme of support for the transition of the remaining brown coal regions, with €40 billion of federal funding to 2038.

Historic experiences of coal transition suggest the need for future policies to prioritise a long-term, well-funded and multi-faceted strategic approach, drawing on the participation of a wide range of stakeholders at multiple levels, and including efforts to generate new ideas, mobilise regional capacities and reconfigure social capital, as well as to involve local communities in transition.



1 INTRODUCTION

Structural change in coal regions has risen up the policy agenda in the context of intensified concerns with climate change. The 2016 Paris Agreement, setting long-term goals to limit increases in global temperatures, has led to new climate strategies at EU level and within individual European countries. Decarbonisation of the energy sector is an important element of these strategies, as it is the leading contributor to CO₂ emissions. The EU aims to reduce total climate emissions by at least 40 percent by 2030 (at least 80 percent by 2050), compared to 1990 levels, and to reduce emissions from the energy sector by at least 54 percent by 2030 (at least 93 percent by 2050).¹

Energy production from fossil fuels such as coal is a major contributor to climate emissions. Coal is currently mined in 41 regions across 12 EU countries, making it the most abundant fossil fuel in the EU and a significant source of economic activity, both directly and through linkages into wider supply chains.² Policy-makers in coal-intensive countries and regions are faced with a dilemma: Should they continue with coal³-mining and coal-fired energy production, despite high climate emissions, or should they transition out of coal, and face regional structural change and, potentially, challenges with energy supply?

Regional policies in countries such as the Czech Republic, Germany, Poland and the United Kingdom, as well as at EU level, have long included a focus on coal regions because:

- Coal production and power generation are by definition located in specific regions, so that the economic and social impacts of restructuring or closure are concentrated in these locations.
- These impacts are often exacerbated by the key role that coal-mining and power generation play in wide-ranging regional supply chains, leading to knock-on effects on other sectors, e.g. iron/steel, plant/mechanical engineering, and chemicals.
- The economic and employment impacts of restructuring are heightened because coal sector jobs (and jobs in related sectors) are typically well-paid and highly skilled from a regional perspective.
- The geographical concentration of economic activities, plus the hardships associated with coal mining, often lead to a strong sense of community in these regions, so that restructuring may lead to wider social dislocation.
- This sense of community may also feed into strong trade unionism and political activism, potentially leading to influence on political decision-making.

This paper begins by examining coal production and emissions in European countries and regions, as well as the implications of climate change targets for coal and wider energy transition (Section 2). It then provides an overview of EU support for coal transition regions (Section 3), as well as national regional policies for coal regions in Germany and Poland (Section 4). Section 5 provides an assessment, draws conclusions and sets out questions for discussion.



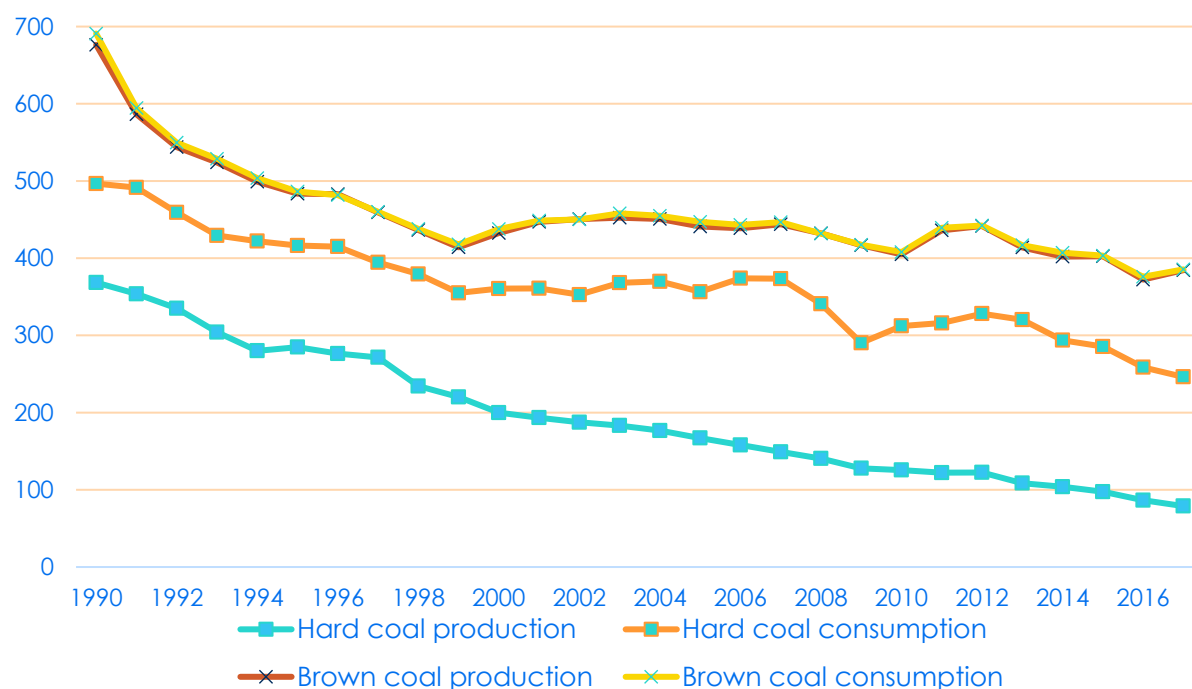
2 COAL POWER AND TRANSITION IN EUROPE TODAY

Coal was one of the main fuels of European societies in the 19th and 20th centuries, and coal-mining and coal-fired power plants continue to be an important source of energy and economic activities today in some countries and regions. Coal-based energy use, climate targets, and regional structural change are inextricably linked. Coal is an important contributor to climate emissions, while coal production and coal-fired energy are strongly concentrated in specific regions.

2.1 Coal production and emissions across Europe

The coal market has been characterised by major fluctuations over time, but coal use has decreased steadily since the 1990s due to mine exhaustion, market changes, and climate change policies. In 1990, coal provided c. 40 percent of energy consumption and power generation in the EU-28 but by 2015 accounted for 16 percent of EU-28 energy consumption and 24 percent of power generation.⁴

Figure 1: Gross inland production and consumption of hard coal and brown coal in the EU-28 (1990-2017), in million tonnes per annum (Source: Eurostat).



Hard coal production in the EU-28 has declined relatively steadily from 368 million tonnes in 1990 to 79 million tonnes in 2017 (Figure 1), while brown coal (including lignite) production declined rapidly in the 1990s but has remained at c. 400 million tonnes since 1999. Consumption of hard coal in the EU-28 has halved since the 1990s, while brown coal consumption mirrors production. In Norway, hard coal consumption has remained stable at c. 0.7 million tonnes per

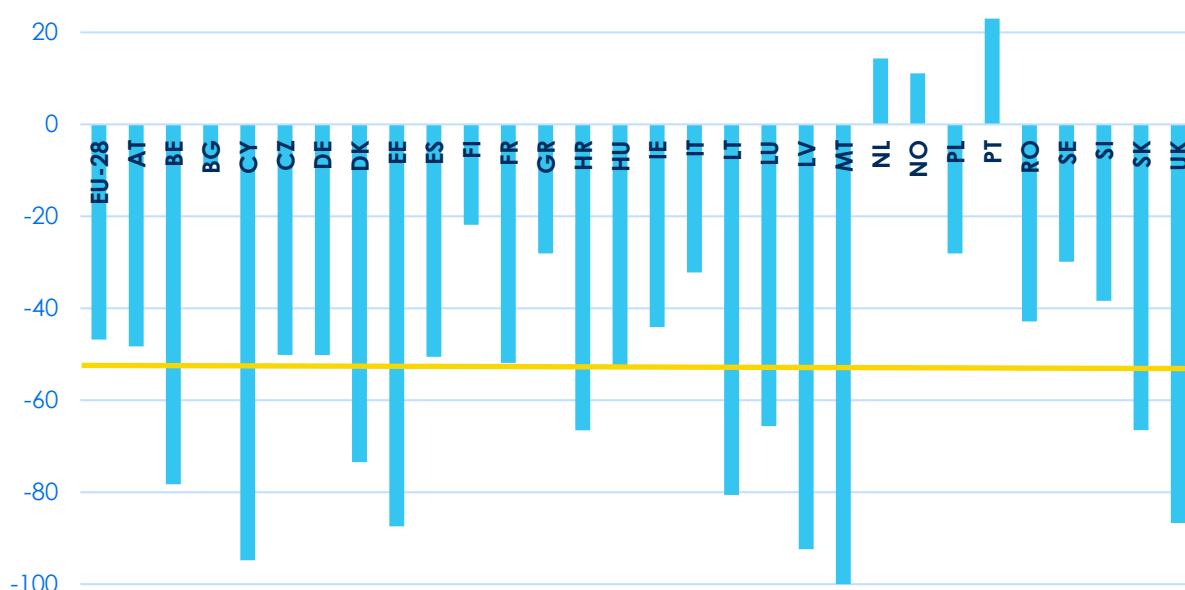
year, with production levels decreasing from 0.30 to 0.13 million tonnes per year. Overall, most coal is used for the production of electricity and heat.

The difference between hard coal production and consumption in Figure 1 is due to coal imports e.g. from the USA, Colombia, South Africa, Australia and Russia. European countries' subsidies for domestic coal production at sometimes aimed at ensuring energy security and limiting dependency on foreign energy sources.⁵

From a geographical perspective, the number of EU Member States producing hard coal has decreased from 14 to five: Poland, Czech Republic, Germany, United Kingdom and Spain. In 2018, Poland was the largest producer of hard coal (63.4 million tonnes), with 86 percent of the EU total.⁶ For brown coal, Germany accounted for 45 percent of EU production in 2017, followed by Poland (16 percent), the Czech Republic and Greece (both 10 percent), Bulgaria (9 percent) and Romania (7 percent). Coal production is declining steadily in most coal producing countries. Coal production has fallen most rapidly in the United Kingdom (1991-95), France (1990-2000), Norway (2007-2012), Romania (1992-1995) and Belgium (1990-1992).

Figure 2 shows the changes in consumption levels between 1990 and 2017 (in percentages). In comparison to the 47 percent decline in total coal consumption in the EU-28, as displayed by the yellow line, it is clear that most smaller countries and the United Kingdom show the strongest reduction and almost entirely phased out coal use. The reduction levels in Bulgaria, Finland, Greece, Italy, Poland and Sweden are relatively low, whereas the Netherlands, Norway and Portugal have increased their coal consumption since 1990.

Figure 2: Percentage change in gross consumption of hard coal and brown coal between 1990 and 2017 in the EU-28 and Norway (Source: Eurostat).

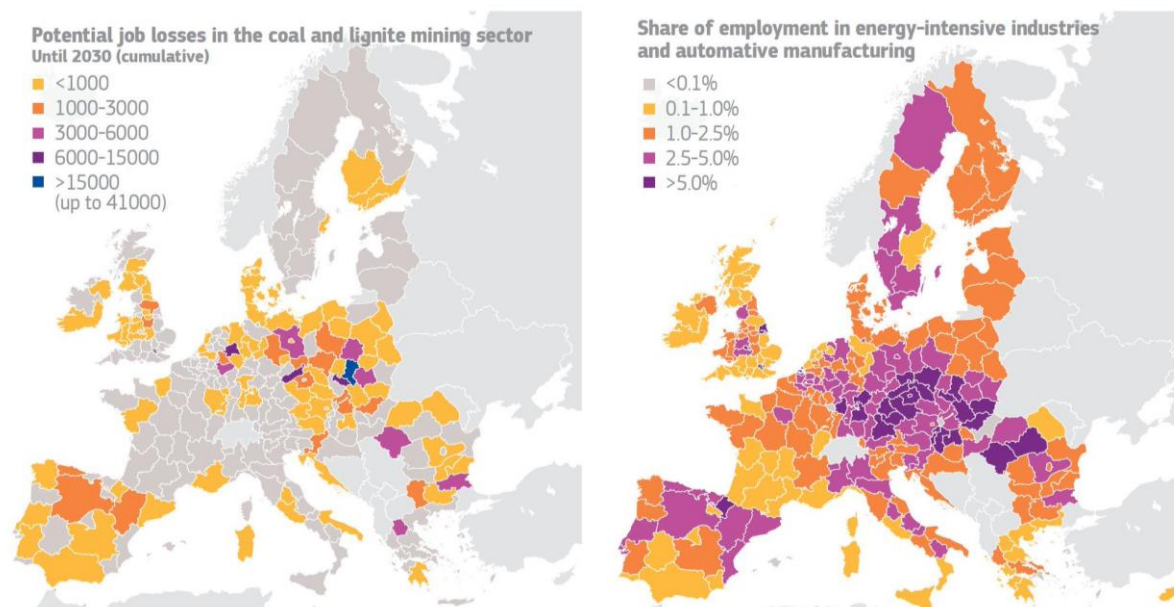


2.2 Socio-economic changes and the energy transition

Due to the ongoing phasing out of hard coal and lignite mining, the European Commission estimates that around two-thirds (67.5 percent) of the current 237,000 direct jobs may be lost by 2030.⁷ Besides direct job losses, firms in coal-related supply chains (e.g. steel and automotive engineering, chemical industries) and local service providers may also feel the effects of the changing intensities and geographies of energy production. The EU Member States with the highest production and consumption of coal are Poland, Germany, the Czech Republic, Bulgaria and Romania. Germany and Poland account for 51 percent of the EU's coal-fired power and also for 54 percent of coal-related emissions.⁸

Figure 3 shows the regional dimension of the direct job losses, as well as the share of employment in carbon energy intensive industries and the automotive sector. Regional variations are high, both within and between countries. In addition to complex economic and employment transition challenges in coal producing regions, historic dependence on coal production has also shaped residential, demographic, landscape, political, cultural and social class-related patterns of particular regions.

Figure 3: Coal and carbon-intensive regions



Source: EPSC (2019) *Delivering on European Common Goods: Strengthening Member States' Capacity to Act in the 21st Century*. Brussels: European Political Strategy Centre, May 2019, p.19.

Regions in the EU28, which are likely to be particularly strongly affected by transition out of coal, in terms of potential for direct job losses, include:⁹

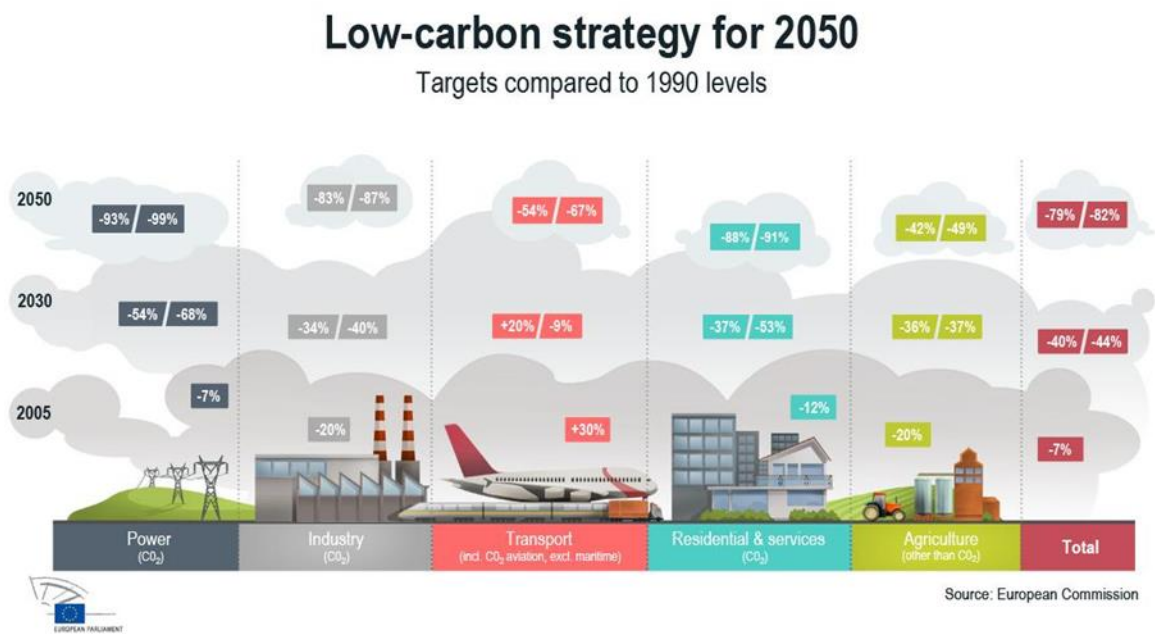
- Poland: Coal production is concentrated in the south-western region of Upper Silesia, which also accounts for a high share of coal-fired power generation. Transition out of coal would also be likely to cause systemic regional economic effects, as other important industries, notably automotive engineering, are interconnected with the local coal sector. The Polish situation is examined further in Section 4.2.

- Germany: Brown coal production and coal-fired power stations are concentrated in the regions of Lusatia (*Länder* of Brandenburg and Saxony), the Rhineland (*Land* North-Rhine Westfalia), and the Central coal region (*Länder* of Saxony and Saxony-Anhalt). The Helmstedt area (*Land* Lower Saxony) also experiences challenges due to the legacy of brown coal mining. In addition, hard coal is produced in areas of the *Länder* of North-Rhine Westfalia, the Saarland, Lower Saxony, and Mecklenburg West Pomerania. The German situation is explored in more detail in Section 4.1.
- Central Europe: Coal production and power continues to be important in the Czech Republic, Hungary, Slovakia and Slovenia, often with regional systemic linkages between coal and wider engineering and other supply chains. Transition out of coal would imply the loss of thousands of directly related jobs in these countries.
- Romania, Bulgaria and Greece: Coal-mining is also a significant issue in regions such as Southwest Romania, East Bulgaria and West Macedonia in Greece. The efficiency of coal-fired power plants is particularly low in these regions. Structural change would cause particular difficulties in these regions, due to low national GDP per capita and (particularly in the case of Greece) high nationwide unemployment rates.
- Spain: While only producing 3 percent of EU hard coal, transition is complicated by low national economic growth and low population density in coal-producing regions (e.g. Aragón, Asturias and Castilla-y-León). Other regions, such as the Basque Country and Catalonia, are also affected through their dependence on carbon-intensive industries (e.g. petrochemicals, automotive engineering). The use of coal in power generation has risen from low levels in recent years, partly fuelled by imported hard coal.

2.3 Energy transition and climate targets

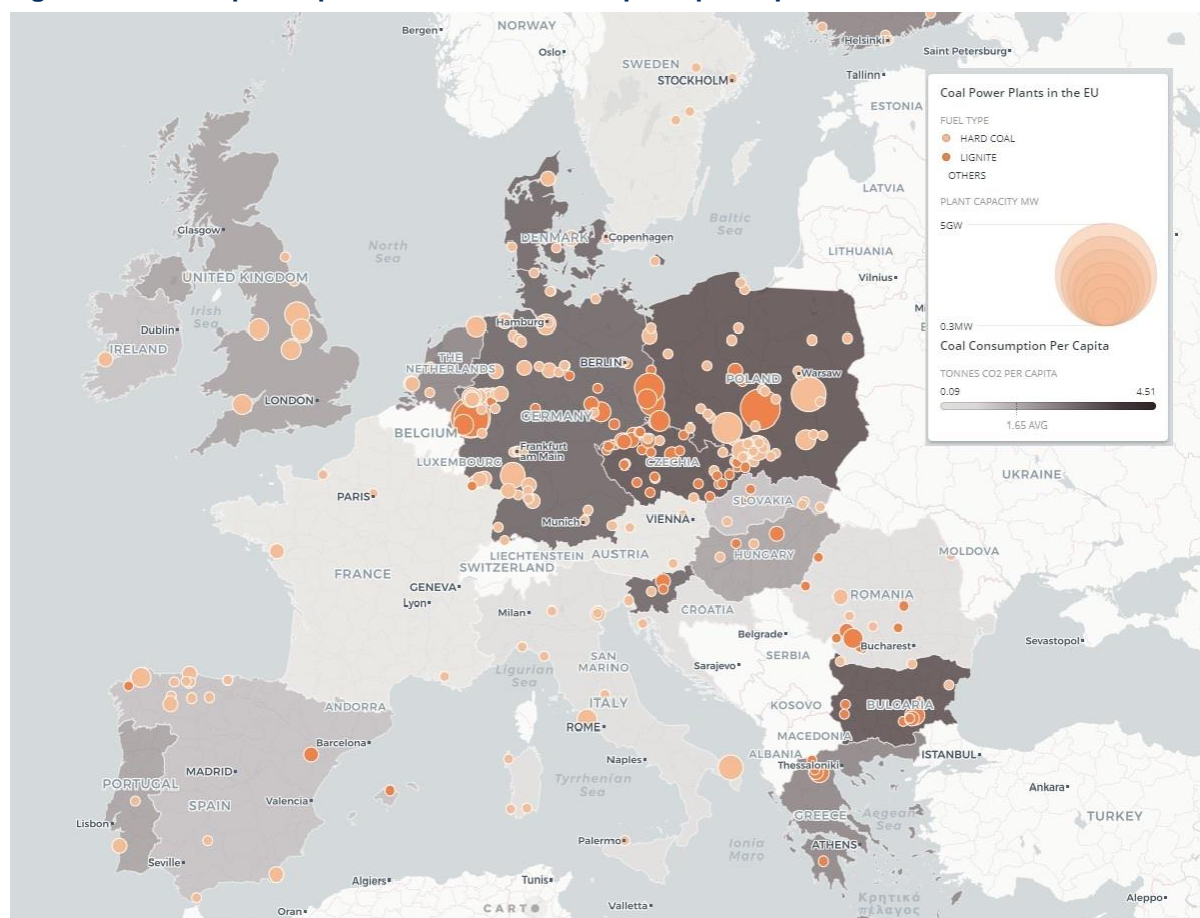
Most national strategies to phase out coal are based on the 2016 Paris Agreement's long-term goal of containing the global temperature increase "well below" 2°C and ideally limited to 1.5°C.¹⁰ Decarbonisation of the power sector, the largest contributing sector to CO₂ emissions, is crucial for meeting this goal.¹¹ For the EU, this means that climate targets directly involve a reduction in the number of coal-fired power plants. Figure 4 illustrates EU climate targets set out within the 2050 low-carbon strategy (percentages are compared to the 1990 level). Intermediate targets for 2030 include a 40 percent reduction in greenhouse gas emissions and a 32 percent share of renewable energy sources in energy production.

Figure 4: EU climate strategy for 2050¹²



Coal producing countries (such as Poland, Germany, Czech Republic, Bulgaria and Romania) are among the major generators of overall carbon and other emissions, but other countries with particularly high coal-fired energy consumption (e.g. power plants, technology sectors) can also be carbon-intensive - and are significantly affected by a shift in energy source.¹³ Thus countries such as the Netherlands, Denmark, Finland, Hungary, Slovenia and Greece have high CO₂-emission levels in tonnes per capita in (see Figure 5).

Figure 5: EU coal power plants and CO2 consumption per capita



Source: EPRC based on <https://climateanalytics.carto.com/me> (accessed 18.6.2019).

While coal phase-out strategies partly involve the closure of coal-fired power plants and coal mines, they also include measures aimed at increasing the predictability of energy supply, and at reducing the economic, social and environmental costs of transition in coal-intensive regions. There is often particular interest in renewable energies, which have the benefit of being inexhaustible, and can stimulate the emergence of new business models in the energy industry and potentially create new employment in the affected regions.¹⁴

3 EU SUPPORT FOR REGIONAL COAL TRANSITION

EU policies have long supported restructuring in coal regions and energy-related training, R&I and (in Cohesion countries) infrastructure. Historically, support from the European Coal and Steel Community was also available to support restructuring in coal areas. More recently, the themes of energy transition and decarbonisation have become prominent in Cohesion policy and RD&I policy, through the EU's Horizon 2020 programme.



3.1 European Coal and Steel Community (ECSC)

The ECSC was set up in 1951 by the Treaty of Paris, which was signed by Belgium, the Federal Republic of Germany, France, Italy, Luxembourg and the Netherlands. The ECSC aimed to contribute to economic expansion, the development of employment and the improvement of the standard of living in the participating countries through the institution of a common market for coal and steel.¹⁵ The ECSC budget allocated funding to support restructuring, via loans at favourable market rates for investment projects associated with the creation of jobs in areas affected by restructuring of coal and steel. Jobs arising had to be suitable for former coal and steel workers. Loans were implemented directly and through financial intermediaries. At the same time, ECSC loans were available for investment projects that promoted the consumption of European Community coal, and for converting gas or oil fired boiler systems to coal. The ECSC institutions were absorbed into the EU institutions after 2002.

3.2 Cohesion policy

Since the 1990s, Cohesion policy funding for coal restructuring has been available from specific initiatives such as RECHAR and, in recent years, through mainstream programmes which are supporting the transition to low and zero carbon.

3.2.1 RECHAR Community Initiative for coal-mining areas (1990-99)

During the 1990s, coal regions were the specific target of the RECHAR Community Initiative. RECHAR allocated a total of €1.1 billion in 1990-99 period from the ERDF and ESF, with additional resources from the ECSC, and from EIB loans. Eligible areas were sub-NUTS III spatial units which were losing at least 1,000 jobs in coal-mining - in total, 26 areas (population of c. 14 million), mainly in Belgium, France, Germany, Spain and the United Kingdom.

RECHAR supported the economic conversion of coal-mining areas through: the promotion of new activities (27 percent); vocational training for miners losing their jobs (17 percent); and infrastructure, notably environmental regeneration (56 percent).¹⁶ An evaluation found that RECHAR leveraged public/private sector funding, and catalysed regeneration, but also that:

- Programmes and projects lacked critical mass, particularly in the UK, where project calls were published after mainstream Structural Fund programmes were approved. In France, in contrast, RECHAR projects were developed in the context of wider regional or national development plans, and tended to be larger. Programmes in Belgium, France and the UK mainly funded infrastructure, while Germany and Spain had a stronger focus on promoting new activities and training;
- Target-setting was limited, leading to a lack of data and limits on scope for evaluation;
- Programmes and projects were at times not clearly distinctive, compared to mainstream Structural Funds programmes.¹⁷

After 2000, most Community Initiatives were discontinued, with the intention that eligible measures under RECHAR (and other initiatives such as RESIDER, RETEX and KONVER) would be mainstreamed within the Cohesion policy programmes for Objective 1 and 2 areas.

3.2.2 Supporting the transition to low carbon (2007-13 and 2014-20)

In 2007-13, the focus of Cohesion policy moved further towards supporting the transition to a low-carbon economy. The ERDF and Cohesion Fund provided increased funding (€18.5 billion) for renewable energy, energy efficiency, clean urban transport and cycling infrastructure. However, climate change mitigation was not an explicit priority, and there was no obligation to earmark funding for these interventions.

The commitment to climate change mitigation increased significantly in 2014-20, with the earmarking of funding for low carbon (20 percent in more developed regions, 15 percent in transition regions, and 12 percent in less-developed regions). In addition, the thematic objective 'Supporting the shift towards a low-carbon economy in all sectors' was introduced, as well as a tracking methodology of assigning climate coefficients (100 percent, 40 percent or 0 percent) to the different intervention fields of Cohesion policy.

In 2014-20, the European Commission set out its longer-term visions in the form of the 2030 Climate & Energy framework and the 2050 Long-term Strategy, leading to a shift from 'low carbon' to 'climate neutral' (i.e. reducing carbon emissions by 85-90 percent). These strategies are expected to inform climate-related funding post-2020, with stricter targets and a clearer transformation focus. The funds spent on the specific low-carbon objective and on wider climate action (including in the energy sector, industry, transport and agriculture) are forecast to amount to €200 billion in 2014-20.¹⁸

Cohesion policy programmes in 2014-20 have tended not to be used for activities directly related to coal mining, or to prepare regions for the future beyond coal, due to a focus on wider regional priorities.¹⁹ Related, Cohesion policy support for low-carbon projects has mainly targeted renewables and energy efficiency, rather than being "mainstreamed in the sense of supporting the transition towards a carbon neutral economy, which would include support to phase-out high carbon technologies".²⁰ However, Cohesion policy has funded interventions such as re-training, labour mobility and ICT which are particularly relevant for the structural transition out of coal mining and use.

3.2.3 Future Cohesion policy support for coal and energy transition

Although negotiations are still ongoing on the multiannual financial framework (MFF) for 2021-2027 (including the Cohesion policy budget), it is likely that significant funding will be allocated to carbon-free economy objectives, including sustainable energy transition. The European Commission has proposed earmarking a minimum of 25 percent of the EU's MFF 2021-2027 for climate-related funding, up from 20 percent in 2014-20.



Cohesion policy funding is likely to be subject to requirements to concentrate funds on themes considered to have high added value. The Commission is proposing that the majority of ERDF funding would be concentrated on the innovation and carbon-free economy objectives, with more flexibility for less developed countries. In addition, climate tracking methodologies will be applied more strictly and climate mainstreaming requirements are expected to be extended to all investment areas.²¹

In addition, the European Parliament has proposed that €4.8 billion be allocated to an Energy Transition Fund (ETF) to support EU coal-dependent regions. This will potentially be a mix between dedicated funds and existing Structural Funds resources, aimed at supporting poorer EU regions. Linking with the themes of the Coal Regions in Transition Platform (see Section 3.3.1), ETF funding could potentially be earmarked for retraining workers, unemployment schemes, helping local businesses and other measures.

3.3 The wider EU agenda for coal-intensive regions

Several recent initiatives have seen support for coal regions rise up the EU agenda. These new initiatives have already had an impact on the 2014-20 Cohesion policy programmes, driving an increased focus on coal and carbon-intensive regions.

3.3.1 Coal Regions in Transition Platform

In 2017, the European Commission launched a series of country teams to support pilot coal regions in their transition efforts. A dedicated Platform for Coal Regions in Transition was established to facilitate the exchange of best practices and to discuss strategies and projects with a potential to kick-start the transition process.²² The Platform aims to:

- build capacity, providing technical assistance and advice to coal regions in transition, focusing on three key areas of the transition process (strategies and governance; project identification; and project design and development);
- develop support materials, through toolkits, guidelines and reports, covering transition-related issues such as governance, environmental rehabilitation, employment, financing and clean air and technologies; and
- connect stakeholders, facilitating collective dialogue among regions and the wider stakeholder community.

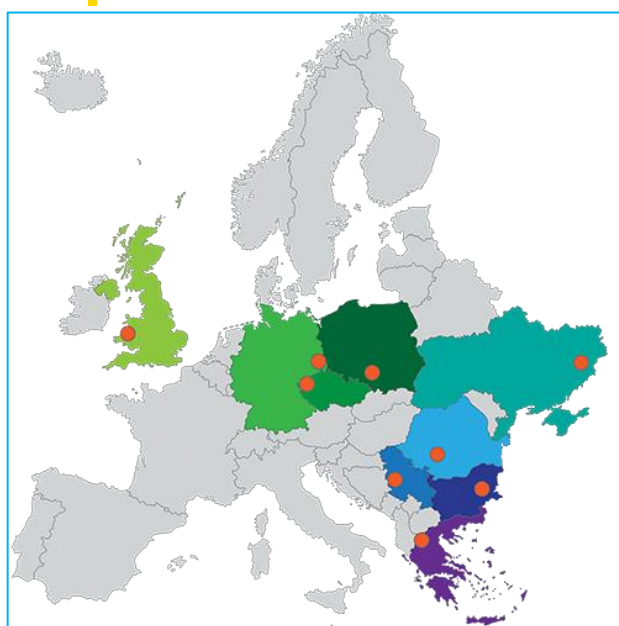
Pilot projects are underway in 14 regions: Silesia (Poland), Western Macedonia (Greece), Trencin (Slovakia), Moravia-Silesia, Usti and Karlovy Vary (Czech Republic), Jiu Valley (Romania), Asturias, Aragón, Castilla-y-León and Castilla-La Mancha (Spain), and in Brandenburg, Saxony and Saxony Anhalt (Germany).

3.3.2 INTERREG DeCarb Project (2018-2023)

The INTERREG-funded DeCarb project supports stakeholder engagement and exchange of experience on clean energy transition in coal-intensive regions.²³ With nine partners in nine EU countries, it runs from June 2018 to May 2023. Activities include:

- Designing methods for assessing the socio-economic impact of decoupling energy and coal mining in target regions;
- Identifying good practices on decarbonisation and clean energy transition, including the mapping of funding instruments;
- SWOT analyses to determine decarbonisation growth pathways; and
- Analyses of needs relating to environmental restitution and land restoration, focusing on ecosystem services and building site development.

3.3.3 TRACER (2019-2022)



EPRC is cooperating with 14 partners in the Horizon 2020-funded TRACER project, which aims to support nine coal-intensive regions to agree Smart Specialisation Strategies and to facilitate transition towards sustainable energy systems.²⁴

The nine (EU-28 and non-EU) regions are: Southeast Region (Bulgaria), North West Bohemia (Czech Republic), Lusatia (Germany), West Macedonia (Greece), Upper Silesia (Poland), Jiu Valley (Romania), Kolubara (Serbia), Wales (United Kingdom), and Donetsk (Ukraine).

TRACER aims to:

- Mobilise a wide range of stakeholders (from business, research/education, government/policy, and civil society) to come together in order to discuss and agree on a shared strategic vision and priorities for energy R&D&I in coal transition regions, and to move forwards with accessing investment and implementing these strategies and priorities;
- Analyse best practice examples of transition processes in coal intensive regions, including: social, environmental and ecological issues; labour markets and tourism; financial instruments and funding programmes at regional, national and EU levels;





stakeholder engagement; and transition of regional energy production towards renewables.

4 NATIONAL REGIONAL POLICIES FOR COAL TRANSITION

Regional policies have often emerged in response to the structural economic difficulties of coal producing regions. For example:

- In the UK, regional policy began in the 1930s, with central government investment in industrial estates, and the provision of loans to firms establishing plants in four Special Areas with high unemployment rates due to structural change in the coal industry and other heavy industry sectors (South Wales, Clydeside, Durham and Tyneside, and West Cumberland).²⁵
- In the Federal Republic of Germany, regional policy focused on areas of economic weakness following World War II, as well as eastern border areas. However, the creation of the Regional Joint Task in 1969 (still Germany's main regional policy instrument) was shaped by the economic downturn of 1966-67 and its negative impact on coal producing areas, such as the Ruhr area.²⁶
- In the Czech Republic, the challenges faced by coal mining regions as a result of industrial restructuring and privatisation in the 1990s drove a number of initiatives and interventions that laid the foundations for contemporary regional policy.²⁷
- In Poland, regional policy in the 1990s took the form of ad hoc instruments targeting specific regions with particularly severe problems caused by economic transformation, such as the Contract for Katowice in Upper Silesia, which set out key actions for restructuring the region's industrial economy, including coal.²⁸

This section focuses on two EU Member States – Poland and Germany – which are contrasting examples of countries at different stages of coal restructuring and transition, and representative of different groups of Member States. Both are strong producers and consumers of coal, and both have significant policy agendas for addressing the challenges facing coal producing regions.

4.1 Poland

Poland faces serious economic and political challenges in relation to coal, which are illustrative of the situation facing other major coal producing countries, such as the Czech Republic and Slovakia. The coal sector in Poland has seen major restructuring since 1990 but it remains an important regional employer. Poland is committed to meeting international targets on climate emissions and energy transition but also faces the need to ensure energy supply and regional employment. The regional policy Programme for Silesia supports a shift from traditional sectors such as coal towards future-oriented sectors.

4.1.1 Coal production in Poland

Hard coal is the largest energy resource in Poland. Nearly half of Polish electricity production is generated in hard coal-fired power plants. National hard coal reserves have a realistic potential of c. 40-50 years (although hard coal deposits would, in principle, be sufficient for over 860 years of extraction if technical, economic and social constraints did not exist).²⁹

Much of Poland's coal production is concentrated in Upper Silesia, a highly urbanised area in south-western Poland, with a population of 4.6 million (which has been steadily decreasing since 1989, due to negative natural population growth and strong net out-migration). Silesia is home to Poland's three largest coal corporations (with 27 mines), and accounts for 82 percent of the coal extracted nationally in 2007-15. Coal production shapes the region's economy, society and physical geography, accounting for seven percent of regional GDP (2016). The Upper Silesian Coal basin encompasses 45 percent of the region's surface area, and over 50 km² of land is awaiting reclamation.

Employment in coal-mining (including both hard coal and lignite) significant: 113,500 people in 2016, of which 23,500 in lignite mining and 90,000 in hard coal mining.³⁰ There is further significant employment in coal-fired power generation. In addition, coal is an important input to other industries, such as automotive engineering, so that coal restructuring would have a wider impact on regional economic structures. Coal-mining and coal-fired energy production are also of considerable political, social and cultural importance, both nationally and especially for the region of Upper Silesia.

4.1.2 National Energy and Climate Plan 2021-2030

Poland's coal sector has seen significant restructuring and job losses since the 1990s in the context of economic transition. Climate targets are expected to lead to a gradual shift from fossil fuels to renewable energy sources but coal currently remains important, both politically and in terms of energy supply. Poland's National Energy and Climate Plan 2021-2030 (of January 2019) includes commitments to support significant growth in renewable energy capacity but also anticipates that coal will continue to account for 60 percent of electricity generation by 2030 (currently: 77 percent).³¹

4.1.3 National Programme for the Coal Mining Sector 2016-2030

In this context, the National Programme for the Coal Mining Sector 2016-2030 aims to create conditions to help build a profitable, efficiency and modern coal mining sector. Key programme goals include:

- Ensuring that domestic coal supply is sufficient to meet domestic demand;
- Improving working conditions for miners; and
- Supporting transition to a low-carbon economy.



The Programme includes funding opportunities for mining companies (e.g. from the national promotional bank BGK) and PhD scholarships in the sector. There is also a national Programme for the Lignite Mining Sector, which oversees the exploitation of existing mines and supports the development of new technologies and innovation, contributing to the implementation of low-carbon technologies.

Pressure is also increasing for measures to restore the environment and to transform former mining sites into potential areas for business development. These sites are often attractive to businesses due to their location, existing infrastructure, size and zoning in local plans.

4.1.4 The Programme for Silesia: Goals

The Programme for Silesia was adopted in 2017, as part of the Polish Strategy for Responsible Development. It aims to support the region's transition from reliance on traditional sectors (including coal mining and metallurgy) towards more innovative and high-tech sectors, in order to "gently transform" the region's economic profile. The programme aims to:

- Increase industrial innovation and investment in technological development in the region;
- Increase the professional profile and qualifications of the region's inhabitants;
- Improve the quality of the natural environment;
- Develop and modernise transport infrastructure;
- Using the region's potential to ensure energy security and to improve conditions for development in Silesia's cities.

The programme is based on cooperation between the central State and the region, including social, economic, environmental and governance actions.

4.1.5 The Programme for Silesia: Funding and projects

The programme aims to fund 85 projects with a total value of over PLN 55 billion (c. €13 billion). By June 2019, c. PLN 42 billion (c. €10 billion) had been allocated to projects (c. 75 percent of the planned funding). Until 2020, the bulk of funding will come from Cohesion policy programmes (particularly the Silesian Regional OP and the National OP for Infrastructure and the Environment), with domestic public and private co-financing. After 2020, additional instruments will be introduced, combining national, regional and local resources, as well as EU funding outside Cohesion policy. Silesia is also part of the European Union's Coal Regions in Transition Platform (see Section 3.3.1).

Examples of projects funded under the Programme for Silesia include:³²

- Around PLN 1 billion (€233 million) from the Cohesion policy OP for Infrastructure and the Environment to improve air quality.³³

- Funding of PLN 270 million (€63 million) for thermal modernisation of multi-family residential buildings, modernisation of heating networks and promotion of modern production of electricity and heat.
- Funding of PLN 220 million (€51 million) from the National Centre for Research and Development for innovative investments in the steel, energy, automotive, medicine and pharmaceuticals sectors in the region.

Funding of around PLN 40 million (€9.3 million) for seven Silesian universities, focused on the creation of new faculties in fields that are seen as crucial for the transition of the regional economy (IT, medical and energy sectors and cybersecurity).

4.2 Germany

Germany's 2016 Federal Climate Protection Plan 2050 set out the commitment to phasing out of coal-fired power in order to meet international targets to reduce climate emissions. In 2019, the federal government agreed an ambitious programme of support for the transition of the remaining brown coal regions, with €40 billion of federal funding to 2038.

4.2.1 Coal production in Germany

Brown coal accounted for 23.1 percent of Germany's gross electricity production in 2016 (2000: 25.7 percent) and 11.4 percent of primary energy consumption (2000: 10.8 percent). Domestically produced brown coal is largely used domestically for electricity production and district heating (92 percent).³⁴

In 2016, c. 20,000 people were employed directly in Germany's brown coal sector, including both mining and coal-fired power stations. The coal sector is also estimated to have significant positive indirect and induced employment effects via three channels, namely: (i) demand for intermediate goods; (ii) demand for consumer goods, due to the spending of wages/salaries in the coal sector; and (iii) demand for investment goods. Overall, it is estimated that one job in the coal sector leads to an additional 1.6 jobs in Germany's main coal regions, and an additional 2.8 jobs nationwide.³⁵

Brown coal production and power in Germany is concentrated in the regions of Lusatia (*Länder* of Brandenburg and Saxony), the Rhineland (*Land* North-Rhine Westfalia), and the Central coal region (*Länder* of Saxony and Saxony-Anhalt). In addition, the Helmstedt area (*Land* Lower Saxony) continues to experience challenges due to historic brown coal production. Further, hard coal continues to be produced in areas of the *Länder* of North-Rhine Westfalia, the Saarland, Lower Saxony, and Mecklenburg West Pomerania.

4.2.2 Federal Climate Protection Plan 2050

The challenges facing coal transition regions have become a major theme in German regional policy since late 2016, when a new federal Climate Protection Plan 2050 was agreed.³⁶ This Plan committed the federal government to phasing out lignite (brown coal) fired power



stations and, in this context, to addressing the regional socio-economic impacts of the closure of coal mines and coal-fired power stations.

4.2.3 Federal government decision to allocate €40 billion by 2038

In June 2018, the federal government launched a Commission on Growth, Structural Change and Employment to assess the impact of the federal Climate Protection Plan on structural change in lignite regions, and to propose measures to support economic development in these regions.³⁷ The Commission was made up of high-level experts from the fields of policy-making, business, trade unions, environmental protection, and energy, and linked to a federal civil service committee and secretariat. Discussions were informed by a series of studies.³⁸

The Commission's final report was published in January 2019. It analysed the situation facing Germany's lignite regions from climate protection, energy policy and economic development perspectives, and proposed measures a) for the energy sector and b) to support structural change and employment in the coal regions.³⁹ It recommended ending coal-fired power generation by 2038, and proposed federal funding of c. €40 billion for the lignite regions.

In May 2019, the federal government published a paper,⁴⁰ committing the federal government to allocating c. €40 billion of federal funding for investment in the lignite regions by 2038. This funding is divided into three blocks.

4.2.4 Step 1: Funding for lignite regions in 2019-21

The federal government and relevant *Länder* have agreed a programme for 2019-21 which draws on the €500 million annually that the federal government has already budgeted for 'regional structural policy / structural change in coal policy'.

This includes up to €240 million per annum for existing federal programmes that support sustainable locational effects and new opportunities for value added creation and employment in the three largest lignite regions (i.e. the Lausitz, the Rhineland, and the central coal region). Around €90 million will be allocated to projects in the Helmstedt area of Lower Saxony. Further federal funding (c. €1 billion) will be allocated to structurally weak anthracite areas (e.g. in the *Länder* of North-Rhine Westfalia, the Saarland, Lower Saxony, and Mecklenburg West Pomerania).

4.2.5 Step 2: Additional federal funding to affected Länder

The federal government will provide an additional €14 billion by 2038 to the four *Länder* with ongoing lignite production. The overall division between *Länder* will be as follows:

- Brandenburg: 25.8 percent;
- North-Rhine Westfalia: 37.0 percent;

- Saxony: 25.2 percent;
- Saxony-Anhalt: 12 percent.

The *Länder* will be able to use the funding for significant investment projects which they or local authorities initiate and manage, and for types of interventions outlined in the Constitution (Articles 104b and 104c) e.g. business-oriented infrastructure, R&I, business investment, and training. The funding will be regulated by a new Investment Law for Coal Regions and by an agreement between the federal authorities and the four *Länder*.

4.2.6 Step 3: Additional federal investment in the lignite regions

The federal government will also allocate up to €26 billion by 2038 (i.e. up to €1.3 billion annually) for its own priority investment projects in the lignite regions. In the next five years, funding will include up to:

- €2.6 billion for North-Rhine Westfalia;
- €1.9 billion for Brandenburg;
- €1.8 billion for Saxony;
- €0.86 billion for Saxony-Anhalt.

4.2.7 Enterprise Coal Area programme 2017

The existing 'Enterprise Coal Area' programme (*Unternehmen Revier*) is one of the instruments through which these federal resources will be channelled.⁴¹ This programme was launched in November 2017, with €4 million annually over a ten year period from Germany's Energy and Climate Fund (*Energie- und Klimafonds, EKF*), targeted on the lignite regions.

4.2.8 New legal and coordination frameworks

Federal funding will be regulated by a new law and supported by a coordination committee, chaired by a State Secretary from the Federal Ministry for Economic Affairs and Energy, and made up of State Secretaries from other relevant federal ministries and representatives of four *Länder* (Brandenburg, North-Rhine Westfalia, Saxony and Saxony-Anhalt).

5 CONCLUSIONS

5.1 New challenges and opportunities linked to climate transition

The drivers of coal restructuring have shifted radically in the past decade. Transition is now mainly being fuelled by the urgency of global climate-related challenges and by



internationally agreed targets to reduce carbon emissions – rather than by concerns over the value-for-money and productivity of coal production and power in individual regions.

Climate transition implies a more uncertain context for regional economic restructuring and employment creation, as other carbon-intensive industries (e.g. metals, automotive engineering...) also face pressure to reduce emissions. Nevertheless, climate change strategies are also generating new economic and employment opportunities, which coal restructuring regions may be able to exploit, such as renewable energy technologies, circular economy models and other more sustainable technologies and business activities. Much depends on wider regional advantages, notably regional location/accessibility, as well as their human, knowledge and physical capital, and the quality of institutions and governance.

Further, the scope for coal-intensive regions to transition into new activities is likely to be shaped by stakeholders' capacity to manage and transform the political, social and cultural challenges which are traditionally associated with coal restructuring. A particular difficulty is the planning and phasing of transition i.e. how can sufficient momentum be ensured to meet climate targets, while also allowing enough time for economic, employment and socio-cultural change so that regional economic and social dislocation is limited?

5.2 Lessons from historical regional policies for coal communities

The impact of coal restructuring continues to be seen in former coal communities across Europe which continue to have poorer business, employment and life opportunities. Nevertheless, some former coal regions are thriving and have moved into new sectors, with future-oriented, skilled employment.⁴²

Historical case studies show that regional transition out of coal requires active policy support for restructuring and environmental mitigation, as well as significant investment to reorient physical infrastructure, facilitate the growth of new sectors, and enhance human resources and research/innovation. Effective transition strategies need to include a mix of complementary policy instruments, and to be based in a thorough assessment of the barriers and opportunities for innovation facing the transitioning region. Lessons drawn from an overview of historical cases of regional support for coal communities include:⁴³

- Economic transition out of coal usually takes decades, and the associated socio-cultural and political changes can take even longer.
- There is thus a need for a long-term strategic approach and significant funding, aimed at 'managing a retreat' out of coal-related activities.
- Strategies need to be multi-faceted, including not only on physical regeneration and infrastructure, but also support for business creation and investment, for re-training workers and wider education/training, as well as for R&D&I, and for community development.



- Strategies should actively involve a wide range of stakeholders, including business, policy, research/education and civil society, and at multiple levels (local, regional, national, European), in order to mobilise a variety of capacities and resources. The participation of local/regional stakeholders and citizens in community development processes can help to facilitate the socio-cultural dimensions of transition.
- Efforts to build new forms of cooperation across sectoral and organisational boundaries, and to involve new stakeholders, can help to generate new ideas, mobilise regional capacities and reconfigure social capital. This is particularly important where the dominance of coal and related sectors has led to functional, political and cognitive “lock in” to traditional ways of thinking and acting.⁴⁴
- Strategies should aim to build on regional strengths and to prioritise the diversification of local/regional economies and supply chains away from the coal sector, also drawing where possible on coal-related skills, capacities and resources.
- There may be a need for additional support for those local areas with fewer advantages and more limited capacities to adapt to new opportunities.
- Last, political patience is needed to provide space for policy experimentation and learning, as well as potential policy failures. At the same time, celebrating small victories can help to shift cognitive lock in and oppose a culture of defeat.





Notes

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EoRPA RESEARCH

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