

Magdalena Szmytkowska

Experiences of European (Post-)Coal Regions in Energy Transition Processes and Their Implications for Poland:

A Comparative Study of the Midlands (Ireland), Stara Zagora
(Bulgaria) and Lusatia (Germany)

**SERIES: GREEN TRANSFORMATION
POLICY IN POLAND**



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PREFACE

It is widely recognised that Poland's green transformation policy is centred on the shift away from fossil fuels, particularly coal, towards renewable energy sources (RES), with the overarching objective of achieving climate neutrality by 2050. This transition is being pursued through the *Energy Policy of Poland until 2040* (PEP2040), the *National Recovery and Resilience Plan* (NRRP) and European Union regulatory frameworks, including the European Green Deal. These measures encompass the development of renewable energy sources, the modernisation of the energy sector, including the development of nuclear power, improvements in the energy efficiency of buildings, the promotion of low-emission transport and support for innovation. Their implementation requires substantial investment, financed, inter alia, through European Union (EU) funding. Research indicates growing optimism among the Polish public

regarding the potential economic and social benefits of the transition. Nevertheless, the process requires significant levels of investment and entails considerable challenges, particularly for coal-mining regions. It also poses important theoretical, descriptive and practical challenges for the academic community.

The present series of publications, devoted to green transformation policy in Poland, provides an in-depth examination of the issues associated with this field of research. Spanning six volumes, the series enables a multifaceted exploration of the subject matter, integrating theoretical perspectives with practical considerations.

The publication series adopts an interdisciplinary approach, with the aforementioned subject matter providing a common thematic framework for the individual monographs. The authors address issues relating to public policy, management, environmental protection, law and public administration. By bringing these studies together within a single series, the research provides a comprehensive and multidimensional perspective on the issues under consideration.

The third volume in the series identifies and analyses the experiences of selected European (post-)coal regions currently undergoing a process of just energy transition — the Midlands, Stara Zagora and Lusatia — while also examining how these experiences may be used to formulate

recommendations for Poland's coal regions. The analysis confirms that there is no universal model of just transition. Furthermore, just transition cannot be equated solely with the phasing out of coal-mining activities and the development of renewable energy sources.

INTRODUCTION

Contemporary changes taking place in the energy sector are among the most important processes determining the directions of socio-economic development of countries and regions. The ongoing decarbonisation of the economy, driven by global climate commitments and European Union policy, is leading to a fundamental restructuring of energy systems, models of energy production and consumption, and the economic structures of regions that have traditionally relied on the extraction and use of fossil fuels. Energy transition, however, extends beyond the technological and environmental dimensions. Its success depends on the capacity to simultaneously address the social, economic and spatial consequences arising from the shift away from a carbon-intensive economy.

In this context, the concept of just transition (*Just Transition*) assumes particular significance. According to this concept, the transition towards a climate-neutral economy should

ensure an equitable distribution of the benefits and costs of the transition, reduce the risk of deepening social inequalities, and create new development opportunities for communities and regions that are most dependent on the extractive and energy industries. (Post-)coal regions therefore constitute distinctive laboratories of change, in which processes of economic restructuring, labour-market transformation, revitalisation of post-industrial areas, and the development of new competitive advantages take place concurrently.

The aim of this study is to identify and analyse the experiences of selected European (post-)coal regions currently undergoing a process of just energy transition and to determine the possibilities for drawing on these experiences in order to formulate recommendations for Polish coal regions, particularly in the environmental-spatial and socio-cultural dimensions. The starting point is a review of the theoretical literature concerning the concept and objectives of energy transition, the dimensions of sustainable policy, and just transition (Chapter 1). The subsequent part of the study (Chapter 2) is devoted to establishing the significance of the regional scale as the optimal level for the successful implementation of energy transition processes and to identifying EU regions undergoing transformation with support from the Just Transition Fund (JTF), with particular emphasis on the pathway through which Polish coal regions have gained access to this support mechanism.

The empirical part of the study comprises two principal sections (Chapters 3–4). The first presents a detailed comparative study of the (post-)coal regions selected for analysis in accordance with the adopted methodological assumptions: the Midlands (Ireland), Stara Zagora (Bulgaria), and Lusatia (Germany). The regions are analysed according to a common framework comprising: (a) geographical location and socio-economic characteristics; (b) general characteristics of the transition; and (c) transition priorities and objectives. The analyses of these regions, which represent diverse historical, economic, and institutional conditions, made it possible to identify models of transition and to determine both common and region-specific transition pathways. The second section presents recommendations and good practices for Polish coal regions, formulated on the basis of an in-depth analysis of strategic and planning documents and sectoral programmes implemented in the selected reference regions: the Midlands, Stara Zagora, and Lusatia.

The adopted research approach assumes that the successful energy transition of regions is not limited to replacing fossil fuels with renewable energy sources. Rather, it is a multidimensional process that simultaneously encompasses energy-related, social, economic, environmental, and spatial issues, with the overarching objective of building resilient, competitive, and sustainable regions capable of functioning within a climate-neutral economy.

CHAPTER I

JUST ENERGY TRANSITION AND ITS DIMENSIONS

1.1. Energy Transition

Transformations are defined as complex, unstructured, non-linear and unplanned processes that evolve from one state of dynamic systemic equilibrium to another (Krupnik et al. 2022), while the concept of transformation itself refers to ways of actively shaping changes within processes (Kucharska 2021). At present, the energy sector is likewise undergoing a range of multidimensional changes and transformations driven by environmental factors (the need to mitigate climate change and the depletion of fossil fuel resources), social factors (improving residents' quality of life and health), and economic factors (enhancing energy

security, developing green technologies and the associated emergence of new economic sectors, as well as increasing the level of innovation within the economy).

Today, the energy sector is understood as an interconnected socio-technical system comprising technologies, actors and institutional structures, which is undergoing a fundamental change involving decarbonisation: a transition from a carbon-intensive system to one that is carbon-neutral, together with the generation of energy from renewable sources, including bioenergy, hydropower, geothermal energy, solar energy, wind energy and ocean energy (Krupnik et al. 2022).

Energy transition is understood as a shift from an energy model based on non-renewable energy sources in the form of fossil fuels to an energy system based on renewable and low-carbon energy sources. This entails replacing the energy carriers used to date and reducing fuel and energy consumption, improving energy efficiency through specific measures, and reducing concentrations of greenhouse gases and other harmful air pollutants (Młynarski et al. 2017; Mirowski 2017). Maintaining a balance between the costs and benefits arising from energy investments in a given area requires due consideration when designing large-scale measures, which are often regarded as strategic from the perspective of the development not only of the region concerned, but also of the country as a whole

(Ulewicz et al. 2023). An inherent feature of energy transition is the decentralisation (dispersion) of energy systems, which are commonly defined in terms of the relatively low capacity of their energy sources and their relatively short distance from end users, associated with a certain degree of independence from centrally managed energy systems. Decentralised energy systems are regarded as beneficial in terms of security of energy supply, the efficiency of energy production, storage and transmission, and the development and cohesion of communities through the provision of sources of income and the creation of jobs at the local level (Graczyk et al. 2021).

Energy transition is a multidimensional process, not only in terms of its underlying causes, but also with regard to the areas it affects and the consequences it generates. The principal areas of change associated with energy transition processes include:

- a) institutional changes, concerning institutional cooperation aimed at achieving a better understanding of the social context of energy transition and developing an appropriate strategy;
- b) technical changes, related to the possibilities of producing energy not only from fossil fuels or renewable sources, but also from waste;

- c) political changes, requiring the management of the process despite divergent interests represented by different social groups at the local and regional levels;
- d) spatial changes, concerning spatial planning within the energy transition process at all territorial levels: local, regional and national (Młynarski et al. 2017).

The global energy transition is changing the way in which societies produce and use energy. It is a response to overlapping crises: climate instability, the need for rapid decarbonisation, and persistent inequalities within existing energy systems. This change is not simply a technical substitution of renewable energy sources for fossil fuels. It is also a social, technical and political transformation, the implementation of which requires not only the scaling up of renewable energy generation, electrification and energy efficiency, but also attention to gaps in energy access, affordability, reliability and resilience (Yannam et al. 2026).

The new energy system requires a paradigm shift: from a centralised, costly and relatively inflexible system towards a digital and decentralised network in which local energy production and consumption become an asset rather than a threat (Górník 2025). At the same time, the effective energy transition of cities cannot be based on a single, universal solution. It requires the application of a broad spectrum of instruments, ranging from substantial investment in infrastructure and the energy-efficient retrofitting of public

buildings, which should serve as examples to be followed, to softer educational and participatory measures¹.

The transition must be accompanied by improvements in energy efficiency, the energy-efficient retrofitting of buildings, consumer education, and the promotion of modern technologies in households; it must therefore also demonstrate sensitivity to social considerations. Every citizen can become both a participant in and a beneficiary of this change—as a prosumer generating energy and as an informed user committed to energy conservation and efficiency (Motyka 2025).

In recent years, energy and climate have been among the European Union's most important areas of activity, and energy transition has consequently become one of the EU's key development priorities. The EU's strategic objective is to achieve climate neutrality by 2050, which will require a radical acceleration of the energy transition process across all Member States. A turning point in EU energy and climate policy came in 2019, when the strategy for the development of the European Green Deal was announced (Kardaś 2024). On 14 July 2021, the European Commission

¹ *Strategiczny wymiar transformacji energetycznej. Polskie miasta w dialogu ze szwajcarskim doświadczeniem*, Centrum Konsultacyjne Polsko-Szwajcarskiego Programu Rozwoju Miast, 2026, p. 2, https://wsparciemiast.pl/wp-content/uploads/2026/04/Strategiczny-wymiar-transformacji-energetycznej.pdf?utm_source=chatgpt.com

published a package of legislative amendments under the *Fit for 55* initiative, the overarching objective of which was to establish a pathway towards achieving climate neutrality by 2050 through dedicated targets and regulatory measures. These measures directly and comprehensively address all key EU regulations concerning energy and climate, while also generating indirect changes in related legislation (Kurtyka 2021).

More recently, the pace and scope of the energy transition have been influenced by EU initiatives undertaken in response to Russia's invasion of Ukraine in February 2022. Of particular importance in this context are the REPowerEU programme and the EU's external energy commitments, which together form part of the EU's external energy policy strategy. Their principal objectives are to achieve complete independence from Russian energy supplies, diversify sources of energy supply, reduce energy consumption within the EU, and increase the share of renewable energy (Kardaś 2024). The objectives of European Union energy policy are to ensure security, while also generating tangible benefits for every consumer and creating added value for the economy as a whole. This entails providing consumers—both households and businesses—with secure, sustainable, competitive and affordable clean energy, ensuring its efficient use, and reducing dependence on fossil fuels (Nowak and Przepióra 2023). Achieving the

ambitions of the European Union's climate and energy policy requires particular mobilisation in order to facilitate Poland's energy transition, as the country faces the challenge of developing a new, zero-emission energy system over the coming decades (Kurtyka 2021).

1.2. Sustainable Energy Policy

Energy transition should be pursued in an ambitious and consistent manner, while at the same time remaining responsible and sustainable (Kurtyka 2021). Sustainability transitions refer to large-scale, fundamental changes in societal systems that are considered necessary to address challenges of such magnitude as climate change (Krupnik et al. 2022). Therefore, although transformations of energy systems arise from different socio-technical configurations and are associated with economic restructuring, socio-environmental considerations remain central to the entire process.

Sustainable energy development is a concept associated with the application of sustainable development principles to the energy sector and should be based on a combination of renewable energy technologies, renewable fuel transport, renewable heat, demand reduction, efficient energy use, and the cogeneration of energy (Graczyk et al. 2021).

The principal pillars of sustainable energy policy are energy efficiency and renewable energy. An ecological approach to processes of economic modernisation, through the implementation of technological innovations, should facilitate progress towards environmental and production objectives, while at the same time ensuring that development processes remain balanced (Młynarski et al. 2017).

Although the energy sector is undergoing a global transformation involving, among other processes, a shift away from fossil fuel-based infrastructure, it is equally important, as already noted, to take into account the socio-cultural dimension of the transition, which is generally regional or even local in character. The transformation of energy systems is not only an exceptionally challenging technical undertaking, but also a major cultural and political challenge. The higher cost of transitioning towards renewable energy compared with fossil fuels or nuclear energy makes its integration into policy and practice difficult (Kim et al. 2020). Bottom-up and often individual—and therefore subjective—perspectives on energy transition may, or indeed should, be considered just as important as the objective systemic changes themselves (Stirling 2014).

The difficulty involved in implementing such profound structural changes associated with energy transitions stems from the complexity of the system as a whole (Pearson 2018) and the processes accompanying it. These cannot

be understood through separate analyses of individual constituent elements—environmental, demographic, socio-economic and technological changes—but rather through their synthesis and the adoption of a holistic approach.

Given the multiplicity of factors involved, as well as their fluidity and unpredictability, it is virtually impossible to predict precisely how these processes will unfold and what their consequences will be. The complex system that emerges in the course of transition generates uncertainty, while the various potential processes—innovative, political and socio-cultural—that may drive the transition are themselves characterised as non-linear and interdependent (Haas et al. 2023). Moreover, the so-called human factor, together with a range of circumstances and converging developments, may significantly influence and disrupt the large-scale restructuring of long-standing ‘socio-technical regimes’ planned from the top down (Stirling 2014: 83).

Consequently, the course and outcomes of energy transition, given its multidimensional nature, complexity and sensitivity to a wide range of factors, are neither unequivocal nor fully predictable. Above all, the effects of these transformations may differ substantially depending on the specific characteristics of the regions undergoing transition. The regional and local context is therefore

crucial to the planning and implementation of sustainable energy policy.

Local and regional authorities face increasing challenges in planning energy transition. These involve not only the need to reduce CO₂ emissions in accordance with national climate targets, but also the need to respond appropriately to local priorities and to ensure that the transition is just and equitable for all social groups. This is not a straightforward task: energy transition is inherently political and value-based, involving diverse groups of stakeholders who represent competing interests and possess unequal resources (Sundaram et al. 2026).

The International Energy Agency defines sustainable energy as a long-term, globally oriented approach to energy that ensures environmental protection, economic efficiency and competitiveness, as well as social responsibility (Graczyk et al. 2021). In the process of ensuring the sustainable development of the energy sector, its three fundamental dimensions—social, economic and environmental—should be treated as equally important, while their respective aspects should be closely and mutually interconnected (Figure 1).

Sustainable energy policy should take into account both objectives aimed at increasing the share of renewable energy sources in individual countries' energy mixes and improvements in broadly understood energy efficiency,

while also ensuring that energy is supplied to consumers at relatively affordable prices. This is particularly important in the context of the need to minimise energy poverty among households (Adamczewska and Zajączkowska 2022), whose residents, often on low incomes, live in energy-inefficient buildings with poor insulation and outdated appliances, and consequently face high energy bills and poor indoor air quality (Bouzarovski and Simcock 2017).

Therefore, the use of renewable resources as new sources of energy is crucial to sustainable energy development. On the one hand, such resources have a less significant impact on climate change, while, on the other, they offer substantially greater security in the context of the various constraints and rising costs associated with the use of non-renewable resources. Equally importantly, changes in this area must also be accompanied by institutional restructuring associated with changes in consumption patterns and approaches to energy management, based on the principles of the broadly understood social economy, conscious consumption and socially responsible business practices.

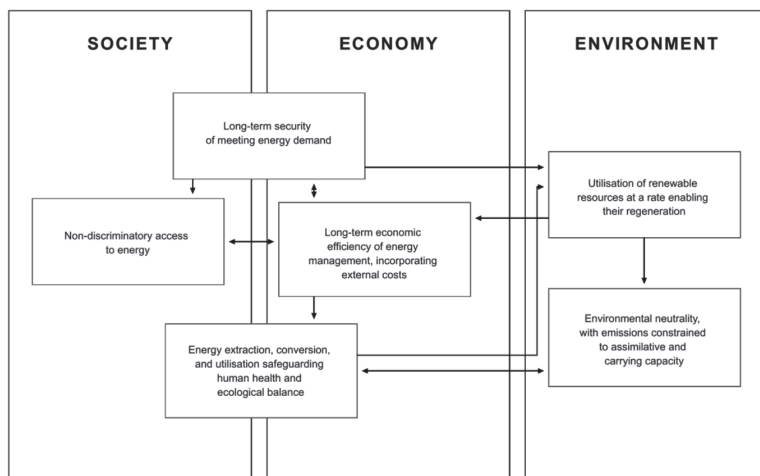


Figure 1. Attributes of Sustainable Energy Management

Source: Graczyk 2021: 28.

In the socio-economic dimension, particular emphasis is placed on opportunities for job creation, reducing economic migration, especially from rural areas, broad stakeholder engagement, the equitable distribution of costs and benefits, and the development of social capital that enhances social cohesion and strengthens the potential for local and regional initiatives (Graczyk et al. 2021). An inclusive approach to energy development provides the foundation for both a just transition and the spatially equitable distribution of local resources (Ulewicz et al. 2023). Spatial justice should therefore constitute one of the fundamental considerations in renewable energy development. This

means that local communities required to bear the costs associated with hosting energy-generating infrastructure should also derive tangible benefits from the operation of new energy installations (Chodkowska et al. 2022). Energy justice, in conjunction with climate justice and environmental justice, contributes to achieving a substantive form of just transition (Drobniak et al. 2022).

1.3. Just Transition

The concept of just transition emerged in connection with workers' strikes in the 1970s. The purpose of this concept is to emphasise that economic transformation should proceed in a manner that protects the environment and limits the impact of human activity on the climate, but not at the expense of society (Filipiak and Mielczarski 2023). Conceptually, just transition is defined in terms of equal access to environmental resources, the labour market and infrastructure, as well as reducing development disparities in order to promote a high quality of life and opportunities for development. Just transition places a clear emphasis on social issues, including workers and local communities, rather than being limited exclusively to climate change (Drobniak 2021a: 50). This entails focusing attention on those affected by the transition, for whom its costs and

pace must be acceptable; otherwise, appropriate support must be provided. The principal risks arising in the context of transition processes in the energy sector are increasing energy poverty and job losses. Regions with the greatest transition needs and a more limited capacity to generate appropriate innovations should not be required to bear the highest costs of the measures being planned (Kurtyka 2021).

Just transition is accompanied by a reorientation of economic structures towards solutions consistent with the European Green Deal, under which the extraction and exploration of fossil fuels will be significantly reduced, while activities characterised by high greenhouse gas emissions will undergo profound transformation in favour of the development of a green economy (Drobniak 2021a)². Just energy transition and the design of measures associated with it therefore require the adoption of an exceptionally broad perspective encompassing all relevant aspects, including—and indeed, above all—the views of residents and adequate compensation for the impacts of transition measures. The location of large-scale energy investments is inevitably determined by practical considerations; nevertheless, the socio-spatial dimension and a context-sensitive

² The elements of a green economy include the development of renewable energy sources, passive building design and energy-efficient materials, low-emission transport, efficient water management, the circular economy, and spatial management.

perspective should constitute equally important elements of the decision-making process (Ulewicz et al. 2023).

The implementation of a just transition should be based on several key principles that need to be observed in the course of its successful implementation. These include:

- a) a comprehensive analysis of existing conditions and an assessment of the impacts of planned policies, together with the identification of the necessary transition processes and measures prior to the commencement of the transition;
- b) planning from short-, medium- and long-term perspectives;
- c) consideration of the diverse contexts of transition (geopolitical, environmental, cultural and socio-economic);
- d) social dialogue (democratic decision-making in consultation with trade unions, experts, civil society organisations and the local community);
- e) investment (cooperation between the state, local and regional authorities, and businesses in investments designed to fill the gaps left by closed enterprises and generate new jobs, while drawing on the knowledge and skills of the available workforce and enabling its further development);
- f) protection in the form of programmes supporting local communities (employment activation policies,

- programmes supporting occupational retraining, financial assistance and psychological support);
- g) transparency of transition processes (Filipiak and Mielczarski 2023).

Research on just energy transition conducted by numerous scholars indicates that, although the concept has been approached in several ways, there is generally agreement on its three fundamental dimensions:

- 1) distributive justice – requiring an equitable distribution of the costs and benefits of the energy system;
- 2) procedural justice – advocating inclusive governance and the meaningful participation of marginalised communities in decision-making processes;
- 3) recognition justice – seeking to address systemic and historical marginalisation while recognising diverse identities, values and needs (McCauley et al. 2014; Williams and Doyon 2019; Sundaram et al. 2026; Yannam et al. 2026).

In addition, some researchers recognise the rationale for identifying a fourth pillar of energy justice, referred to as restorative justice, which focuses on mitigating the harms resulting from dependence on fossil fuels and providing remedies for affected communities, while maintaining procedural transparency and ensuring intergenerational equity (Yannam et al. 2026: 2; Sundaram et al. 2026).

The socio-spatial dimension is particularly important in a just transition, since it is local communities and patterns of spatial development that are affected most directly by transition-related changes. The transition will be socially just only if residents of mining regions feel that it is ‘about them’ and ‘for them’; that they are taken seriously in the process and are placed at its centre. This requires treating them as active participants in a transparent process, as well as providing education and maintaining an open dialogue. Although initiated and supported at the national level, the transition in each region should be bottom-up and inclusive: it should be conducted ‘with people’ and ‘for people’, and should be accepted and legitimised by them. The involvement of local communities from the very outset—their sense of agency, shared responsibility and a form of ‘co-ownership’ of the process—is crucial to ensuring that the resulting change is lasting (Pawlik 2025). Just transition is associated with the quality of social dialogue, processes that genuinely involve local actors in both the planning and implementation of change, and state policy, particularly the state’s capacity to decentralise the energy system (Herudziński 2025).

In the process of just energy transition from conventional energy systems towards systems based on renewable energy sources, it is important to consider not only the challenges and principles involved, but also the barriers

that must be overcome in order to maintain a just approach, including higher costs, limited access to energy sources, and infrastructure-related constraints (Figure 2). Although the diagram below provides a visual representation of the transition from conventional to renewable energy systems in accordance with the principles of just transition, it should be emphasised that this process is considerably more complex and multidimensional, and depends on a wide range of factors. These include the broader conditions shaping the transition (including EU climate policy, climate-neutrality targets and energy security), as well as implementation instruments (including the Just Transition Fund, regional policy, investment in renewable energy sources, workforce reskilling, education, innovation, spatial planning, public participation, and cooperation between public administration, businesses, academia and residents).

The effects of a just transition should be expected across all key dimensions of regional development: energy-related, social, economic, environmental and spatial. Based on studies and documents produced by European and international institutions, including the OECD, ESPON and the European Commission, the principal expected outcomes of a just transition have been identified according to these five dimensions of development (Figure 3).

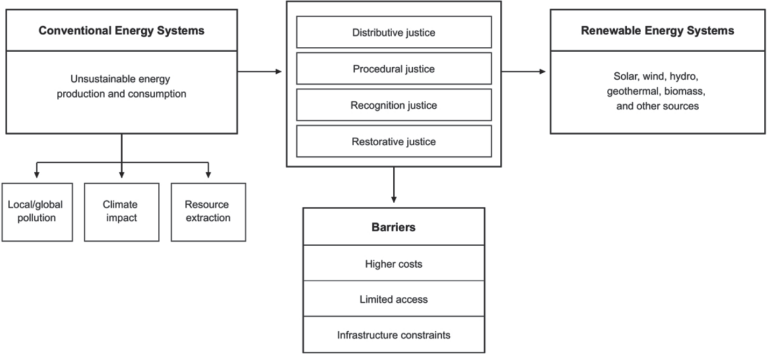


Figure 2. Challenges, Dimensions of Justice and Barriers Associated with Energy Transition

Source: Yannam et al. 2026: 3.

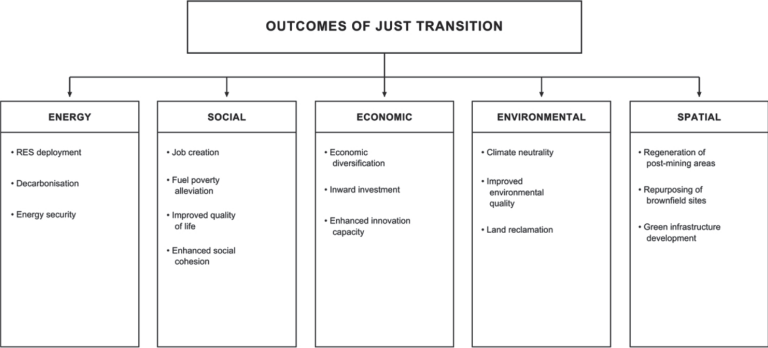


Figure 3. Effects of a Just Transition

Source: Author's own elaboration.

It should be emphasised that, while energy transition assumes sustainable development and a reduction in greenhouse gas emissions, just transition places particular emphasis on the fact that changing the ways in which energy is generated does not in itself guarantee social sustainability. Accordingly, just transition mechanisms are expected to prevent or mitigate the emergence of social inequalities as potential consequences of energy transition (Herudziński 2025).

CHAPTER II

POST-COAL REGIONS AS DISTINCTIVE AREAS UNDERGOING ENERGY TRANSITION

2.1. The Regional Dimension of Energy Transition

Coal regions, classified as lagging regions, are among the areas most socially and economically vulnerable to the green transition. Consequently, the pressure associated with the shift towards a zero-emission economy through socio-economic and technological changes driven by efforts to achieve the UN Sustainable Development Goals and the objectives of the European Green Deal is particularly strong in these regions (Drobniak 2021a).

A key development challenge for coal regions is their declining competitiveness, resulting from the low productivity of mining activities at a time of increasing pressure

to use renewable energy sources and the availability of cheaper coal from countries and continents characterised by lower labour costs and/or less costly access to this resource. The fundamental challenge involved in reorienting the development pathways of coal regions is their high dependence on mining infrastructure and the underdevelopment of other sectors of the economy (Drobniak et al. 2020; Drobniak 2021b).

A common feature of regions requiring transition is the exhaustion or obsolescence of their existing development model and the need to move towards a new structure that draws on existing potential while simultaneously introducing new development opportunities³. Since industrial monoculture has significantly contributed to the occupational and skills-related homogenisation of local labour markets and to the dependence of industrial workers and their families on local mining and production enterprises, the challenge encompasses not only structural economic transformation, but also regional environmental-spatial and socio-cultural issues.

The European Union's, as well as the global, trajectory towards decarbonisation and climate neutrality necessitates a major structural transformation of the energy sector,

³ *Biała Księga Zrównoważonej transformacji regionów węglowych w Polsce 2025-2049 (projekt)*, 2025, Warszawa: Ministerstwo Przemysłu

involving a shift from fossil fuel-based energy production to renewable energy sources. The underlying operating model of the entire system is also changing: from relatively controllable and centralised generation and broadly predictable consumption towards highly intermittent, decentralised, weather-dependent and spatially dispersed generation, accompanied by considerably more variable patterns of consumption (Leśniewicz and Eron 2025).

In view of the above, the regional and subregional scales appear to be optimal for transition measures, while also providing the greatest potential for effective planning and implementation of individual actions. Each region has its own specific characteristics—its structure, development model, and social and economic culture—which need to be taken into account in order to ensure an effective, sustainable and just transition. At the same time, it should be recognised that the coordination of certain measures may be more effectively undertaken at the national level⁴. On the other hand, action at the regional scale safeguards the implementation of supra-local public objectives that could not be rationally defined and pursued at the municipal level (Wałęga and Zathey 2025).

Energy policy pursued under the new global conditions is a multidimensional issue, encompassing spatial,

⁴ *Biała Księga Zrównoważonej transformacji regionów węglowych w Polsce 2025–2049 (projekt)*, Warszawa 2025.

temporal and environmental aspects, expert knowledge and workforce skills, the social dimension (including efforts to combat energy poverty), technical and technological considerations, organisational and legal arrangements, financial issues, the institutional dimension (the statutory allocation of competences), and economic considerations. All these dimensions are interconnected and require a holistic approach, which can be effectively implemented at the regional level—the level most appropriate for coordinating the development of energy infrastructure while simultaneously recognising local conditions and intra-regional disparities (Zathey 2025).

Research conducted in regions that have undertaken the challenges associated with transition indicates that regional institutions play a key role in mitigating tensions and building public acceptance (Herudziński 2025). Accordingly, for transition processes to succeed—given that they encompass not only centrally directed energy and economic issues, but also a wide range of other measures—the proactive role of regional governments should be strengthened by granting them substantive competences in energy planning. Appropriately coordinated decentralisation that takes account of intra-regional diversity will make it possible to address challenges such as climate change, the growing energy deficit, and threats to energy security (Zathey 2025).

2.2. Just Transition Regions

The European Green Deal assumes that no region will be left without support in the process of green transition. This applies particularly to coal regions, whose communities will experience the consequences of the phase-out of coal most acutely. The Just Transition Mechanism is intended to address this challenge by serving as a key instrument and safeguard to ensure that the transition towards a climate-neutral economy takes place in a just manner. Its cornerstone is the Just Transition Fund (JTF), which is intended to support coal regions in their transition and mitigate its socio-economic consequences (Ślimko et al. 2021).

The operation of the Just Transition Fund accelerates economic modernisation and increases regions' resilience to social and economic shocks. Although supporting infrastructure in degraded areas is important, without more substantial structural measures the Fund performs a compensatory rather than a transformative function. It is therefore crucial that JTF resources be directed towards projects that build new models of regional development based on innovation, entrepreneurship and sustainable growth.

Integrated transition plans for NUTS 3 regional units, or even NUTS 4 subregional units, may prove effective by combining measures aimed at mitigating the consequences

of mining with a comprehensive socio-economic development policy. However, the emphasis declared to date on ‘soft’ and environmental measures is insufficient to ensure lasting development. A qualitative change in the economic model of mining regions is necessary, while respecting their heritage and traditions and simultaneously placing greater emphasis on modernisation, technology and knowledge. Ultimately, the JTF should serve not only to mitigate the consequences of industrial closures, but also to create a new economic identity for these regions⁵.

According to European Commission data, at the outset of the implementation of the European Green Deal framework in 2018, there were 41 regions (NUTS 2) in the European Union in which 128 coal mines were operating. The coal regions with the highest numbers of workers employed in the mining sector were located in Poland, followed by Germany, the Czech Republic, Romania, Bulgaria, Greece and Spain (Drobniak 2021a).

European countries seeking to participate in the allocation of these funds to their coal regions were required to prepare Territorial Just Transition Plans (TJTTPs), which were to include:

- a description of the anticipated transition process towards a climate-neutral economy, in accordance

⁵ *Biała Księga Zrównoważonej transformacji regionów węglowych w Polsce 2025–2049 (projekt)*, Warszawa 2025.

- with the objectives of national energy and climate plans and other existing documents;
- a timetable for the cessation or reduction of hard coal and lignite mining or electricity generation in coal-fired installations;
 - a description of the territories expected to be most severely affected by the adverse consequences of the transition;
 - an assessment of the economic, social and territorial impacts of the transition towards a climate-neutral economy;
 - development needs and objectives to 2030 aimed at achieving climate neutrality, as well as the types of measures and operations planned;
 - a description of the processes of public participation, monitoring and evaluation (Ślimko et al. 2021).

Ensuring the participation of local communities and civil society organisations was of particular importance in the preparation of these plans. A necessary condition for obtaining support from the Fund was, in turn, the provision of a timetable for mine closures by 2030 or a commitment to a significant reduction in coal extraction (Ślimko et al. 2021).

As shown in Table 1, a total of 96 coal regions (NUTS 3) were ultimately designated for which just transition measures were programmed and funding was allocated under the *Just Transition Fund (JTF)*, including 63 regions

in Western European countries and 33 in post-socialist countries.

Table 1. Just Transition Fund Regions by Country

Country	Number of Regions	Just Transition Fund (JTF) Regions
Western European Countries		
Austria	1	Austria Region
Belgium	2	Arrondissements de Tournai, Mons et Charleroi
Cyprus	1	Cyprus
Denmark	2	Northern Jutland, Southern Jutland
Finland	14	Etelä-Karjala, Etelä-Pohjanmaa, Etelä-Savo, Kainuu, Keski-Pohjanmaa, Keski-Suomi, Kymenlaakso, Lappi, Pirkanmaa, Pohjanmaa, Pohjois-Karjala, Pohjois-Pohjanmaa, Pohjois-Savo, Satakunta
France	6	Bouches-du-Rhone, Nord – Pas-de-Calais, Loire-Atlantique, Moselle – Meurthe-et-Moselle – Haut-Rhin, Rhone-Isère, Vallées de la Seine et de la Bresle
Germany	8	Chemnitz, Nordliches Ruhrgebiet, Rheinisches Revier, Lausitz Brandenburg, Lausitz Sachsen, Mitteldeutsches Revier Sachsen, Mitteldeutsches Revier Sachsen-Anhalt, Uckermark

Country	Number of Regions	Just Transition Fund (JTF) Regions
Greece:	3	Megalopoli, North and South Aegan Islands and Crete, Western Macedonia
Ireland	1	Midlands
Italy	2	Taranto, Sulcis-Iglesiente
Luxembourg	1	Luxemburg
Malta	1	Malta
Netherlands	6	Groningen and Emmen, Groot-Rijnmond, IJmond, West-Noord Brabant, Zeeuws-Vlaanderen, Zuid-Limburg
Portugal	3	Alentejo Litoral, Médio Tejo, Matosinhos
Spain	9	A Coruña, Alcadia, Almería, Asturias, Cádiz, Córdoba, León, Palencia, Teruel
Sweden	3	Gotland, Norrbotten, Västerbotten
Post-Socialist Countries		
Bulgaria	3	Kyustendil, Pernik, Stara Zagora
Croatia	2	Istria, Sisak-Moslavina
Czechia	3	Karlovy-Vary, Ústí, Moravian-Silesian
Estonia	1	Ida-Viru
Hungary	3	Borsod-Abaúj-Zemplén, Heves, Baranya
Latvia	4	Kurzeme, Latgale, Vidzeme, Zemgale
Lithuania	3	Kaunas, Telšiai, Šiauliai
Poland	4	Eastern Greater Poland, Łódź, Silesia, Wałbrzych

Country	Number of Regions	Just Transition Fund (JTF) Regions
Romania	5	Dolj, Galați, Gorj, Hunedoara, Mureș, Prahova
Slovakia	3	Banská Bystrica, Košice, Trenčín
Slovenia	2	Zasavska, Savinjsko-Šaleška

Source: Author's own elaboration based on: https://commission.europa.eu/index_pl; Szmytkowska et al. 2025: 5.

In the case of Poland, work on programming measures for a just transition was undertaken for the following coal regions:

- Lower Silesian Voivodeship:
 - Wałbrzych NUTS 3 subregion, extended to include Kamienna Góra County;
 - Zgorzelec County;
- Lublin Voivodeship:
 - modified Lublin NUTS 3 subregion comprising Chełm, Lubartów, Lublin, Łęczna, Parczew, Świdnik and Włodawa Counties, as well as one city with county rights, namely Chełm (excluding the city of Lublin);
- Silesian Voivodeship:
 - seven NUTS 3 subregions: Bielsko-Biała, Bytom, Gliwice, Katowice, Rybnik, Sosnowiec and Tychy;

- Łódź Voivodeship:
 - the so-called Bełchatów Transition Area, comprising parts of two NUTS 3 subregions, namely Piotrków Trybunalski and Sieradz;
- Lesser Poland Voivodeship:
 - Oświęcim NUTS 3 subregion, the so-called Western Małopolska area;
- Greater Poland Voivodeship:
 - Konin NUTS 3 subregion, excluding two counties, namely Gniezno and Września (Drobniak 2021a).

Ultimately, the European Commission provided support from the Just Transition Fund to four Polish coal regions: Upper Silesia, Eastern Wielkopolska, the Wałbrzych subregion in Lower Silesia, and the Bełchatów Transition Area in the Łódź region.

The regional approach makes it possible to tailor measures to specific local conditions, recognising the importance of the reclamation of post-mining areas, education, and the strengthening of cultural capital as elements contributing to the development of a new identity for post-industrial regions.

CHAPTER III

TRANSITION PROCESSES IN SELECTED EUROPEAN (POST-)COAL REGIONS

For the purposes of this study, an inventory was conducted of regions located in European Union Member States in which transition processes associated with decarbonisation and, at the same time, measures aimed at achieving climate neutrality are under way.

The primary criterion for selecting regions for analysis was the cessation or phasing out of industrial activity, with particular emphasis on extractive industries involving surface (open-cast) rather than underground mining. A further criterion was the selection of regions from countries that have undergone or continue to undergo intensive socio-economic changes resulting either from rapid economic development driven by policies adopted and implemented at the national level (e.g. Ireland and Spain), or from systemic political changes and the transition from

an authoritarian socialist state to a democratic post-socialist/capitalist state (e.g. East Germany, the Czech Republic, Bulgaria and Romania). The third criterion was the inclusion of the regions in the EU Platform for Coal Regions in Transition and the existence of regional programmes under the EU Just Transition Fund. The fourth criterion was that the regions qualifying for the comparative study belonged to the NUTS 3 level of the EU classification of territorial units for statistical purposes.

The application of these principal criteria made it possible to identify several significant (post-)transition areas in the EU, from which the following were ultimately selected for in-depth analysis and comparative study:

- the Midlands Region in Ireland;
- the Stara Zagora Region in Bulgaria;
- the Lusatia Region (Łużyce) in Germany.

Furthermore, in order to provide the broadest possible framework for the comparative study, the selected regions respectively represent: Ireland as a capitalist country of Western Europe; Bulgaria as a post-socialist country of Central and Eastern Europe; and Germany, which experienced political division and functioned under both of the aforementioned political and economic systems.

The regions identified above were analysed according to the following criteria:

- geographical location and general socio-economic characteristics;
- general characteristics of the transition undergone;
- the objectives established during the transition and the timetable for their implementation.

3.1. The Midlands Region (Ireland)

3.1.1. Geographical Location and General Socio-Economic Characteristics

The Midlands Region (NUTS 3) is located in the central part of Ireland and forms part of the NUTS 2 region comprising the Eastern Region (which includes the national capital, Dublin) and the Midlands⁶. Administratively, the Midlands Region consists of four counties:

- Westmeath (96.2 thousand inhabitants in 2022; 30% of the region's total population);
- Laois (92 thousand inhabitants in 2022; 29% of the region's total population);
- Offaly (83.1 thousand inhabitants in 2022; 26% of the region's total population);

⁶ *Regional Profile. Midlands, Ireland*, Platform for Coal Regions in Transition, European Commission, 2020.

- Longford (46.5 thousand inhabitants in 2022; 15% of the region's total population).

The principal urban centres of the region include the following towns, which are relatively small in terms of population but display positive demographic trends:

- Portlaoise (County Laois; 23.5 thousand inhabitants in 2022);
- Athlone (County Westmeath; 22.9 thousand inhabitants in 2022);
- Mullingar (County Westmeath; 22.7 thousand inhabitants in 2022);
- Tullamore (County Offaly; 15.6 thousand inhabitants in 2022);
- Longford (County Longford; 10.9 thousand inhabitants in 2022).

According to data from the 2022 national census ⁷, the region has a population of 318 thousand (approximately 6.2% of Ireland's total population), covers an area of 6,524 km² (9.5% of the country's territory), and has a population density of 49 inhabitants per km². It should be emphasised that the Midlands Region is characterised by positive demographic trends, as demonstrated by the fact that its population increased by 13% compared with 2011. Population growth has also been recorded in each of the individual counties and in the region's largest urban centres.

⁷ Central Statistics Office, <https://www.cso.ie/en/>

The region's demographic growth results from both a high rate of natural increase (more than 10 births per 1,000 inhabitants in all counties of the region, according to 2018 data) and positive net migration (ranging on average from 7 to 19 per 1,000 inhabitants, depending on the county, in the period 2016–2022). Furthermore, the population of the Midlands is relatively young, as reflected in the following age structure:

- under 20 years of age – 28%;
- 20–64 years of age – 57%;
- over 64 years of age – 15% (as of 2022).

In socio-economic terms, the Midlands Region lies within the sphere of influence of the Dublin metropolitan area, resulting in a significant level of commuting by the working population to Dublin and other cities (an estimated 24 thousand people per day). Given the considerable scale of these daily commuting flows, the extent to which they are served by public transport is insufficient, resulting in high traffic volumes on the main road networks leading to urban centres⁸.

In economic terms, the Midlands Region is one of the relatively less developed areas of the country, as demonstrated, among other indicators, by the fact that GDP per capita in the region amounted to 37.5% of the national

⁸ European Commission, Directorate-General for Energy, *Regional Profile: Midlands, Ireland*, Luxembourg 2024.

average in 2017. The region is predominantly rural, with agriculture and the peat industry traditionally constituting key sectors of its economy. The peat industry was of particular economic and social importance in this area, as it supplied a carbon-intensive fuel that was burned for energy generation. At present, however, peat production has been substantially reduced as Ireland seeks to address climate change by reducing greenhouse gas emissions⁹.

Industrial activity in the region is concentrated primarily in the food sector, as well as in advanced technology industries (ICT and MedTech), a development associated with the establishment of world-class research and development (R&D) facilities and the emergence of a low-carbon (green) business sector in the region, supported by 14 higher education institutions¹⁰.

The Midlands Region is recognised as an area characterised by valuable landscapes, significant natural environmental assets, and biodiversity of international importance. Moreover, the environment may play a significant role in achieving national decarbonisation targets, both as an area for the development of renewable energy and through its capacity to contribute to carbon sequestration¹¹.

⁹ European Commission, *Regional Profile. Midlands, Ireland*, Platform for Coal Regions in Transition, 2020.

¹⁰ Government of Ireland, *Mid-Term Progress Report. Midlands Regional Enterprise Plan to 2024*, 2022.

¹¹ European Commission, *Midlands Pathway to Transition*, Platform for Coal Regions in Transition, 2020.

An important asset of the Midlands Region is its social and cultural capital. The former—compared with many other EU regions undergoing transition—is reflected in a significant concentration of socially active organisations, public-sector bodies and non-governmental organisations. Cultural capital, in turn, is reflected in the strong sense of identity, history and culture among local communities, which provides an important stimulus for the development of a range of local initiatives for residents.

3.1.2. General Characteristics of the Transition

Ireland has extensive peat resources, which were exploited and managed by the state-owned company Bord na Móna (BnM). The land managed by the company extended over approximately 80 thousand hectares and comprised more than 130 individual peatlands organised and managed in groups. The vast majority were concentrated in the Midlands Region, although they also extended into Counties Kildare, Roscommon, East Galway and North Tipperary.

In addition to peat extraction, a purpose-built industrial railway network of approximately 700 km transported harvested peat to three power stations located in the Midlands: Edenderry, West Offaly and Lough Ree. For much of the preceding two decades—before the process of phasing out and

closing the power stations began—energy generation from peat combustion was supported through a Public Service Obligation imposed on electricity consumers to support the use of indigenous fuel, which contributed to increased employment in the Midlands Region. This support was withdrawn in 2019, after which all three of Ireland’s peat-fired power stations located in the Midlands were closed.

The process of closing the power stations began with the onset of the COVID-19 pandemic in March 2020, when operations at the West Offaly and Lough Ree power stations were suspended due to reduced energy demand. Industrial-scale peat extraction in Ireland was used both to supply power stations for electricity generation and to produce peat briquettes for domestic heating. In 2019, the volume of milled peat amounted to 3 Mt, while 500 thousand peat briquettes were produced. Peat extraction and electricity generation played a dominant role in the local economy of the region and neighbouring counties, sustaining a supply chain of local businesses providing ancillary services, particularly small engineering and technical enterprises supplying machinery, equipment and tools. Moreover, many such businesses had their origins in Bord na Móna, as they had been established by former employees of the company¹².

¹² European Commission, *Regional Profile. Midlands, Ireland*, Platform for Coal Regions in Transition, 2020.

The Electricity Supply Board (ESB), in turn, is a state-owned energy company that operated, among other facilities, two peat-fired power stations in the Midlands, supplied with peat extracted by Bord na Móna. In 2019, ESB submitted an application to the planning authority for permission to convert the West Offaly power station from peat to biomass from 2020 onwards; however, the application was rejected due to the absence of a viable business model. Consequently, both power stations ceased electricity generation at the end of 2020. The third power station, Edenderry Power, owned by Bord na Móna and co-firing peat and biomass, was authorised to operate until 2023¹³.

The closure of the power stations and the cessation of peat harvesting have had a significant impact on local communities that developed around peatland areas in Counties Offaly, Laois, Longford and Westmeath in the Midlands, as well as in several counties neighbouring the region where peat-industry workers reside. Both state-owned companies played a major role in shaping the local labour market by providing substantial levels of employment. In 2020, approximately 1.7 thousand people were directly employed at Bord na Móna facilities, excluding seasonal workers. The contraction of the workforce during the final years of the peat extraction and energy industries

¹³ *Ibidem.*

also contributed to its ageing. In 2020, the average age of employees exceeded 50 years, while their level of formal education was relatively lower.

The closure of the power stations may lead to an increase in unemployment rates in peatland communities, as there are currently limited alternative local employment opportunities for the Bord na Móna workforce. Employment opportunities outside the region and neighbouring regions may, in turn, place additional pressure on the rail and road networks as a result of increased commuting to larger cities. Moreover, the restructuring of the extractive and energy industries may have further consequences for indirect and induced employment in the region, as well as broader socio-economic effects, such as a loss of purchasing power in rural communities, the loss of seasonal employment, and reduced local authority rates revenue, which may affect the quality of local service provision¹⁴.

In the case of former and older peatland and power-station workers, it is emphasised that, although their level of formal education may be below average, they nevertheless possess a strong base of engineering and technical skills. This may be important in the context of changes taking place in local labour markets in the Midlands, where

¹⁴ European Commission, *Regional Profile. Midlands, Ireland*, Platform for Coal Regions in Transition, 2020.

shortages of skilled labour have been identified in areas such as ICT, renewable energy technologies and construction¹⁵.

The social context of the energy transition is also important. The Midlands Region and its neighbouring counties are largely composed of rural communities in which agriculture, peat extraction and the energy industry based on this resource have played a key role in the local economy. Peat milling has a long history in Ireland, deeply rooted in generations of families whose livelihoods depended on the peat industry. For generations, Ireland's peatlands have constituted a significant resource, serving not only as a source of fuel and employment, but also as an important focus of local communities, their traditions and their history. The urgent need to address climate change means that the time has come for the relationship between people and peatlands to become more equitable. Ways must be established to support sustainably the livelihoods of communities surrounding Ireland's raised bogs, while simultaneously helping these unique natural habitats to recover and develop.

To ensure a just transition, communities and groups affected by the phase-out of peat need to be supported in addressing the adverse consequences of the transition and

¹⁵ European Commission, *Midlands Pathway to Transition*, Platform for Coal Regions in Transition, 2020.

taking advantage of new opportunities. This means targeting investments and related projects and programmes at affected localities and social groups, primarily those who have lost their jobs and young people. For this approach to succeed, action should proceed along two complementary pathways: from the bottom up, by targeting affected communities and groups, and from the top down, by investing in broader regional development, an approach that has proved effective in other post-mining regions (e.g. Limburg in Belgium and the Ruhr region in Germany). This type of transition pathway, combining the facilitation of small-scale bottom-up and local initiatives with larger-scale regional development measures and investments, links economic efficiency with social justice¹⁶.

In July 2019, the Midlands Region was included in the EU Platform for Coal Regions in Transition initiative, which was established to support coal regions during the transition period. Membership of the Platform enables the Midlands Region to benefit from assistance in developing strategies and projects for the region, with a particular focus on the employment challenges faced by workers affected by decarbonisation. The accelerated phase-out of peat also required strategies aimed at identifying and implementing alternative employment opportunities, as well

¹⁶ *Ibidem.*

as programmes for reskilling and upskilling the affected workforce. The objective was to retain and create employment opportunities in the Midlands Region and to avoid relocation or increased commuting to the Greater Dublin Area. The accelerated pace of the transition had particular consequences for the workforce, as many employees had insufficient time to plan and prepare for alternative employment and acquire new skills. Affected communities therefore needed support in identifying career pathways and training requirements, as well as guidance on establishing new businesses¹⁷.

Under the EU START programme, a socio-economic profile of the region, a document concerning future employment and skills, and a portfolio of project proposals supporting a just transition in the Midlands Region were prepared. Particular emphasis was placed on projects aimed at creating opportunities and mitigating the adverse effects on communities and individuals most affected by the transition towards a low-carbon society. In total, more than 150 project proposals were generated and submitted. These were prepared by community, public-sector, private-sector and non-governmental organisations and were intended to assist the region in identifying potential

¹⁷ European Commission, *Midlands Pathway to Transition*, Platform for Coal Regions in Transition, 2020.

investment needs for inclusion in the support programme under the new EU Just Transition Fund (JTF)¹⁸.

On the basis of the results of the START project, growth sectors were identified through an extensive regional analysis. In order to reflect the long-term nature of the transition, the objectives and measures associated with the process were phased over time. Moreover, the transition pathway was intended to combine top-down and bottom-up approaches. Previous energy transitions in EU regions had demonstrated that harnessing the potential of local and regional communities, together with that of the national public sector, during a phased transition facilitates positive change. Ultimately, three regional phases of transition were identified:

- 1) Phase 1 (up to three years), with the following objectives:
 - mitigating the adverse effects of business restructuring and redundancies;
 - assessing and safeguarding associated assets and records;
 - strengthening the resilience and adaptive capacity of communities, society and citizens;
 - reorienting regional potential towards the transition;

¹⁸ *Ibidem.*

- promoting innovation and investment in order to take advantage of future opportunities;
 - developing the outcomes of the project inventory.
- 2) Phase 2 (from approximately the third year of the transition), characterised by the scaling up and acceleration of regional investment related to energy transition, economic diversification, infrastructure, environmental and biodiversity enhancement, and the utilisation of assets.
- 3) Phase 3 (from approximately the fifth year of the transition), characterised by discernible structural changes, including increases in productivity and capital resulting from the energy transition, smart specialisation and growth in the identified emerging sectors, as well as the repurposing of regional assets¹⁹.

The EU Just Transition Fund (JTF) represented the most important instrument for the Midlands in the context of measures aimed at decarbonisation and climate neutrality. In Ireland, where the national Climate Action Plan aims to achieve a climate-resilient, climate-neutral and environmentally sustainable economy by 2050, the EU Fund focuses primarily on the Midlands Region as it transitions away from peat production and peat-fired electricity generation. In accordance with legal requirements, Ireland prepared

¹⁹ European Commission, *Midlands Pathway to Transition*, Platform for Coal Regions in Transition, 2020.

a Territorial Just Transition Plan and an accompanying programme setting out the measures to be supported by the Fund. Following the European Commission's approval of Ireland's Territorial Just Transition Plan and programme, activities under the programme commenced in 2023.

The Fund operates under EU Regulation 2021/1056 within the framework of EU cohesion policy. Co-financed by the Government of Ireland and the European Union, funding of up to EUR 169 million will be available over the Fund's programming period. Investment will be directed towards supporting the diversification of local economies and creating new opportunities in areas requiring support. As the Midlands Region is the first area in Ireland in which a just transition process is being implemented, the development and implementation of its transition pathway may provide lessons for other Irish regions²⁰.

3.1.3. Transition Priorities and Objectives

As already noted, the Midlands Region is the most important area in Ireland for the implementation of the Just Transition Fund for post-coal regions. In accordance with the objectives of the just transition programme, the

²⁰ K. Mulvey, *Just Transition Final Progress Report*, 2021.

Midlands Regional Transition Team (MRTT) was established to mitigate the effects of job losses and develop alternative employment opportunities. The MRTT plays an important role in coordinating key regional stakeholders in order to support the development of projects with transformative potential in the region and represents the region on the EU Just Transition Platform²¹.

Both national financial resources, in the form of the National Just Transition Fund (NJTF), and EU financial resources, in the form of the Just Transition Fund (JTF), provide ongoing support for mitigating the socio-economic consequences of the closure of peat-fired power stations and the cessation of commercial peat extraction as a raw material for energy generation. The National Just Transition Fund (NJTF) supports a variety of innovative projects that contribute to the economic, social and environmental sustainability of the region. The EU Just Transition Fund, in turn, is intended to support the most affected regions in EU Member States in addressing the challenges associated with achieving the EU's climate targets by 2030 and climate neutrality by 2050 at the latest²².

²¹ European Commission, *Midlands Pathway to Transition*, Platform for Coal Regions in Transition, 2020.

²² Government of Ireland, *Delivering a Just Transition in the Midlands Region, 2023, Climate Action Plan 2024*.

The just transition programme comprises three complementary investment priorities aimed at strengthening the regional economy, addressing poverty and depopulation in rural areas, and promoting a diversified and resilient economy based on climate neutrality²³.

The principal priority is **generating employment for former peat communities through investment in the diversification of the local economy**. In pursuit of this objective, EUR 38 million has been allocated to the economic diversification of the territory through: (a) supporting tourism investment in micro-enterprises, small and medium-sized enterprises (SMEs), and businesses operating in key sectors of the Midlands, enabling them to establish, modernise, diversify and expand their activities; and (b) developing digitalisation within SMEs operating in the tourism sector. In addition, a further EUR 29 million has been allocated to support the implementation of bottom-up local and regional initiatives aligned with the priorities of eight Local Economic and Community Plans and four Regional Enterprise Plans within the area concerned. These primarily include:

- infrastructure investments that contribute at the local level to improving the business and consumer environment, particularly projects relating to the green economy, circular economy and low-carbon economy;

²³ *Ibidem.*

- investment in skills-training infrastructure to enable people to return to work, change employment or remain in employment;
- training or skills-development programmes that make a positive contribution to addressing climate change;
- investment in cultural heritage infrastructure, including the repurposing of post-industrial sites.

A further EUR 20 million has been allocated to development and innovation activities intended to contribute to the growth of a sustainable circular bioeconomy. This includes support for the transfer of advanced technologies through living laboratories and demonstration initiatives aimed at developing sustainable, higher-value products for a new resource-efficient circular bioindustry.

The second priority is **supporting the rehabilitation and restoration of degraded peatlands and the regeneration and repurposing of industrial heritage assets**. Under this priority, EUR 12 million has been allocated to the rehabilitation and restoration of degraded wetlands, including research, education and the development of visitor facilities. In addition, approximately EUR 15 million has been allocated to research and knowledge transfer to the economy, as well as monitoring activities relating to improvements in land management on cultivated grassland peat soils. The objective is to identify appropriate land-management practices that maintain low levels of greenhouse gas (GHG)

emissions and support agricultural biodiversity under wet conditions. Almost EUR 30 million will be used to develop a network of trails and to regenerate and repurpose industrial heritage assets that will no longer be used for the extraction, transport and processing of peat.

The third priority is **providing former peat communities with smart and sustainable mobility options** to enable them to benefit directly from the transition. Under this priority, EUR 3 million has been allocated to investments in the decarbonisation of local public bus routes in rural areas, including the purchase of electric buses and the installation of charging points to support private bus operators in their transition to electric vehicles. Above all, however, measures will focus on installing accessible fast-charging infrastructure at public facilities, as reflected in the EUR 15 million allocated for this purpose.

As part of its decarbonisation measures, in addition to the Just Transition Fund, the Midlands Region has access to EU funding totalling approximately EUR 108 million for the implementation of the Peatlands Decommissioning, Rehabilitation and Restoration Scheme. The aim of the programme is to rehabilitate 82 peatlands covering approximately 33 thousand hectares, managed by Bord na Móna and previously used for peat extraction for electricity generation. The rehabilitation works will be carried

out over a period of five years. This is the largest peatland rehabilitation programme in the country's history and encompasses a wide range of engineering and hydrological works aimed at restoring, promoting and accelerating natural processes.

Following rehabilitation, the peatlands will support peat-forming habitats, as well as wetlands, heathlands, grasslands and woodlands, while safeguarding the storage of millions of tonnes of carbon, enhancing biodiversity and strengthening the capacity of peatland communities to respond to the challenges associated with the transition towards a zero-carbon economy²⁴.

Another EU initiative is the LIFE Peatlands and People project, a seven-year programme worth EUR 10 million, implemented by a consortium led by Bord na Móna and based on three main pillars:

- identifying and implementing good practices in peatland restoration and rehabilitation in order to reduce greenhouse gas emissions and increase carbon storage capacity;
- the *Accelerate Green* just transition accelerator programme for innovation focused on the low-carbon and circular economies in order to support the region's economic development;

²⁴ *Ibidem.*

- establishing a local community centre to promote the importance of climate action, with particular emphasis on the role of peatlands and the long-term objective of creating an educational space dedicated to climate-related issues²⁵.

In the context of the transition, increasing attention is being paid to the development of projects aimed at harnessing the distinctive natural assets of peatlands and wetlands for tourism purposes. Fáilte Ireland (Ireland's National Tourism Development Authority) has recognised the potential of tourism to generate employment for communities previously engaged in peat extraction. To this end, a set of measures has been developed for inclusion in the EU JTF programme, with the aim of creating new businesses and jobs by establishing the Midlands as an authentic regenerative tourism destination based on the sustainable use of peatlands and wetlands.

The *Regenerative Tourism & Placemaking Scheme*, in turn, was developed to enhance the region's potential as a place to live and work and to regenerate regional towns and villages through the development of high-quality tourism and recreational infrastructure capable of transforming the economies of communities in these areas. The Scheme is intended to support efforts to transform the Midlands

²⁵ *Ibidem.*

Region into a carbon-neutral area by funding sustainable tourism projects expected to have a significant impact on the regeneration of local communities and peatlands.

In June 2024, the first round of approved investment grants was announced for projects under the EU Just Transition Fund relating to regenerative tourism and job creation for the period 2023–2026, co-funded by the Government of Ireland and the European Union. Under the programme, projects representing investments worth EUR 27.1 million were approved, including walking and cycling trails on former industrial peatlands and investments in tourism development projects.

Fáilte Ireland also announced the inclusion of 85 tourism businesses in its EU Just Transition Digital Transformation Programme, with a total planned value of approximately EUR 5.5 million. The funding programme for private and community-based SMEs aims to provide visitors with new and enhanced experiences and to develop a low-carbon tourism base. The ambition of the programme is to attract more visitors, extend the duration of their stays and encourage overnight stays. This will contribute to the creation of new jobs in the sector and support the development of the tourism economy²⁶.

²⁶ Fáilte Ireland, *EU Just Transition Fund Regenerative Tourism & Placemaking Scheme for Ireland's Midlands 2023–2026*, 2022.

In conclusion, attention should be drawn to the social and environmental priorities of the energy transition being pursued in the Midlands Region. Most of the proposed solutions, projects being developed and financial support received concern the implementation of local bottom-up initiatives, with the genuine involvement of multiple actors and users of the areas undergoing transition. Respect for local cultural heritage and environmental assets, together with a focus on the needs of local communities and improvements in quality of life, predominates in the measures being planned and implemented.

At the same time, a number of the measures undertaken are also aimed at the economic development of the region, based on local assets and opportunities (tourism, innovation, development of the SME sector, etc.). This should be linked to the policy of developing an area that constitutes an alternative to the Dublin Region and offers a high level of residential attractiveness for both existing and new residents, as well as attractiveness as a tourist destination.

3.2. Stara Zagora (Bulgaria)

3.2.1. Geographical Location and General Socio-Economic Characteristics

The Stara Zagora Region is located in the south-central part of Bulgaria and, in administrative terms, comprises 11 municipalities, which vary in terms of area, population and level of socio-economic development²⁷.

According to the EU classification, Stara Zagora constitutes one of the 28 NUTS 3 units in Bulgaria and, together with three other districts (Burgas, Sliven and Yambol), belongs to the Yugoiztochen Region (NUTS 2). According to 2023 data, the Stara Zagora Region covered an area of 5.2 thousand km² (4.6% of the country's territory) and had a population of 290.3 thousand (4.5% of the country's population), which means that the regional population density was 56 inhabitants per km². The region's urbanisation rate reached 71% in 2023, and its principal urban centres include:

- Stara Zagora – 142.3 thousand inhabitants;
- Kazanlak – 64.0 thousand inhabitants;
- Chirpan – 17.6 thousand inhabitants;
- Radnevo – 16.0 thousand inhabitants;
- Pavel Banya – 12.3 thousand inhabitants.

²⁷ *Portrait of the Regions: Bulgaria – Stara Zagora. Geography and History.*

Stara Zagora is a region facing demographic challenges, as demonstrated by the fact that its population has declined by 14% since 2010. This situation is primarily attributable to negative trends in natural population change (−7.3‰ in 2023), which are not offset by positive net migration (+2.4‰ in 2023)²⁸.

The educational structure of the workforce in the region is improving. In 2021, the proportion of the population aged 25–64 with higher education reached 22.0%, although it remained below the national average of 29.6%. However, the proportion of the population with primary education or below was relatively low, at 15.8%, compared with 16.6% nationally. The relatively high proportion of the workforce with higher levels of education is consistent with the region's industrial profile²⁹. This constitutes an important advantage for the region in the context of the structural nationwide shortage of skilled workers with secondary and higher education and may be particularly significant given the need for changes in qualifications and skills resulting from economic transition and changes in the regional labour market.

²⁸ National Statistical Institute of the Republic of Bulgaria, https://www.nsi.bg/en/?utm_source=chatgpt.com

²⁹ Institute for Market Economics (IME), *Regional Profiles. Indicators of Development*, Sofia 2023.

The population of the Stara Zagora Region is undergoing a progressive ageing process, as demonstrated by a comparison of its age structure in 2010 and 2023 (Table 2).

Table 2. Age Structure of the Population of Stara Zagora, 2010–2023

Specification	2010	2023
Under 20 years of age	28%	20%
20–64 years of age	57%	56%
Over 64 years of age	15%	24%

Source: Author's own elaboration based on data from the National Statistical Institute (NSI).

In economic terms, the region is regarded as one of the most dynamically developing areas in Bulgaria. Regional gross domestic product amounts to EUR 10.3 thousand per capita, placing Stara Zagora second only to the capital, Sofia. At the same time, the GDP generated in the region accounts for 4.5% of the country's GDP³⁰.

In the case of Stara Zagora, particular emphasis is placed on the importance of its geographical location in terms of transport accessibility, as the region—located in the centre of Bulgaria—constitutes a key intersection of three major European transport corridors connecting the Adriatic Sea with the Black Sea, Finland with Greece, and Germany with Turkey.

³⁰ European Commission, *Stara Zagora. Regional Profile*, Initiative for Coal Regions in Transition, 2024.

The region's industrial profile is dominated by mining and industrial production. Coal mining and energy production have provided high levels of employment and local income. The region is known as a key energy region in Bulgaria, and the Maritsa area is home to the country's largest coal mine and coal-fired power plant. The Maritsa Iztok energy complex comprises three lignite mines, as well as three coal-fired power plants and one briquette plant, employing more than 13,000 people.

In addition to coal-related activities, the region's economy is characterised by the presence of manufacturing industries (particularly heavy equipment, military equipment and electronics), the chemical industry (particularly fertilisers, plastics, rubber products and essential oils for the cosmetics industry), food processing, construction services, and wholesale and retail trade³¹.

Positive economic trends are reflected in the situation on the regional labour market, where a steady increase in employment has been accompanied by a marked decline in unemployment. In 2022, the employment rate among the working-age population (15–64 years) reached 76%, while the unemployment rate stood at only 1.1% (Table 3).

³¹ European Commission, *Stara Zagora. Regional Profile*, Initiative for Coal Regions in Transition, 2024.

Table 3. Selected Labour Market Indicators in the Stara Zagora Region, 2010–2022

	2010	2015	2020	2021	2022
Employment Rate	63,5	60,3	73,3	72,2	75,4
Unemployment Rate	6,7	9,7	2,1	3,2	1,1

Source: Author's own elaboration based on data from the National Statistical Institute (NSI).

3.2.2. General Characteristics of the Transition

Bulgaria's National Recovery and Resilience Plan (NRRP), approved in May 2022, stipulated that coal-fired electricity generation would be phased out by 2038. This transition timetable was supported by a decision of the National Assembly adopted in January 2023 and confirmed in the Territorial Just Transition Plan (TJTP) submitted by the Bulgarian Government in September 2023. The TJTP was approved by the European Commission in December 2023.

This timetable is highly ambitious and indeed critical for Stara Zagora, as the region plays a dominant role in national electricity generation due to the concentration of thermal power plants (TPPs) and associated lignite mines in the area. Coal from these mines accounts for approximately 30% of Bulgaria's total electricity generation, while the

three major power plants supply 25–35% of the electricity consumed in Bulgaria³².

Under the proposal, coal-fired power plants and coal mines will be gradually closed, while affected workers will receive compensation or assistance through a state-owned enterprise established to support and facilitate Bulgaria's transition away from coal. The enterprise is to be called Conversion of Coal Regions (KVR) and will assume responsibility for formulating a plan setting out specific measures and transition timelines for achieving the 2038 target.

Until 2027, the enterprise will focus on preparatory activities for pre-closure planning, including feasibility studies, data collection and surveys of mining sites, the identification of environmental and safety risk factors associated with the mine-closure process, as well as the preparation of spatial development plans for the repurposing of these areas for renewable energy generation, industrial uses, infrastructure projects or sustainable agriculture.

After 2027, KVR will gradually expand its activities related to the rehabilitation of mining sites and the decommissioning of power plants, while some mining operations

³² European Commission, *Regional Industrial Diversification in Stara Zagora. Placing EU CRiT START Support in a Strategic Context*, 2024.

will continue in order to ensure the security of the electricity system during the transition process³³.

The Stara Zagora Region is home to coal mines and four thermal power plants. The Just Transition Fund is also dedicated to degraded areas in order to prepare them for alternative economic activities and for the transition to green energy. The economy of the Stara Zagora Region, and particularly the Maritsa Iztok energy complex, will be significantly affected by the energy transition.

It is estimated that by 2026 approximately 12 thousand jobs within the complex will need to be transferred to other sectors of the economy. By 2038, at least a further 15 thousand jobs will be at risk of being lost as a result of the final phase-out of coal. Taking into account workers in the coal sectors and their families, as well as indirect employment, 30% of the region's total population may be affected, in one way or another, by the planned closure or transformation of traditional industry and energy production³⁴.

The Territorial Just Transition Plan for Stara Zagora is a key strategic document for the region's transition. In terms of the energy transition, the Plan places considerable emphasis on the development of renewable energy sources,

³³ European Commission, *Stara Zagora. Regional Profile*, Initiative for Coal Regions in Transition, 2024.

³⁴ Territorial plan for a just transition of Stara Zagora region, Annex 2: Template For Territorial Just Transition Plans, Ministry of Energy, Bulgaria.

particularly solar photovoltaic energy, but also wind energy, green hydrogen and geothermal energy. Renewable energy projects will be located on reclaimed mining land or in its immediate vicinity, with the aim of safeguarding the local workforce, maintaining established mobility patterns and addressing employment gaps resulting from the transition of coal-related activities in the region.

The region has the potential to become one of the EU's hydrogen hubs, producing green hydrogen for thermal processes (heating, electricity generation, industrial processes, etc.), as well as hydrogen fuel cells for electricity generation. Stara Zagora has already registered a flagship European hydrogen hub initiative and a plan to establish a hydrogen valley. A hydrogen-based economy is regarded as a strategic priority for the transition of the Stara Zagora Region³⁵.

The region also has other plans that incorporate aspects of the green transition into their strategies. One of these is the *Integrated Territorial Development Strategy for the South-East Region of Bulgaria 2021–2027* (2022), which covers the Stara Zagora Region. The development plan establishes a framework for integrated spatial development, taking into account local territorial potential and the principles

³⁵ Ministry of Energy, Bulgaria, *Territorial Plan for a Just Transition of Stara Zagora Region, Annex 2: Template for Territorial Just Transition Plans*.

of sustainable development. The Strategy provides for support for research into and development of affordable clean energy technologies, support for SMEs and innovative start-ups, the establishment of innovation centres and clusters, the reduction of waste generated in production processes and the development of industrial symbiosis, as well as measures to strengthen the circular economy across the region.

Three municipal development plans for 2021–2027—for Stara Zagora, Radnevo and Galabovo—and one plan for the remaining eight municipalities in the region (2021) are also intended to contribute to the region's transition and development. Some of the recurring priorities in these plans include achieving sustainable economic growth, promoting sustainable tourism and agriculture, developing renewable energy infrastructure, improving energy efficiency in public and private buildings, supporting SMEs and local potential, improving digital connectivity, ensuring environmental protection, including the prevention and management of natural disasters, investing in human capital, and improving educational, healthcare, social, cultural and sports infrastructure³⁶.

In order to counteract the depopulation of the region, the Stara Zagora authorities plan to digitalise and introduce

³⁶ Stara Zagora. Regional Profile. 2024. Initiative for coal regions in transition. European Commission.

innovation into the regional economy, thereby attracting new businesses and start-ups. In 2021, a European Digital Innovation Hub was established, bringing together actors from academia, business and non-governmental organisations to provide a range of essential services, including digital skills and training for local businesses, with a view to identifying investment opportunities. A second approach to increasing the attractiveness of the region is the rehabilitation of areas for tourism purposes. Stara Zagora has a rich historical heritage (including Neolithic dwellings) and, consequently, considerable potential for tourism development, which currently remains largely unexplored³⁷.

The main institutions and partners involved in the development and implementation of transition strategies and plans in the energy transition process are:

- at the national level: the Ministry of Energy, the Ministry of Labour and Social Policy, the Ministry of Regional Development and Public Works, the Ministry of Economy, and their executive agencies;
- at the regional and local levels:
 - regional and local administrations: the Stara Zagora Regional Administration and the municipalities of Bratya, Chirpan, Galabovo, Gurkovo,

³⁷ Exchange between Stara Zagora (BG) and Karlovy Vary (CZ), 2023, European Commission

Kazanlak, Maglizh, Nikolaevo, Opan, Pavel Banya, Radnevo and Stara Zagora;

- energy companies:
 - Bulgarian Energy Holding EAD (a state-owned energy holding company in Bulgaria, which owns the Mini Maritsa East mines, the Maritsa Iztok 2 thermal power plant and the Brikel EAD power plant);
 - AES Bulgaria (a privately owned American energy company that owns the Maritsa Iztok 1 and Maritsa Iztok 3 thermal power plants);
- development agency: the Stara Zagora Regional Economic Development Agency (SZ REDA);
- business associations: the Stara Zagora Chamber of Commerce and Industry;
- non-governmental organisations: WWF, CEE Bankwatch and Za Zemiata (Friends of the Earth Bulgaria);
- trade unions: the Confederation of Independent Trade Unions in Bulgaria (CITUB) and the Confederation of Labour “Podkrepa”³⁸.

The assumptions underlying the transition process generally emphasise the educational attainment, skills and competences of the workforce, as well as the need to retain

³⁸ Ministry of Energy, Bulgaria, *Territorial Plan for a Just Transition of Stara Zagora Region, Annex 2: Template for Territorial Just Transition Plans*.

and reskill workers so that those leaving high-emission sectors of the economy can take up employment in enterprises requiring highly and medium-skilled personnel to implement energy-efficiency projects (including photovoltaic panels, electrical equipment and technical components for photovoltaic panels, hydrogen electrolyzers, geothermal equipment, etc.).

The Stara Zagora Region has considerable potential for a transition based on the integrated transformation of assets, which would make it possible to preserve the region's energy profile, the quality of employment and added value at the regional level through the implementation of large-scale investments and the development of new high-value-added industries in the field of clean technologies, while harnessing the potential of the available infrastructure, human capital and land. Moreover, the presence of scientific and research and development institutions (including Trakia University, the Institute for Sustainable Transition and Development, the Regional Economic Development Agency, etc.) makes Stara Zagora a particularly promising region for research and development and innovation in the field of new clean technologies, as well as for building a model of active participation by local stakeholders in the governance and implementation of the transition³⁹.

³⁹ *Ibidem.*

The coal mines (open-cast mines) and adjacent areas will require large-scale rehabilitation on a scale never previously undertaken in Bulgaria, which represents a major challenge for the just transition process in the region. Moreover, the Maritsa Iztok energy complex will require industrial reconversion and a technological transition to alternative energy sources in order to reduce carbon dioxide emissions and enable it to continue operating as an energy complex.

The main objective to be supported by the JTF is an asset-based transition of the region towards carbon-neutral sectors. These assets include a large consolidated area of land, the strongest energy grid in the country, a highly skilled technical workforce, transport infrastructure, an exceptionally valuable strategic location, and other resources. These assets should help the region transform into a carbon-neutral industrial hub, both in terms of net-zero processes and industries contributing to future carbon neutrality. To achieve this objective, meet the established national targets, and use the JTF to support green growth, decarbonisation and the transition towards a climate-neutral economy, the region will need to take steps to reduce its dependence on greenhouse gas emitters. The energy sector is the largest source of greenhouse gas emissions: in 2020, this sector alone accounted for 71.29% of total emissions. Clean technologies and clean energy have been

identified as appropriate areas of development that also contribute to the decarbonisation objective⁴⁰.

Renewable energy sources (solar, wind, green hydrogen, geothermal energy and biomethane), together with energy storage and production facilities, have been identified as an appropriate form of replacement production that can be located close to existing coal-based production (e.g. on reclaimed land within lignite mining areas). This has the potential to preserve local employment characteristics and commuting patterns, while filling the employment gap that cannot be addressed by jobs generated by SMEs. This new production will also have the advantage of contributing significantly to Bulgaria's large-scale energy transition by providing energy storage infrastructure and clean energy capacity.

The Stara Zagora area is one of the most suitable areas for ground-mounted photovoltaic installations, as approximately one-quarter of the mining complex is undergoing rehabilitation and these areas do not conflict with agricultural land or protected areas. Supporting the development of renewable energy sources may increase the investment attractiveness of both the region and the country as a whole and lead to an increase in foreign direct investment. Measures aimed at promoting renewable energy sources

⁴⁰ *Ibidem.*

and energy storage are complementary and are intended to ensure economic diversification, increase employment and quality of life, and support climate-neutrality objectives. Moreover, the region has the potential to become one of the EU's hydrogen hubs, producing green hydrogen for thermal processes (heating, electricity generation, industrial processes, etc.), as well as hydrogen fuel cells generating electricity on board vehicles or in other devices⁴¹.

3.2.3. Transition Priorities and Objectives

The implementation of the challenges and measures outlined above as part of the just energy transition is intended to contribute to the achievement of the following three main objectives:

- 1) The transfer of jobs to new types of industrial activity in transition sectors and sectors with high potential for generating gross value added in relation to renewable energy solutions;
- 2) Large-scale rehabilitation of mining areas involving a substantial number of workers, which will provide immediate alternative employment for the available mining workforce and create sites for alternative

⁴¹ *Ibidem.*

investments, including photovoltaic installations or post-industrial development;

- 3) The transition to alternative energy sources in order to reduce carbon dioxide emissions through photovoltaic and solar energy, heat pumps, green hydrogen, geothermal energy, wind energy or biomethane.

The energy transition plan for Stara Zagora is based on three principal pillars that reflect the challenges and needs of the region. They are also consistent with the principles of the EU Just Transition Fund, leading towards a climate-neutral economy, environmental protection and long-term sustainable development.

The first pillar is **industry for sustainable energy solutions**. Under this pillar, funding will be provided for the development and implementation of new sustainable energy solutions in line with the objectives of the transition towards climate neutrality, economic diversification and job creation. Table 4 presents the main measures envisaged under the first pillar.

Table 4. Measures Envisaged for Support and Implementation under the First Pillar of the Energy Transition in the Stara Zagora Region

Measure	Description of the Measure
Rehabilitation of Lignite Quarries	The rehabilitation of lignite quarries requires skills similar to those possessed by workers most directly affected by the transition, as well as the management of ongoing coal-mining activities in parallel with rehabilitation, planning and preparation of abandoned sites for future industrial activities.
Support Programme for Developing Hydrogen Value Chain Capacity	The objective is to attract one or more large manufacturing investors to the area, provide alternative employment opportunities and safeguard Bulgaria's energy transition.
Support for the Development of Industrial Parks	Support for the expansion or development of industrial parks focused on cleantech solutions as a showcase for the region's industrial reconversion.
Support Programme for Photovoltaic Parks with Electrolyser and/or Energy Storage Systems	Support for the decarbonisation of the country's energy sector and the implementation of the priority objective of transforming the Maritsa Iztok complex into a more environmentally sustainable energy producer, while maintaining its key role in the country's energy production.
Support Programme for the Use of Green Hydrogen	Support will be targeted at the production of green hydrogen as a solution for energy and heat storage and/or as a chemical feedstock, with the aim of attracting investment in advanced and high-tech industries in hard-to-abate sectors (chemicals, transport, fertilisers, etc.).
Support for Biomethane Production and Distribution and Wind Energy Generation	Biomethane will be used as a low-emission alternative fuel and a source of job creation, using organic waste for industrial applications. Energy generated by wind turbines will be used as a low-emission alternative energy source and a means of creating jobs. The programme will support the reduction of greenhouse gas emissions and contribute to the decarbonisation of the local economy. The programme will also be open to large enterprises.

Source: Author's own elaboration based on: Ministry of Energy, Bulgaria, Territorial Plan for a Just Transition of Stara Zagora Region, Annex 2: Template for Territorial Just Transition Plans.

The second pillar of the region's transition is **social support and employment**. Measures undertaken under this pillar are intended to support the social transition and protect local and regional labour markets. They include the establishment of centres to facilitate the upskilling and reskilling of the existing workforce and its transition to alternative employment. These measures have been formulated as three main priorities:

- mapping the skills of the workforce directly affected by the energy transition;
- reskilling and upskilling the workforce;
- financing energy-efficiency and renewable energy measures focused on energy poverty.

The third pillar concerns **diversification of the local economy**. It envisages support for measures such as economic diversification, the development of new economic sectors, job creation, the establishment of start-ups, entrepreneurship development and the development of the R&D sector in order to facilitate the transition to new employment following the phase-out of the coal-mining and coal-based energy sectors, as well as the establishment of regional transport connections to support the future development of the economy. These measures have been grouped into two main categories of transition initiatives:

- diversification and adaptation of enterprises to the economic transition;

- support for research and innovation for enterprises.

Alongside the three pillars outlined above, a horizontal priority under the heading “technical assistance” will be implemented with the aim of strengthening the technical capacity of beneficiaries in order to improve the quality and approval rate of project applications. Measures supporting all stakeholders involved in the transition include:

- organising periodic training for stakeholder personnel, such as workshops, study visits and seminars aimed at exchanging experience and good practices;
- technical assistance, consultancy services and specialist expertise provided by external organisations and experts in response to the specific needs of beneficiaries;
- research, feasibility studies, studies of SME potential at district level, other analyses, and a portfolio of projects related to the transition process;
- support for regional development agencies;
- training for local and regional administrations in the design and implementation of just transition projects;
- information days organised with the support of social partners in the affected regions to ensure that issues relating to the energy transition are communicated accurately to local communities and that their engagement in the process is ensured.

3.3. The Lusatia Region (Germany)

3.3.1. Geographical Location and General Socio-Economic Characteristics

The Lusatia Region extends across parts of the federal states of Brandenburg and Saxony in eastern Germany, along the border with Poland and, for a short section, with the Czech Republic. Lusatia comprises NUTS 3 areas forming part of the federal states of Brandenburg and Saxony. In Brandenburg, it includes the districts of Dahme-Spreewald, Elbe-Elster, Oberspreewald-Lausitz and Spree-Neiße, as well as the independent city of Cottbus, while in Saxony it comprises the districts of Bautzen and Görlitz. The region consists of 235 municipalities, has a population of approximately 1.14 million and covers an area of 11.7 thousand km². It is a predominantly rural territory, as reflected in its low population density of 99 inhabitants per km², considerably below the national average of 230 inhabitants per km². The regional urban network consists primarily of small and medium-sized towns, the largest of which, according to 2022 data, are:

- Cottbus (93.9 thousand inhabitants);
- Görlitz (54.6 thousand inhabitants);
- Bautzen (38.0 thousand inhabitants);

- Spremberg (21.4 thousand inhabitants)⁴².

It should be emphasised that since the beginning of the systemic transformation, the Lusatia Region has lost more than 20% of its population, with the decline affecting the working-age population to the greatest extent – the most important age group from the perspective of local and regional labour markets. Demographic projections for Lusatia indicate that this negative trend will continue. Lusatia will have to prepare for substantial population losses unless exceptionally high migration gains compensate for the natural population decline. According to current projections, Lusatia will lose a further 200 thousand inhabitants by 2030, representing a decline of 17%. Demographic change will have an even greater impact on the region's labour force potential. In this respect, the decline of almost 30% will be even more pronounced than that of the population as a whole. By 2030, the average age of Lusatia's inhabitants is expected to increase from approximately 48 to more than 53 years, indicating an ongoing process of population ageing in the region.

The region's population has been declining since German reunification as a result of both negative trends in natural population change and net migration. In the case of migration, however, a slight upward trend has been evident since

⁴² Data from the 2022 National Population Census

2015, driven primarily by positive net migration recorded in the Dahme-Spreewald district and the city of Cottbus⁴³. Projections indicate that the regional labour force will decline to fewer than 400 thousand people by 2035, compared with 600 thousand employed persons in 2012. During the first two decades of the twenty-first century, Lusatia recorded GDP per capita⁴⁴ below the national average, although it should be emphasised that the dynamics of change were more favourable, particularly in comparison with Brandenburg and Saxony⁴⁵.

In general, from the mid-nineteenth century onwards, the economy of the Lusatia Region was largely based on lignite mining and manufacturing. The region played a key economic role in the German Democratic Republic (GDR) as a centre of lignite mining and energy production. The expansion of the lignite industry began there in 1957, following the decision to develop Lusatia as the coal and energy centre of the GDR. It reached its peak in 1988, when a total of 15 open-cast mines were in operation and employment in the mining and energy industries reached 80 thousand workers.

⁴³ European Economic and Social Committee, *Energy Policy and the Labour Market: Consequences for Employment in Regions Undergoing Energy Transitions*, Brussels, 2023.

⁴⁴ Institute for Climate Protection, Energy and Mobility (IKEM), *Regional Profile: Lusatia, Germany*, Berlin, 2020.

⁴⁵ European Economic and Social Committee, *Energy Policy and the Labour Market...*, 2023.

In the 1990s, following German reunification, most of the mines and power plants were closed, resulting in a drastic reduction in the workforce and substantial out-migration, particularly among the younger generation, leading to a so-called brain drain and a severe shortage of skilled workers. This process of contraction, combined with delayed infrastructure development, created unfavourable conditions for the forthcoming transition process in the region (Matern et al. 2025).

It should be emphasised that even after the socio-political and economic upheavals of the early 1990s, the regional economy remained focused on lignite mining and its use for energy generation, despite the closure of power plants and several mines, which resulted in drastic declines in employment in the mining and energy industries. In 2020, approximately 8 thousand people were still directly employed in the coal and energy industries. In addition to these leading industrial sectors, other industries began to develop in the Lusatia Region, including the chemical, plastics, food-processing, metal and mechanical engineering industries (in 2013, these provided employment for almost half of all industrial workers). Approximately 23% of the region's workforce is employed in the industrial sector, which contributes 30% of regional GDP. Germany's energy transition, and particularly the agreement on the phase-out of coal adopted by Germany, pose major

challenges for Lusatia, where the decline of the coal industry will constitute a major socio-economic challenge⁴⁶.

Annual lignite production in Germany amounts to approximately 130 million tonnes, which means that Germany remains the world's leading producer (data from the Statistisches Bundesamt for 2022). In 2021, by comparison, almost 47 million tonnes of lignite were extracted in the Lusatian mining area, accounting for one-third of total national production. With the lignite-fired power plants at Jänschwalde in Brandenburg and Boxberg in Saxony, Lusatia is home to two of the largest power plants in Germany.

The economic development of Lusatia in recent years can be regarded as positive, particularly when considered against selected indicators for the federal states of Brandenburg and Saxony (including GDP and gross value added). The industrial structure of Lusatia is more heterogeneous than the average for eastern Germany. In addition to the mining and energy industries, the region's economic profile is shaped by the chemicals and plastics, logistics, metallurgy, mechanical engineering and tourism sectors. The heterogeneity of Lusatia's industrial structure can certainly be regarded as an opportunity in terms of resilience to potential economic fluctuations or

⁴⁶ Institute for Climate Protection, Energy and Mobility (IKEM), *Regional Profile: Lusatia, Germany*, Berlin, 2020.

policy-driven changes, as well as in terms of the region's innovative potential⁴⁷.

Compared with the national average, the unemployment rate in the Lusatia Region is slightly higher (5.7% and 5.6%, respectively, in 2023). As a result of economic development, unemployment has declined markedly since the first decade of the twenty-first century. The decline in unemployment in Lusatia, as well as in the federal states of Brandenburg and Saxony, is also attributable to the so-called demographic relief effect. An increasing number of retirements and continued economic growth, accompanied by a slightly rising employment rate, generate strong demand for labour in almost all sectors. Despite the overall positive development, long-term unemployment (persons who have been unemployed for one year or longer) remains a problem in the region. In terms of average monthly earnings, which amount to EUR 2400 in the region, Lusatia remains markedly below the national average of EUR 3000⁴⁸.

⁴⁷ European Economic and Social Committee, *Energy Policy and the Labour Market: Consequences for Employment in Regions Undergoing Energy Transitions*, Brussels, 2023.

⁴⁸ European Economic and Social Committee, *Energy Policy and the Labour Market...*, 2023.

3.3.2. General Characteristics of the Transition

In order to support the energy transition, in June 2018 the German Government established the so-called Coal Commission, whose aim was to develop a programme of measures for the phase-out of coal in Germany in cooperation with political and industry stakeholders, civil society, academics, trade unions and representatives of those affected by transition processes in coal-mining regions. The political decision to phase out coal in Germany brought about significant changes in the economic structure of the Lusatia Region, while at the same time creating opportunities for its sustainable transition.

The Coal Commission's final report contains both cross-regional measures concerning climate protection, the energy market, security of supply, and value and job creation, as well as specific perspectives for individual coal regions. It sets 2038 as the final date for the phase-out of coal in Germany. As a direct response to the Commission's work, an emergency programme worth EUR 260 million was adopted for the regions concerned in order to implement initial projects. In May 2019, the Federal Government published a key issues document based on the Coal Commission's reports, setting out priority projects and guiding principles for the various regions. At the same time, preparations were made to implement the

Commission's recommendations through the 2020 Structural Support Act, which established a binding framework for structural policy and financial resources for public investment and projects in the regions. The Act provided funding of EUR 40 billion, of which approximately EUR 17 billion was allocated to the transformation of the Lusatia Region (Matern et al. 2025).

Following the drastic changes in the mining and energy sectors that affected the Lusatia Region as a result of the systemic transformation and German reunification, lignite production and employment in the coal industry in Lusatia remained relatively stable from the beginning of the twenty-first century. However, since lignite and the energy industry remain the foundation of the regional economy, Germany's coal phase-out, announced in January 2019, has had significant socio-economic consequences for the region. Since German reunification, various strategies have been implemented in the region to support regional economic development and facilitate the necessary structural changes. Many of these measures have focused on economic diversification.

The region has developed a strong tourism industry by promoting local attractions, including the Spreewald Biosphere Reserve and the Lusatian Lakeland, a chain of artificial lakes created in former open-cast mining areas and extending over an area of 140 km². Lusatia has also

established an entrepreneurship institute in Cottbus and an innovation centre in Senftenberg in order to attract biotechnology and medical engineering start-ups to the region⁴⁹.

In 2017, the German Federal Ministry of Education and Research launched the *Innovation and Structural Transformation* programme to facilitate sustainable transition in regions affected by structural weaknesses. The funding programme facilitates cooperation between regional stakeholders with a view to fostering innovative ideas for regional transformation. One of the selected projects, the Lusatian initiative *Land-Innovation-Lausitz*, aims to establish Lusatia as a model region for the bioeconomy.

In addressing the numerous challenges associated with structural change, the Lusatia Region draws on its long-standing tradition as an energy region, as well as the related know-how of regional research institutions and economic actors. In 2000, construction of a wind farm began on former mining land in Lusatia, while in 2011 the Solarpark Senftenberg/Schipkau commenced operations on the site of a former coal mine. In 2016, Germany's largest solar thermal power plant was installed in the town of Senftenberg. Today, the region is home to solar and wind farms as well as a wind turbine blade manufacturing facility.

⁴⁹ Institute for Climate Protection, Energy and Mobility (IKEM), *Regional Profile: Lusatia, Germany*, Berlin 2020.

Between 2017 and 2021, Lusatia participated in the WindNODE project, which developed solutions to facilitate the transition towards a renewable, smart energy system. Since 2019, Lusatia has received funding from the German Federal Ministry of Transport and Digital Infrastructure under the HyLand programme (Hydrogen Regions in Germany). The initiative supports the development of a regional strategy and network for the production, storage and use of hydrogen from renewable energy sources. Also in 2019, two projects in the region were selected by the German Government to receive funding as ‘real-world laboratories’ for innovative energy projects⁵⁰.

In recent years, the regional transition has received support from various stakeholders and newly established institutions at all levels. In 2016, Innovationsregion Lausitz was established in response to the publication of federal plans to close older coal-fired power plants. Since then, cooperation between regional business stakeholders and BTU Cottbus-Senftenberg has generated new and innovative ideas for companies facing transition-related challenges. The Zukunftswerkstatt Lausitz project brought together all municipalities in the Lusatia Region to develop ideas for a post-lignite future.

⁵⁰ *Ibidem.*

The governments of Saxony and Brandenburg have identified structural change in Lusatia as a top priority and appointed regional commissioners within their respective state chancelleries to serve as direct points of contact for the region. At the operational level, the commissioners negotiate the conditions for structural support with the German Federal Government and the European Union. Brandenburg and Saxony also receive support at the European level for the development of a low-carbon economy as pilot regions within the European Commission's Platform for Coal Regions in Transition.

In September 2019, 20 mayors from Lusatia signed the *Mayors' Declaration on Just Transition* to express their support for a just transition towards a post-coal era, call for appropriate support mechanisms, and emphasise the importance of social dialogue and consultation with local authorities. The Declaration resulted from the second Just Transition Mayors' Forum, held in Lusatia, and was signed by 41 mayors representing 10 mining regions in nine European countries⁵¹.

Germany's agreement on the phase-out of coal gave rise to various transition proposals for the Lusatia Region. In January 2019, a comprehensive report was submitted to the German Government recommending the gradual phase-out

⁵¹ *Ibidem.*

of coal-fired electricity generation by 2038. The report sets out various economic development strategies for Lusatia and other affected coal regions and proposes a package of financial support measures. One year later, a timetable for the closure of coal-fired power plants was adopted together with the enactment of the Coal Phase-out Act. The proposed funding package for the coal regions is to be implemented under the *Strukturstärkungsgesetz* (Structural Strengthening Act) for coal regions.

The German Government, the federal states and the affected regions agreed on a plan for the distribution of funding in mid-2019. The Federal Government, together with the federal states, plans to allocate EUR 40 billion to coal phase-out initiatives, providing substantial resources for regional development over the next 20 years and beyond. Of the EUR 17 billion allocated to structural support for Lusatia, one-third of the funding is to be made available to the federal states of Saxony and Brandenburg, with the remainder allocated to regional investments managed by federal ministries in the affected areas. Of the structural support funding, EUR 104 million is to be spent immediately on new infrastructure projects, including the expansion of broadband networks and the establishment of new clusters involving research institutions, universities and agencies.

The draft *Strukturstärkungsgesetz* identifies a broad range of potential priority areas for Lusatia. These include energy

and hydrogen; mobility and digital infrastructure; health-care; research and development; and the establishment or expansion of institutions, agencies and research institutes⁵².

3.3.3. Transition Priorities and Objectives

The Territorial Just Transition Plan (TJTP) for the Lusatia Region for 2021–2027 identifies the principal objectives on the region's path towards climate neutrality for which funding has been provided⁵³. A key priority is to support the **investment needs of SMEs** in relation to adaptation, diversification and modernisation, with particular regard to energy and resource efficiency. Under the programme, support may be provided to small and medium-sized enterprises that:

- operate within the value chain associated with lignite extraction and use and require support for the diversification and modernisation of their activities;
- contribute to safeguarding and creating sustainable jobs and training places;

⁵² *Ibidem.*

⁵³ *Territorialer Plan für einen gerechten Übergang (TJTP) für das Lausitzer Revier Brandenburg 2021–2027, ERDF/JTF 2021–2027 Brandenburg.*

- create appropriate conditions for investment and employment in order to mitigate the difficulties associated with the transition to a climate-neutral economy by maintaining development potential;
- undertake investments incorporating energy and resource efficiency in the following areas:
 - construction and expansion, and the acquisition of equipment, buildings and systems;
 - diversification of business activities;
 - adaptation and modernisation of production while safeguarding existing jobs and training places and creating new ones;
 - promotion of product sales;
 - increasing resource and energy efficiency, including through the use of renewable energy;
 - development of a circular economy.

Furthermore, in order to enhance the region's diversification and investment attractiveness, support will be provided to **business founders and start-ups** under the *Lausitz Start-up Money* programme, particularly those creating new jobs or training places, as well as those providing consultancy services and external support for assessing transition needs and opportunities. Funding will also be available for the development and implementation of new resource-efficient and climate-friendly processes, products,

organisational and business models, together with the associated training requirements.

Another important objective is to provide **dedicated reskilling and training opportunities** for interested employees in the energy sector and for young people. In order to retain skilled workers during the transition period, training should take place in the workplace. Training provision should be directed towards new fields of activity, such as renewable energy, as well as career guidance and the acquisition of new competences in emerging fields. There is also a need for strategic investment in dual vocational training infrastructure in order to increase its attractiveness, attract skilled workers and retain young people, particularly in technical occupations. It is estimated that by 2027 up to 1,500 employees in the SME sector could benefit from such support.

In view of the implementation of the coal phase-out programme, which affects an industry that has traditionally played a key role in the region's entire energy sector, it is necessary to develop climate-friendly production, storage and distribution capacity so that **climate-neutral energy and heat** can be supplied at comparable costs and in quantities similar to those provided previously. Existing infrastructure and power plant sites should be utilised and further developed in order to facilitate the rapid transformation of the energy value chain.

Another objective of the structural transformation of Lusatia as an energy and industrial region is to undertake substantial **investment in the energy system at existing power plant sites** through the implementation of innovative projects involving plants generating green geothermal energy, which could help bridge the gap in heat supply. Such measures can effectively safeguard local labour markets, productive capital and the local provision of advanced services in the key sectors affected by the transition. Innovative renewable energy projects combined with sector coupling are also planned in order to promote diversification and market development.

An important transition objective also involves **measures in the fields of recycling, research and development, and innovation** in parallel with the phase-out of coal and the transition to renewable energy. Electromobility and resource efficiency, particularly in relation to circular value creation, offer opportunities to create long-term employment in the region. With the end of coal use, there is a particular need to strengthen the region's development potential and attractiveness. Research and development and innovation activities make an important contribution to meeting the demand for new knowledge, modernisation, diversification and regional competitiveness, thereby helping to safeguard existing jobs and create new ones.

New entrepreneurs and existing innovative companies should therefore have access to local R&D resources.

Another objective of the transition is to support **investment in modern broadband infrastructure**, which will contribute to diversification, start-up development, and the creation or retention of jobs through digital innovation in products and processes, as well as the digitalisation of working arrangements, including working from home, in the areas of the region most affected by the transition.

Retaining skilled workers and their families requires the creation of an attractive alternative business and living environment in order to preserve the region's development potential. Given the specific needs of this target group, **improving public transport provision** is particularly important. In view of the distances involved, hydrogen produced from renewable energy may be used as an alternative fuel.

Open-cast mining areas, which have substantially transformed and degraded the local natural environment and landscape, require consistent and effective **ecological restoration**. Particular attention should be given to restoring areas along Lusatian watercourses, thereby improving their ecological quality and attractiveness, while simultaneously increasing the potential for nature-based tourism and contributing to the provision of drinking water.

Finally, an important issue is the need to safeguard **regional cultural heritage and regional identity**, which have traditionally been shaped around coal as a defining symbol. The aim of these measures will be to support educational and cultural initiatives so that, despite the inevitable structural changes associated with the transition, the symbolic significance of particular places and the historical heritage associated with the industrial era, with which local communities identify, can be preserved.

However, the transition process to date has raised a number of concerns. Among those most frequently highlighted are delays in funding (Kulesa 2024), the significant predominance of a *top-down* rather than a *bottom-up* approach, and the tendency of existing strategies to focus primarily on large-scale projects in urban centres while neglecting key objectives of environmentally sustainable development (Matern et al. 2025).

3.4. Regional Similarities and Differences in Approaches to Energy Transition Priorities and Objectives

The characteristics presented above concern regions undergoing an energy transition through the systematic phasing down and eventual abandonment of open-cast mining and the associated energy and heat production based on

lignite or peat. At the same time, the regions analysed are among the EU coal regions in transition participating in the *Platform for Coal Regions in Transition* and implementing regional transformation programmes under the *EU Just Transition Fund*. Despite the formal similarities resulting from the research methodology, a number of both similarities and differences have been identified among the regions analysed in terms of their approaches to transition priorities and the energy transition objectives formulated.

Table 5 presents the most important transition objectives formulated in energy transition strategies, grouped into economic, social and environmental categories. In order to determine the extent to which the transition pathways are universal or region-specific, a **scoring method** was applied. This involved assigning scores ranging from zero (objective absent) to 3 (objective given high priority), corresponding to the importance attached to each objective in strategic and operational documents. The scores were subsequently aggregated in order to identify the sectors and measures that are either of key importance or receive little or no attention in each region.

On the basis of the matrix presented, German Lusatia can be regarded as demonstrating the most comprehensive approach in terms of both declared and implemented transition measures, scoring 44 out of a possible 48 points (92%), followed by the Irish Midlands with 40 out of 48

points (83%). By contrast, Bulgarian Stara Zagora demonstrates a more sectorally focused approach, scoring 28 out of 48 points (58%).

For the individual regions, the hierarchy of objectives by category is as follows:

- **Midlands:** 1. environmental (100%) – 2. social (87%) – 3. economic (75%);
- **Stara Zagora:** 1. social (60%) – 2. economic (54%) – 3. environmental (44%);
- **Lusatia:** 1. economic (96%) – 2. environmental (89%) – 3. social (87%).

Table 5. Comparison of the Importance of Energy Transition Objectives in the Midlands, Stara Zagora and Lusatia Regions by Economic, Social and Environmental Categories

Groups of Objectives	Objectives	Midlands Ireland	Stara Zagora Bulgaria	Lusatia Germany
ECONOMIC	Renewable Energy Production	1	3	3
	Economic Diversification	3	3	3
	Innovation Development and Implementation, with Support from Business Support Institutions	2	2	3
	Cooperation with the R&D Sector	2	3	3

Groups of Objectives	Objectives	Midlands Ireland	Stara Zagora Bulgaria	Lusatia Germany
ECONOMIC	Structural Support for SMEs, Particularly Those Operating in New Economic Sectors	3	1	3
	Tourism Development in Renaturalized Areas	3	1	3
	Tourism Development in Renaturalised Areas	2	0	2
	Digitalisation of Public and Private Entities; Development of Broadband Networks	2	0	3
Socio-Cultural	Adaptation of Local Labour Markets to New Conditions	3	3	3
	Retention and Utilisation of the Skills of Qualified Workers from the Mining and Energy Sectors	3	3	1
	Training and Educational Support for Residents	3	2	3
	Development of Public Transport and Sustainable Mobility	2	1	3
	Preservation of Post-Industrial Cultural Heritage and Regional Identity	2	0	3
Environmental	Decarbonisation	3	3	3
	Biodiversity Development	3	1	2
	Renaturalisation of Former Open-Cast Mining Areas	3	0	3

Groups of Objectives	Objectives	Midlands Ireland	Stara Zagora Bulgaria	Lusatia Germany
Economic Transition Priorities – Total		18	13	23
Social Transition Priorities – Total		13	9	13
Environmental Transition Priorities – Total		9	4	8
Energy Transition Priorities – Total		40	28	44

Source: Author's own elaboration.

Significant differences are revealed by the analysis of strategic objectives according to the identified groups of objectives (Table 6), which indicates which sectors are prioritised in the implementation of the transition objectives.

Table 6. Importance of Strategic Objectives by Groups of Objectives in the Reference Regions Analysed

Group of Objectives	Maximum	MIDLANDS		STARA ZAGORA		LUSATIA	
	Number of Points	Number of Points	%	Number of Points	%	Number of Points	%
Economic	24	18	75%	13	54%	23	96%
Socio-Cultural	15	13	87%	9	60%	13	87%
Environmental	9	9	100%	4	44%	8	89%
TOTAL	48	40	83%	28	58%	44	92%

Source: Author's own elaboration.

The simple scoring assessment conducted for the regions analysed, aimed at determining their approaches to the transition in the context of the key dimensions of people–environment–economy, makes it possible to identify a certain underlying philosophy of structural regional transformation arising from the need to transition former coal regions. In the case of the Midlands, environmental and social issues are given priority and are to be addressed by supporting bottom-up solutions – developed locally and through participatory processes – that respond to the actual needs of residents. The economic dimension primarily concerns support for the local SME sector and innovative enterprises, as well as the development of sustainable regenerative tourism in former extraction areas, which may provide an attractive alternative to Ireland's urban tourism

(Dublin, Cork and Galway) and sightseeing tourism along the island's western coast (*Wild Atlantic Way*).

In the Stara Zagora Region, the highest score was recorded for social objectives (60%), although it should be emphasised that this may result from the highly selective inclusion of economic objectives relating to support for the SME sector or tourism development. In Lusatia, by contrast, the economy constitutes the priority area. It should be noted, however, that this region adopts a holistic approach, with the other dimensions – social and environmental – also strongly represented across almost all transition objectives.

While the Irish region gives priority to environmental and socio-cultural aspects and provides particular support for bottom-up initiatives and projects, in the cases of Stara Zagora and Lusatia there is an impression that transition programmes, beyond the key objective of achieving climate neutrality, focus to a greater extent on *top-down* measures and the exogenous development of the regions. This includes large-scale, high-profile investments that appear to be intended primarily to build and promote the image of these regions rather than to respond directly to the local needs of residents during what is a particularly challenging process of regional transition.

CHAPTER IV

GOOD PRACTICES AND RECOMMENDATIONS FOR POLISH POST-COAL REGIONS IN THE ENERGY TRANSITION PROCESS

The comparative analysis of the three post-coal regions – the Midlands (Ireland), Stara Zagora (Bulgaria) and Lusatia (Germany) – in terms of the conditions, priorities and experiences associated with the implementation of transition objectives provides a basis for identifying recommendations and good practices for Polish (post-)coal regions that have also embarked on a transition pathway.

In processes of structural transformation, the economic dimension is generally regarded as an obvious and essential factor in ensuring a successful transition and is supported through top-down EU and national projects and funding. Therefore, this study focuses primarily on solutions that emphasise the importance of the local dimension of change, particularly with regard to environmental and

socio-cultural issues and the development of small and medium-sized enterprises. Particular importance and value are also attributed to projects and programmes that are or will be implemented as bottom-up initiatives involving a wide range of local stakeholders and, above all, resulting from the genuine participation of residents, who can and should move from being the *losers* of the transition to becoming its *winners* in the new socio-economic reality.

With the above considerations in mind, the following key recommendations have been identified on the basis of the analysis of the regions discussed:

- 1) **support for local communities and the development of public participation** in the transition process, particularly in the context of labour market transformation and education and training measures aimed at making effective use of existing occupational skills or developing new ones;
- 2) measures aimed at strengthening local entrepreneurship and **systemic support for the SME sector**, accompanied by the development of effective links between the business and research and development sectors;
- 3) development of green and blue infrastructure through **renaturalisation processes and biodiversity enhancement**;
- 4) **development of regenerative tourism** in post-coal areas.

Table 7 presents the recommendations in relation to the specific reference regions from which inspiration was drawn in formulating them and identifying, on this basis, good practices for Polish postcoal regions.

Table 7. Recommendations for Polish (Post-)Coal Regions Based on Transition Measures Implemented in the Reference Regions

Lp.	Recommendations	Regions Implementing the Recommended Measure
1.	Support for Local Communities and the Development of Public Participation in the Transition Process	Midlands (Ireland)
2.	Support for the SME Sector and Measures to Strengthen Local Entrepreneurship	Stara Zagora (Bulgaria) Lusatia (Germany)
3.	Development of Green and Blue Infrastructure through Renaturalisation Processes and Biodiversity Enhancement	Midlands (Ireland) Lusatia (Germany)
4.	Development of Regenerative Tourism	Midlands (Ireland) Lusatia (Germany)

Source: Author's own elaboration.

The recommendations identified on the basis of the analysis of the selected reference regions are described in detail below, drawing on the plans and measures implemented in the regions that provided inspiration for Polish coal regions.

4.1. Supporting Local Communities and Developing Public Participation in the Transition Process

In areas undergoing profound structural transformation, the main emphasis is generally placed on the broadly defined economic sphere, which can be regulated and supported through top-down measures, including structural solutions adopted by the state and international commitments. However, the social sphere is undergoing equally significant changes and is characterised by greater vulnerability and lower resilience to change. Treating local communities as key stakeholders and giving their needs priority in the energy transition process is therefore crucial, particularly in areas that have already faced a range of social challenges, including depopulation, population ageing, unemployment and poverty. Above all, this requires the active participation of local communities in shaping the changes brought about by the transition.

In the reference regions analysed, social issues are treated either as a leading priority (the Midlands) or as being of comparable importance to economic issues (Lusatia and Stara Zagora). On the basis of the analysis of these reference regions, it is possible to identify solutions and recommend those that have been successfully implemented and may provide inspiration for measures in Polish regions undergoing transition. The Midlands Region is undoubtedly

a leader in measures dedicated to local communities, owing to the comprehensive and bottom-up nature of its approach, which contributes to the effectiveness of the support provided and the changes implemented.

On the basis of selected documents and studies ⁵⁴, the following measures have been identified as being successfully implemented in the Midlands Region:

- a) multi-dimensional **public participation** at every stage of the transition;
- b) comprehensive **mentoring** aimed at providing advisory support and building the capacities of local communities;
- c) systemic **support for community and non-governmental organisations** working for the benefit of the region's residents;
- d) comprehensive **support for workers** in the local labour market.

Public Participation

A key initiative, consistently pursued since the beginning of the energy transition, has been the implementation of

⁵⁴ Eastern and Midland Regional Assembly, *Territorial Just Transition Plan*; Government of Ireland, *National Just Transition Fund*; Department of Enterprise, Trade and Employment, *Midlands Regional Enterprise Plan*.

extensive **participatory measures** involving local communities at every stage of the changes taking place in the region. These measures take the form of:

- open meetings with residents in community centres and cultural centres, organised by local authorities, mentors, councillors and representatives of non-governmental organisations, most often in the evenings or at weekends in order to maximise attendance;
- thematic workshops involving the active participation of residents, rather than expert presentations, which are often difficult to understand and overly technical;
- travelling meetings (the *roadshow* approach) held in smaller localities rather than exclusively in the principal town of the county, with the aim of increasing attendance and fostering a sense that no community is being overlooked;
- digital tools and *online* surveys for people unable to attend in person, which also make it possible to gather opinions more anonymously, for example on potentially contentious issues.

Equally important is the continuous effort to demonstrate to residents the rationale behind the measures being undertaken and to emphasise their capacity to influence the process as a whole. Residents are therefore informed about tangible individual and community benefits, including lower electricity and heating bills, the creation of new jobs

for young people and former Bord na Móna employees, and investment in local infrastructure. They are also assured that renewable energy infrastructure, including wind farms and photovoltaic installations, should generate ownership opportunities and benefits for local communities rather than solely for external investors.

Transparency is particularly important and is ensured through the open presentation of financial arrangements, including RESS and JTF funding, while dialogue is facilitated by involving community representatives in the work of decision-making committees. A key factor in convincing residents of the value of the transition is demonstrating that it directly concerns them and has a tangible impact on their everyday lives. Its benefits should therefore become visible as quickly as possible, for example through grants for local sports and cultural projects, the installation of photovoltaic panels on local schools or cultural centres, and study visits organised for residents. This should be accompanied by continuous education, including workshops for children and youth.

The priority given to public participation is incorporated into all key programmes related to the energy transition, including:

- a) EU Just Transition Fund for the Midlands – the programme requires local consultation in project planning, while part of the funding is allocated

to NGOs, SMEs and community groups that submit their own project proposals;

- b) Local Development Companies (LDC) – LEADER Programme – residents and community organisations participate in Local Action Groups (LAGs), which are involved in selecting projects and allocating funding;
- c) Sustainable Energy Communities (SEC) – SEAI – residents participate in workshops and consultations and are given the opportunity to identify priority projects;
- d) Community Benefit Funds – local management and oversight of funds are ensured through residents’ participation in decision-making committees and their involvement in determining spending priorities, including sport, culture, energy education and the energy-efficient retrofitting of homes, thereby strengthening a sense of community ownership;
- e) Public Participation Networks – networks of community organisations that elect their representatives to local government advisory bodies, enabling residents, through NGOs, to contribute to the formulation of local climate, transport and development strategies, among others;
- f) **Renewable Energy Communities (REC)** – residents, businesses, schools and local authorities are able to establish cooperatives in which all members have voting rights and ownership shares.

As the above examples demonstrate, residents have been involved in the energy transition in the Midlands Region from the outset and in parallel with its implementation. Depending on the programme, different levels of participation are applied, ranging from consultation and joint decision-making, through participation in the allocation of funds, to full community co-ownership and shared responsibility.

Mentoring

In the context of the energy transition and the development of post-coal communities in the Midlands, **mentoring** involves providing a local group (e.g. an association, local council, sports club, school or cooperative) with direct support from an experienced adviser (mentor), who guides it step by step through the process of planning and implementing projects. The mentor has technical, legal and organisational expertise and provides assistance in understanding relevant regulations, support programmes, available funding and application procedures. The main elements of mentoring include:

- individual advisory support (knowledge transfer and explanation);

- community capacity building (providing support rather than carrying out tasks on behalf of the community, e.g. in preparing applications and implementing projects);
- technical and practical support (advice on energy audits and technology selection);
- networking between individuals and institutions (connecting communities with networks of other groups and institutions);
- motivation and trust building.

Where the aim is to engage residents in energy transition processes and effectively demonstrate the value of local initiatives and their capacity to influence change, mentoring can prove to be an effective tool. It lowers the so-called **barrier to entry** by helping local communities understand and engage with a given issue, accelerates project development, builds community capacity for independent action and, importantly, increases trust in the transition process by providing residents with access to an expert who supports them and works with them on an ongoing basis.

Support for Community and Non-Governmental Organisations

The main forms of support available to community and non-governmental organisations include mentoring and

professional advisory services; grants and project funding (including programmes specifically designed for communities to support the energy-efficient retrofitting of homes, renewable energy installations, community infrastructure and bioeconomy projects); funding from **Community Benefit Funds** (under which investors establish mandatory community benefit funds that are managed and allocated by local decision-making committees); local development programmes (providing funding and advisory support based on the *community-led local development* approach); networks and platforms for exchanging experience (including local meetings, study visits and *peer-to-peer learning* aimed at building capacity and identifying practical solutions); and formal channels for participation in public decision-making (including NGO representation in local government consultative bodies and opportunities to influence local strategies).

Comprehensive Support for Workers in the Local Labour Market

In the Midlands Region, a key priority for the regional authorities and Bord na Móna is to retain local workers who, as a result of their previous employment in the energy sector, possess valuable skills, including engineering and technical expertise. Support for these workers therefore

encompasses a range of measures, including active assistance in finding alternative employment, matching existing skills with skills gaps in the local labour market, and providing training to enable workers to acquire the skills required in a new and more diversified regional labour market.

In addition, workers at risk of redundancy are provided with immediate financial support from central or local government, as well as advice and guidance to help them identify labour market opportunities and make informed decisions about their future careers. This support also includes information on taxation, retirement planning, upskilling and reskilling, career guidance and advice on independent job searching, including CV preparation and interview skills, as well as mental health support. The programme was developed jointly by Bord na Móna and representatives of the Midlands Regional Transition Team (MRTT).

An interesting initiative linking the labour market with the provision of affordable housing is a major programme aimed at improving the energy efficiency of social housing in the region. For this purpose, the Government's Department of Social Protection (DSP) established cooperation with the Sustainable Energy Authority of Ireland (SEAI) to identify the skills required for retrofit work and subsequently developed further cooperation with the Regional

Skills Forum and the regional Education and Training Board (ETB). Although residential retrofitting requires higher-level vocational skills in areas such as plumbing and electrical installation, there are also numerous tasks requiring intermediate-level skills, such as the installation of external wall insulation, for which former power plant workers are being trained.

The training courses provided in conjunction with these measures, including *Skills to Advance*, also contribute to the transition process by offering opportunities to obtain certification in the installation of building thermal insulation and by providing training relating to Nearly Zero Energy Building standards, which have been incorporated into building regulations. In addition, the national *Springboard+* programme enables individuals previously employed in manual occupations to access post-secondary education at institutes of technology, with these courses being offered in particular to Bord na Móna workers.

As already noted, the renewable energy and environmental protection sectors are expanding industries that require workers with a broad range of skills. In the Midlands Region, there are a number of initiatives that could potentially provide employment opportunities for Bord na Móna workers. Particular emphasis in this area is placed on education and training, ranging from courses on biodiversity and the natural environment to practical

training in geothermal systems, solar panel installation and energy-efficient boiler systems.

On the basis of the main documents concerning the transition of former coal regions in Ireland ⁵⁵, the principal forms of support for the local labour market in the context of the energy transition can be identified as follows:

- a) support in the event of workforce reductions and redundancies (career guidance, vocational advice, assistance with CV preparation and job placement services);
- b) reskilling and upskilling (technical courses, training in so-called green skills, including photovoltaics, heat pumps and energy-efficient building retrofitting, as well as digitalisation and project management);
- c) traineeships, work placements and employment programmes (combining learning with workplace experience);
- d) financial support and employment subsidies (grants for the creation of new jobs and subsidies for employment in emerging sectors);
- e) support for entrepreneurship and self-employment (business incubators, support for start-ups and micro-grants);

⁵⁵ Eastern and Midland Regional Assembly, *Territorial Just Transition Plan*; Government of Ireland, *National Just Transition Fund*; *Green Skills 2030*; Fáilte Ireland, *Regenerative Tourism & Placemaking Guidance*; Department of Enterprise, Trade and Employment, *Midlands Regional Enterprise Plan*.

- f) matching labour supply with demand (job fairs, cooperation with local employers and employment brokers).

In conclusion, with regard to the involvement of local communities, it should be emphasised that participation should be place-based and inclusive. This means that all plans and solutions should be developed with due regard to local conditions and that residents should have a genuine influence on the design of programmes and their subsequent implementation. Furthermore, given the challenges facing the local labour market, training and continuing education are particularly important, with special emphasis on competencies required in the green economy (*green skills*) and the integration of training strategies – including courses, training programmes, work placements and traineeships – with *Just Transition* programme policies.

Another important measure is to link local social policies with labour market activation in order to minimise the risks of social exclusion and poverty during the transition process. An indispensable element of supporting and involving local communities is appropriate funding, which should primarily take the form of public investment. This should be complemented by the use of *living labs*, in which solutions relating to the socio-economic transition can be tested and evaluated on an ongoing basis⁵⁶.

⁵⁶ Social Justice Ireland, *Delivering a Just Transition for Ireland: Policy Options*, 2024.

4.2. Supporting the SME Sector and Strengthening Local Entrepreneurship

The analysis of transition priorities in the reference regions indicates that support for the small and medium-sized enterprise sector has been given particular priority in two of the regions analysed: Lusatia in Germany and Stara Zagora in Bulgaria. In the German region, it was assumed that a key transition priority should be to address the investment needs of SMEs directly affected by the transition, particularly in relation to economic adaptation, diversification and modernisation. Support should be targeted primarily at small and medium-sized enterprises that:

- operate within the value chain associated with lignite extraction and use and require support for the diversification and modernisation of their activities;
- contribute to safeguarding existing sustainable jobs and creating new ones;
- create appropriate conditions for investment and employment in order to mitigate the difficulties associated with the transition to a climate-neutral economy while maintaining the region's development potential;
- undertake investments that incorporate energy and resource efficiency.

In addition to supporting existing small and medium-sized enterprises, Lusatia is creating conditions conducive to the establishment of new businesses and to enhancing the region's attractiveness to investors. One means of achieving this is through support for start-ups, with funding conditional on the creation of a job or training place. Another initiative involves financing external advisory services for assessing transition-related needs and opportunities, as well as for developing or implementing new resource-efficient and climate-friendly processes, products, organisational and business models, together with associated training measures.

On the basis of key documents⁵⁷ concerning energy transition strategies, the following challenges and measures relating to the SME sector can be identified as potential recommendations for Polish post-coal regions:

- investing in the development of new technologies, such as green hydrogen, energy storage and the digitalisation of industrial processes, in order to enhance the competitiveness of local enterprises;
- organising training programmes and courses for employees and entrepreneurs in order to adapt their

⁵⁷ Institute for Climate Protection, Energy and Mobility (IKEM), *Regional Profile: Lusatia, Germany*, Berlin, 2020; *Territorialer Übergangsplan für das Braunkohlerevier Lausitz 2021–2027*, TJTP Lausitz, 2022.

skills to the requirements of a modern low-carbon economy and strengthen their competencies in new technologies and sustainable development;

- promoting cooperation with universities and research institutes in order to facilitate knowledge and technology transfer to the SME sector;
- implementing measures to improve energy efficiency and promoting the use of renewable energy sources in the business activities of SMEs;
- providing financial support (in the form of grants, preferential loans and tax incentives) and advisory services to SMEs undertaking measures aimed at sustainable development and adaptation to changing market conditions.

Many analogous measures aimed at stimulating local entrepreneurship and supporting the SME sector in post-coal areas can also be identified in Stara Zagora. According to the Integrated Territorial Development Strategy for the South-East Region of Bulgaria for 2021–2027 (2022), support will focus on the development of a diversified SME sector by facilitating access to finance and advisory services, as well as through the establishment of business incubators and innovative start-ups.

A particularly interesting project combining these objectives is the **European Digital Innovation Hub**, established in 2021. Its mission is to support digitalisation and

innovation in private companies, public institutions and start-ups, while also facilitating the green transition and the decarbonisation of the regional economy.

The objectives formulated within the programme place considerable emphasis on supporting the SME sector and increasing the level of innovation in the economy and services in post-coal areas. Table 8 presents the main assumptions of the project with particular reference to local entrepreneurs.

Table 8. Objectives of the Innovation Hub in Stara Zagora in the Context of Support for the SME Sector

Objective	Relevance to the SME Sector
Support for the Twin Transition (Green and Digital)	Assistance in Adopting Digital Technologies while Simultaneously Reducing Emissions (Testing Hydrogen Solutions and Implementing Clean Technologies)
Improving Access to Technological Resources	Enabling Companies to Use Simulations and Testing before Making Investment Decisions (<i>Test Before Invest</i>) in Order to Minimise the Risks for SMEs Associated with the Adoption of New Technologies
Development of Digital and Innovation Skills	Training, Workshops, Hackathons and Ideation Labs to Enhance the Skills and Competencies of SME Employees
Support for Access to Finance	Assistance for SMEs in Accessing Grants and Investment, Advisory Services and Investor Networks

Objective	Relevance to the SME Sector
Development of Innovation and Cooperation Networks	Networking among Companies, Universities and Public Institutions; Organisation of Networking Events and Knowledge Exchange; and Development of Cooperation with Other Innovation Hubs across the European Union

Source: Author's own elaboration based on the websites of European Digital Innovation Hub Zagore, Stara Zagora Regional Economic Development Agency (SZ REDA) and the European Digital Innovation Hubs Network, https://edih-zagore.eu/?utm_source=chatgpt.com

In the context of the objectives identified and their relevance to the SME sector in Stara Zagora, the following aspects are particularly noteworthy and can be recommended for transition measures in Poland:

- a holistic approach to potential areas of production or service provision by SMEs, combining technological and innovative considerations with an awareness of environmental needs;
- the *test before invest* initiative, which reduces investment risks for SMEs by enabling them to test an idea on a small scale before making a final decision to commit capital to a particular project;
- the development of networks involving multiple regional partners (local and regional authorities, higher education institutions and the R&D community, as well as other economic actors) and their cooperation with SMEs in order to provide access

to specific knowledge resources and institutional support, while building local capacities through jointly organised meetings, workshops and training programmes.

On the basis of the analysis presented above of measures undertaken in the reference regions of Lusatia and Stara Zagora to support the SME sector and foster local entrepreneurship, Table 9 provides an overview of the types and forms of support, together with examples of specific measures.

Table 9. Types and Forms of Support for the SME Sector and Examples of Measures in Stara Zagora and Lusatia

Type of Support	Form of Support	Examples of Measures
Financial Support	Grants and Preferential Loans	Financing Investments in Low-Carbon Technologies, Digitalisation and Energy Efficiency
	Start-up Activities	Support for Start-ups (Operating for up to Three Years) and the Creation of New Jobs
	Grants and Subsidies for SMEs	Investment in Clean Energy, Development of Environmentally Friendly Products and Digitalisation
	Preferential Loans and Microcredit	Facilitating Access to Capital for Start-ups and Small Businesses

Type of Support	Form of Support	Examples of Measures
Skills Development	Training for Entrepreneurs	Courses on Digitalisation, Energy Efficiency and New Technologies
	Competence Centres	Technology and Innovation Transfer to SMEs
	Training and Mentoring	Development of Digital and Management Skills among Local Entrepreneurs
	Educational Projects	Programmes in Clean and Hydrogen Technologies
Technology Transfer and Innovation	Cooperation with Research Institutes	Research Projects on New Materials, Energy Storage and Recycling
	Innovation Hub	Testing New Technologies before Investment, Advisory Services and Innovation Networking; Consolidation of Local and Academic Institutions to Support Digital Transformation and Decarbonisation
Development of Local Entrepreneurship	Business Incubators and Advisory Support	Advisory Support for Business Model Transformation and Access to EU Funding
	Grant Programmes and Loans	Financing for New Businesses and Start-ups Implementing Eco-Innovations

Source: Author's own elaboration based on: Regional Profile: Lusatia, Germany, 2020; Territorialer Übergangsplan für das Braunkohlerevier Lausitz 2021–2027, 2022; European Digital Innovation Hub Zagore; Stara Zagora Regional Economic Development Agency (SZ REDA), https://szeda.eu/?utm_source=chatgpt.com; European Digital Innovation Hubs Network; Territorial Plan for a Just Transition of Stara Zagora Region, Annex 2: Template for Territorial Just Transition Plans.

As the above analysis and recommendations indicate, support for the small and medium-sized enterprise sector constitutes a highly important strategic element in the transition of post-coal areas. The strength of SMEs lies in their greater flexibility and responsiveness to changing economic conditions, as well as their ability to adapt their production or service profiles to an evolving economic environment.

Given that large industrial enterprises have traditionally dominated both the reference regions analysed and the Polish reference regions, and have been the largest employers in these areas, there is a substantial pool of workers accustomed to employment in large industrial organisations. It is particularly this group that should be targeted by incentive schemes designed to encourage self-employment and business creation.

Moreover, since these regions are located in post-socialist countries that have undergone rapid socio-economic changes associated with systemic transformation, they have also experienced the phenomenon of corporate spin-offs, whereby former employees establish their own businesses, drawing on the knowledge, skills and experience acquired through their previous employment in a particular field of economic activity.

4.3. Developing Green and Blue Infrastructure through Renaturalisation and Biodiversity Enhancement

Increasing the extent of green areas and improving water quality should constitute an important strategic direction in post-mining regions, as such measures can contribute significantly to reducing greenhouse gas emissions. Given their environmental and landscape characteristics, and the importance attached to green and blue infrastructure as a key element in the transition of post-coal areas, two reference regions were selected for the identification of good practices and the formulation of recommendations: the Midlands (Ireland)⁵⁸ and Lusatia (Germany)⁵⁹.

In the Midlands Region, particular attention has been focused on former peat extraction areas and degraded wetlands. The Irish Government allocated substantial funding from the Just Transition Fund (JTF) budget for the Midlands (EUR 169 million) to support a range of environmental measures, including the renaturalisation of peatlands and

⁵⁸ *Delivering a Just Transition in the Midlands Region, 2023*; Government of Ireland, *Climate Action Plan 2024, 2024*; European Commission, Platform for Coal Regions in Transition, *Midlands Pathway to Transition, 2020*; European Commission, Platform for Coal Regions in Transition, *Regional Profile: Midlands, Ireland, 2020*.

⁵⁹ *Territorialer Übergangsplan für das Braunkohlerevier Lausitz 2021–2027*, TJTP Lausitz, 2022.

wetlands. A particularly valuable good practice, which can also serve as a recommendation for measures planned in Polish regions, is the comprehensive and multidimensional approach to the restoration of former peat extraction areas and wetlands, involving multiple stakeholder groups and linking different sectors of the economy.

Landowners, communities and local groups are encouraged to participate in identifying and restoring wetlands. Involving local leaders, landowners and voluntary groups in decision-making and project implementation increases public acceptance, draws on local knowledge and enhances the long-term sustainability of these measures. Equally important is education aimed at improving understanding of the quality and importance of the natural environment, as well as the planning of its restoration and revitalisation. The development and implementation of educational programmes therefore contribute to raising environmental awareness and strengthening public support for renaturation.

Measures aimed at restoring green areas and achieving appropriate water quality are linked to other sectors of the economy, including the development of ecotourism, nature trails and wildlife observation facilities. These initiatives can generate local economic benefits by creating new recreational opportunities and contributing to the promotion of a region undergoing transition and regeneration.

The multidimensional nature of ecosystem restoration is equally important, as renaturalisation processes can not only enhance biodiversity but also contribute to climate change mitigation through CO₂ sequestration, improve water quality and help prevent flooding.

A key factor in the success of **green and blue infrastructure projects** involving the restoration and renaturalisation of post-coal areas is their integration into regional development plans within broader energy transition programmes, which ensures that they are treated as a strategic priority. Provisions concerning the renaturalisation and improvement of green and blue areas and infrastructure are included not only in the regional Just Transition programme for the Midlands, but also in local programmes and projects such as *Tóchar Midlands*, *Wetland Restoration* and Bord na Móna's *Peatland Restoration Plan*, which are tailored to specific local conditions and spatial and socio-economic characteristics.

In Lusatia, as in the Midlands, the restoration of post-coal areas to create new green spaces, with particular emphasis on water resources, constitutes one of the priorities of the ongoing energy transition. A flagship project in this respect is the transformation of former open-cast mining areas into a network of lakes and water bodies and the creation of Europe's largest artificial lake district on the sites of former mining pits (*Lausitzer Seenland*). Of particular importance is the multidimensional nature of

the measures undertaken within this project, which are aimed not only at the reclamation of post-coal land but also at creating ecosystem, recreational and tourism functions. The Just Transition programme for Lusatia emphasises that the phasing out and closure of mines, together with the resulting changes in water management, require renaturalisation measures, monitoring of groundwater and surface water levels, restoration of the water balance in order to prevent watercourses and wetlands from drying out, and the integration of new measures into the inter-regional water management plan.

Another similarity with the Midlands, and at the same time a good practice in the transformation of post-coal areas, is ensuring consistency between renaturalisation processes and regional development strategies, master plans and sectoral strategies, including those relating to tourism development and technical infrastructure. Such integration allows renaturalisation to generate both environmental and economic benefits, including tourism development and job creation. The creation of water bodies, natural areas and associated recreational infrastructure can provide an impetus for the development of local entrepreneurship, particularly in recreational and tourism services and environmental education.

Another important development priority is the implementation of programmes for habitat restoration and

biodiversity recovery. These should involve restoring habitats, particularly aquatic habitats, planting native species, designating new protected areas and establishing ecological corridors connecting the lakes with existing protected areas. The conversion of post-mining land can generate a wide range of benefits for biodiversity; however, this requires targeted, spatially coherent and systematic measures.

Measures aimed at the renaturalisation of post-coal areas in Lusatia also place considerable emphasis on stakeholder engagement and public participation, including the establishment of local councils, public consultation and the creation of public–community partnerships. Particular attention is also given to developing incentives, facilitation measures and forms of support for landowners and farmers.

In both the Midlands and Lusatia, water constitutes a central element in the transformation of post-coal areas into environmentally valuable landscapes, which can also provide opportunities for the development of recreational and tourism functions and the provision of ecosystem services. The restoration of areas with significant environmental and tourism value can stimulate local entrepreneurship and facilitate the involvement of local SMEs in the development and provision of new services.

4.4. Developing Regenerative Tourism

In the development strategies of the reference regions, particularly the Midlands and Lusatia, tourism has been identified as an important development opportunity. Both natural assets, especially hydrographic features, and potential anthropogenic assets in the form of post-industrial heritage can provide a basis for the development of regenerative tourism, which has gained increasing prominence over the past decade. Regenerative tourism represents a responsible and proactive approach to tourism that prioritises sustainable development and seeks to restore tourism resources while simultaneously promoting the well-being and harmonious development of local communities (Luong et al. 2023). This is achieved through measures focused on resource restoration, carbon offsetting and energy conservation, while fostering community well-being and promoting sustainable practices. Regenerative tourism therefore encourages tourism innovation by embedding tourism practices within local communities and ecological processes in ways that contribute to improved well-being (Bellato et al. 2022). Given that regenerative tourism is adapted to cultural and natural patterns and integrated into locally based development approaches (Duxbury 2020), the natural assets and post-industrial heritage of post-coal

areas can be regarded as key factors in enhancing their tourism attractiveness.

Since 2023, the Midlands Region has been implementing the *Regenerative Tourism & Placemaking Scheme*, which was developed to enhance the region's potential as a place in which to live and work and to support the regeneration of its towns and rural areas through the development of tourism and recreational infrastructure. The scheme is intended to support the transition of the Midlands towards carbon neutrality by financing sustainable tourism projects capable of making a significant contribution to the regeneration of local communities and peatlands. Its objective is to establish the Midlands as a leading destination for regenerative tourism while simultaneously supporting local entrepreneurs and communities and creating new employment opportunities.

The scheme envisages the development of a strategic network of walking, cycling and water-based trails. It also provides for the conversion of former railway lines into recreational trails in order to enhance the attractiveness of the region. Furthermore, the programme supports the restoration and revitalisation of degraded peatlands and the regeneration and adaptive reuse of industrial heritage sites. Its ambition is to develop an attractive tourism offer that complements those of Dublin and Ireland's western

coast, thereby attracting more visitors and encouraging longer stays in the region.

Given the specific characteristics of the Midlands, nature-based tourism is particularly important for the development of regenerative tourism. The revitalisation and renaturalisation of peatlands and wetlands will facilitate the creation of an extensive, publicly accessible and interconnected network of walking and cycling routes. These routes can also perform an educational function through appropriate signage, information boards and mobile applications explaining peatland regeneration processes, the importance of biodiversity and climate action.

Regional conditions in the Midlands favour the development of slow tourism products, such as birdwatching, walking, forest walks and photography excursions. Such activities do not require large-scale tourism infrastructure or generate mass tourism, thereby helping to maintain the ecological balance of local ecosystems.

In the Midlands Region, post-industrial heritage plays a somewhat less prominent role in the development of regenerative tourism owing to the nature and methods of peat extraction. Nevertheless, former peat extraction areas, as well as post-industrial sites associated with the region's principal enterprise and employer, Bord na Móna, can also provide opportunities for the development of tourism functions, particularly regenerative tourism. Recommended

measures include the establishment of visitor centres through the adaptive reuse of former industrial structures associated with peat extraction and energy production, such as warehouses, towers and canals; the creation of viewpoints; the use of post-industrial spaces for cultural activities and festivals; and the development of walking, cycling and kayaking routes linking the post-industrial landscape with the recovering natural environment.

This distinctive landscape transformation – from a space of production and employment into one of tourism and recreation based on natural and cultural assets – has the potential to form a comprehensive tourism product and an important complement to Ireland’s tourism offer, which is dominated by urban tourism in Dublin, Cork and Galway and nature-based tourism along the western coastline. It could also provide a basis for developing a coherent regional brand centred on the broader concepts of regeneration and recreation. Equally importantly, the Midlands regenerative tourism programme recognises the social dimension of this transformation by proposing the involvement of former industrial workers as tourist guides, particularly at post-industrial sites and in former industrial areas.

In Lusatia, the development of regenerative tourism based on both natural and cultural assets, including those associated with the region’s declining industrial function, is likewise treated as a priority in the key strategic documents

concerning the region's energy transition⁶⁰. Particular attention is devoted to the ongoing development of Lausitzer Seenland, Europe's largest artificial lake district created on the sites of former open-cast mines (see Section 4.3). Given that the region is also home to the Spreewald, a UNESCO Biosphere Reserve characterised by a distinctive wetland landscape and an extensive network of waterways that attracts large numbers of visitors interested in ecotourism, the development of Lausitzer Seenland could provide a significant and distinctive complement to the Spreewald tourism offer.

In the context of nature-based tourism, the following measures are recommended:

- development of water-based routes and infrastructure for water sports, including marinas, kayak and pedal-boat hire facilities, and educational facilities at lakes created by flooding former open-cast mines, particularly in the Lausitzer Seenland area;
- development of a network of cycling and walking routes connecting lakes, wetlands and nature reserves, complemented by information and interpretation facilities, including information boards, audio guides and mobile applications;

⁶⁰ *Regional Profile: Lusatia, Germany, 2020; Territorialer Übergangsplan für das Braunkohlerevier Lausitz 2021–2027, 2022; D3.2 Lusatia Case Study Report, 2022.*

- wetland and ecological corridor restoration programmes combined with low-intensity tourism activities, such as educational trails and birdwatching;
- development of slow tourism products, such as forest therapy and restorative stays by lakes, particularly targeted at visitors from large urban areas.

In order to preserve and restore the region's natural assets while developing tourism and recreational functions, the introduction of zoning is recommended. Depending on the ecological sensitivity of individual lake ecosystems, different levels of use may be permitted: *core zones* dedicated primarily to nature conservation, *buffer zones* supporting educational functions, and *recreation zones* designated for recreational activities.

In Lusatia, particular emphasis is placed on the transformation of former mining areas into new recreational spaces, including lakes, parks, and walking and cycling routes, as a means of developing nature-based tourism. The flooding of former lignite open-cast mines contributes to the creation of attractive landscapes conducive to water-based tourism, ecotourism, walking and cycling. Such investments not only enable the development of new tourist attractions but also support biodiversity conservation and the restoration of degraded ecosystems⁶¹.

⁶¹ T. Barrett, *D3.2 Lusatia Case Study Report*, ENTRANCES – Energy Transitions from Coal and Carbon: Effects on Societies, 2022.

In the field of post-industrial tourism, particular potential lies in the adaptive reuse of industrial heritage, including former mines and industrial facilities, for tourism and educational purposes. Such sites can be transformed into industrial heritage interpretation centres, museums, thematic trails and spaces for cultural tourism, combining knowledge of the region's industrial history with recreational experiences. The development of post-industrial tourism can play an important and symbolic role in preserving and promoting the region's industrial heritage, strengthening its cultural and educational attractiveness, and creating new employment opportunities based on the legacy of the coal industry. Local residents, particularly former mine workers, could be specifically trained to work as tourist guides and tourism facilitators.

The tourism offer can be further diversified through the adaptive reuse of post-industrial buildings and infrastructure for tourism-related purposes, including heritage and memorial sites, venues for cultural and sporting events, small boutique hotels, local manufacturing enterprises and craft workshops drawing on local products and reinforcing regional identity. These measures can be complemented by the development of industrial heritage trails connecting former industrial sites with viewpoints and recreational routes⁶².

⁶² Ibidem.

In the context of regenerative tourism, it is important to integrate these two forms of tourism, not only because they can coexist within the same geographical area, but also through the development of routes linking natural and industrial heritage assets. This would provide visitors with a distinctive experience combining the region's natural environment with its industrial history. In the longer term, as in the Midlands, an integrated approach to regional management is recommended in order to establish regenerative tourism in Lusatia as a new form of tourism that complements the region's existing tourism offer, particularly urban tourism, while contributing to its broader socio-economic development.

CONCLUSIONS

The energy transition of (post-)coal regions represents one of the most complex development processes in contemporary Europe. The analysis confirms that its effectiveness depends not only on the implementation of low-carbon technologies, but above all on the capacity to pursue comprehensive measures encompassing the economic, social, environmental and spatial dimensions. From this perspective, the just transition should be understood not merely as an instrument of climate policy, but as a new model of regional development aimed at strengthening the resilience of territories to economic and social change.

The analysis of the experiences of the Midlands, Lusatia and Stara Zagora indicates that, despite their different historical and institutional contexts, a number of common determinants of successful transition processes can be identified. These include, above all, long-term strategic

planning, effective cooperation between public authorities, the research sector and businesses, broad public participation at all stages of the transition process, effective access to and use of European Union funding, and the consistent diversification of regional economies. Investment in human capital, the development of new skills and the creation of attractive employment opportunities in low-carbon sectors are also of considerable importance.

The findings also confirm that a just transition cannot be equated solely with the phasing out of extractive activities and the development of renewable energy sources. The process also encompasses the reclamation of post-mining land, the revitalisation of post-industrial areas, the strengthening of social cohesion, measures to address energy poverty, and the development of a new economic identity for transitioning regions. In this context, the regional dimension is particularly important, as it enables transition measures to be adapted to local potential, needs and specific conditions.

The case studies presented demonstrate that there is no universal model of just transition. Each region develops its own transition pathway, shaped by its economic characteristics, social structure, spatial resources and quality of governance. Nevertheless, good practices can be transferred between regions, particularly those relating to strategic planning, transition governance, stakeholder

engagement and the effective use of European Union financial instruments.

The experience of the European regions analysed demonstrates the need to approach the transition as a long-term and integrated process. This requires the simultaneous development of renewable energy sources, the modernisation of energy infrastructure, support for entrepreneurship and innovation, the redevelopment of post-mining areas, investment in human capital, and the strengthening of regional institutional capacity. Only a holistic approach encompassing all dimensions and spheres of regional development can enable a successful transition towards a development model adapted to contemporary requirements while strengthening socio-economic resilience.

On the basis of the analyses conducted, a number of recommendations can be formulated concerning multi-dimensional support for the energy transition and key measures aimed at achieving climate neutrality in Polish post-coal regions. The recommendations selected relate primarily to local challenges that will need to be addressed by local authorities and communities. Given their nature and suitability for implementation at the local level, the good practices identified can be recommended to local and sub-regional authorities, depending on the profile of individual municipalities, their specific socio-economic conditions, and the particular needs and challenges associated with

the ongoing energy transition. It should be emphasised that many measures, particularly those of an economic nature, will be implemented through a *top-down* approach in accordance with programmes and strategies developed and adopted at EU and national levels. By contrast, social and environmental issues, the stimulation of local entrepreneurship, and the development of local tourism attractiveness constitute challenges that are inherently local. Provided with appropriate financial support and access to relevant *know-how*, these measures can and should be implemented through a *bottom-up* approach, reflecting a greater understanding of local needs and circumstances.

A sustainable and just energy transition requires continuous and genuine cooperation between public administration, the private sector, local communities and educational institutions, with transparency, dialogue and a willingness to adapt existing strategies constituting essential elements of the process. Only under these conditions, as emphasised in the *White Paper on Transition* (2025), can the transition move beyond a merely technocratic restructuring of the economy and become a genuine opportunity for the social, environmental and economic regeneration of Poland's mining regions.

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