REPORT

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JUST TRANSITION POLICIES

Lessons from Europe

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This paper forms part of a broader study in support of county-level low-carbon transition in Shaanxi Province. It provides insights from Europe to serve as reference points for shaping effective regional development strategies. By examining how other regions have managed similar transitions, it aims to offer a comparative perspective to inform policymaking in Shaanxi. The authors gratefully acknowledge the valuable reviews provided by Frauke Röser, Jamie Wong, and Juliette de Grandpré.

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ABBREVIATIONS

CSO	Civil Society Organisation
ETS	Emissions Trading System
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gas
JTF	Just Transition Fund
JTM	Just Transition Mechanism
LTZ	Limited Traffic Zone
NRW	North Rhine-Westphalia
PPP	Polluter Pays Principle
TJTP	Territorial Just Transition Plan
ZRR	Zukunftsagentur Rheinisches Revier

INTRODUCTION

Decarbonising the European economy, phasing out fossil fuels and addressing the unequal impacts of climate change stand among the greatest challenges that European societies face. The European Commission adopted the European Green Deal in 2021 to advance towards its climate neutrality objective by 2050. With the Green Deal, efforts to ensure a just transition gained ground in Europe. The imperative of leaving no one behind became the driver for addressing the socioeconomic impacts of decarbonisation policies in EU regions most affected by the transition.

The concept of just transition draws its roots from North American labour unions and activism tied to environmental justice during the 1980s, demanding solutions to protect both environmental and labour objectives (Vona, 2019). The concept was included in the preamble of the 2015 Paris Agreement, along the necessity for national policymakers to create decent work and quality jobs as part of their commitment to remain below the 1.5°C temperature limit (UNFCCC, 2015). Just transition policies in Europe emerged as intrinsically linked to the socioeconomic impacts of the coal phase out in Eastern European countries. Around 2017, the concept was formalised with the European Commission's Initiative for Coal Regions in Transition (CRiT), which intends to support workers and regional economies in the delivery of the energy transition (European Commission, 2021a). Since then, the concept has evolved and expanded beyond its initial labour focus to encompass a more systemic acknowledgement of the need to include and protect vulnerable social groups and communities (Johansson, 2023).

It is against this global backdrop that the European Commission established the Just Transition Mechanism (JTM) as part of the European Green Deal (European Commission, 2024b). The JTM provides funding and strategic directions to regions in EU Member States to translate high-level policies into local strategies and actions. This territorial approach intends to align European and national climate targets with local realities. It particularly highlights the decisive role that subnational governments and regional authorities play in tailoring climate mitigation policies to their local contexts.

Methodology

This paper is designed to support subnational policymakers in developing their own just transition plans. We examine measures implemented in EU regions and identify key factors for success and challenges. While just transition policies ought to be holistic, the selection in this paper focuses specifically on territories highly dependent on fossil fuels – particularly coal – or on carbon-intensive industries.

NewClimate Institute has previously analysed just transition policies against the coal phase-out background in Germany's Ruhr area and Lusatia, the UK, and Spain, with insights applicable to China's Inner Mongolia and Shandong provinces (NewClimate Institute, 2022). This brief introduces a more accessible and practical collection of policies. It is structured around four main areas that are recurrent in European just transition frameworks: economic diversification and restructuring, worker support during the transition, environmental restoration, and coordination and governance. Policies and examples are highlighted in each area, providing useful insights on the specific local contexts.

While this policy compilation provides guidance for subnational policymakers by drawing on European just transition strategies, it carries certain limitations. First, effective just transition strategies require national-level coordination to drive subnational action, further than encouraging stand-alone regional initiatives. EU just transition policies have been criticised for having a too narrow scope by being overly focused on coal-dependent regions, often lacking meaningful local stakeholder involvement, and relying too heavily on short-term compensatory measures. A truly just transition must address systemic inequalities and be framed as an economic, environmental, and social imperative, thereby necessitating national strategic planning (Think 2030, 2024; Mehl, 2025).

Second, research has shown that European just transition policies primarily follow an investment-oriented approach, aiming to integrate affected communities into a decarbonised economy through reskilling, new job creation, and regional economic development (Mandelli, 2022). While this approach is crucial, protection-oriented measures – meaning policies that guarantee social welfare, such as income support or expanded social services – are also essential to ensure that the transition is genuinely just. These measures would at least partially compensate individuals for the socio-economic disruptions caused by decarbonisation (Mandelli, 2022). Most European States presented below possess welfare states with social security systems covering some protective measures. However, protection-oriented policies are less prominent in European just transition frameworks and are therefore largely absent from this paper.

Recognising these gaps is important so that policymakers proactively develop holistic frameworks and adopt more policies guaranteeing social welfare when designing their strategies.

→ **Tab.** summarises the just transition policies and the regions covered in this paper.

Tab.
Just Transition Policies Overview

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01 ECONOMIC DIVERSIFICATION AND RESTRUCTURING

1.1 TRANSITION AWAY FROM FOSSIL FUELS

National phase-out plans have major impacts on regions' economic development perspectives. As coal- and fossil fuel-intensive industries usually represent a major economic weight in regions' economies, their phase-out needs to be planned strategically to avoid regional economic slowdown and lagging behind national development. The transition towards cleaner energies thus calls for a just economic diversification.

A crucial step in implementing the phase-out of fossil fuel-intensive industries is decommissioning active fossil fuel-powered plants. In the case of coal, operating companies in the European Union and in Germany are legally responsible for financing the decommissioning of their coal power plants. This includes dismantling the plant and addressing potential environmental damage and land restoration. The German government can provide additional support for an early closure of coal power plants ahead of the national phase out target, or when the shutdown of the plants disproportionately affects the socioeconomic structure of the region.

Lusatia, Germany: Decommissioning premiums and reverse auctions for coal-fired power plants

Lusatia is located across the states of Brandenburg and Saxony, in Eastern Germany. The region is still a very important lignite extraction site and fuels an important share of electricity production of the country. In 2018, the German national government started a coal phase-out policy process and created the Commission for Growth, Structural Change and Work (the so-called "Coal Commission") to inform it, with members from civil society, trade unions, and the private sector. The commission resulted in a national consensus to phase-out coal by 2038. The Coal-fired Power Generation Cessation Act (KVBG) laid out support for the phase-out of coal-fired power generation in coal regions. This framework introduces a compensation mechanism for the closure of coal-fired power plants. This allowed Lusatia to plan its shutdown of plants and start its bifurcation towards renewable energies, maintaining the energy identity of the region.

In 2020, the Coal Exit Law implemented two compensation mechanisms for the shutdown of coal-fired power plants. First, fixed decommissioning premiums were planned for the two main lignite power plants operators – RWE and LEAG – amounting to EUR 4.35 billion paid by the state to operating companies. Among these funds, Lusatia will receive EUR 1.75 billion for an early shutdown of its plants through the LEAG company and one of its trustees. This first mechanism has been under scrutiny by independent observers for several reasons detailed below. Secondly, a reverse auction mechanism was introduced for hard coal-fired power plants and small-scale lignite power plants to phase out their activities early, relying on competitive bidding by coal plant operators to receive a compensation. The reverse auction mechanism encourages lower compensation requests and is structured to reward early movers as the compensation levels decrease as time gets

closer to the phase-out date. This mechanism has been perceived positively among researchers (Wettengel, 2020). The separation of mechanisms for the compensation of hard coal-fired power plants and lignite-fired plants goes back to the domination of the lignite sector by two major companies, impeding the holding of competitive auctions (Scott et al., 2022).

Success factors

- **Broader energy policy framework:** Reverse auctions are considered more cost effective than flat-rate compensations even though climate advocates have voiced criticism about their design, as detailed below. Researchers however underline that they are not applicable in every policy context. Germany had key enablers to ensure the success of reverse auctions, such as security of electricity supply, adequate grid planning, complementarity with broader policies ensuring the buildout of renewable energy sources, or incentives linked to EU ETS prices (Scott et al., 2022).
- **Adequate incentives:** For reverse auctions, decreasing payment levels combined with forced closures were identified as essential elements incentivising operating companies to participate in lower bids (Scott et al., 2022).

Challenges

- **Appropriate compensation levels:** Independent researchers have analysed that the compensation level for Lusatia's main lignite operating company LEAG is excessive under the current and projected market conditions. Current trends imply that LEAG's lignite plants would likely shut down soon anyway, even without compensation. They find that the flat-rate compensation of EUR 1.75 billion was overestimated by around EUR 1 billion (Matthes, Hermann and Mendelevitch, 2020). Compensation levels should therefore be based on thorough economic analyses, considering up-to-date assumptions about the economic viability of power plants. On reverse auctions, environmental CSOs have criticised the high compensation levels in euros per CO2 tonne saved during the first tendering round, arguing that the design of the mechanism delayed efficient climate action by encouraging first the closure of power plants with low emissions levels (Greenpeace Energy, 2021).
- **Transparency during negotiations:** In the case of LEAG plants' decommissioning, leaked business plans have sparked controversy around the setting of compensation levels and underlined insufficient transparency around the calculation of payments between the government and coal plant operators. Including local stakeholders is essential to ensure the fairness of such extensive measures. In Germany, local authorities and civil society lacked influence in decommissioning processes as they did not have an institutionalised role (Heilmann and Popp, 2020).

1.2 DIVERSIFICATION OF THE REGIONAL ECONOMY

Phasing out coal in monolithic economies leaves massive gaps in the labour market of the region. If done inappropriately, it can burden the economic growth of the region and generate heightened unemployment levels as well as the outbound migration of skilled workers, which further hampers economic development.

Regions phasing out coal or extractive industries need policies fostering economic regeneration in parallel. Subnational governments can act on a number of levers to manage this change in economic structure, including creating the right conditions for the establishment of new industries and investing in education. Retraining skilled workers and equipping young people with green skills is paramount to ensure balance and attract new businesses. For that, it is key to strategically coordinate the identification of new economic development paths for the region and the attraction of corresponding new businesses, while also assessing the existing skills and developing the education infrastructure for the development of the local workforce.

Ruhr Area, Germany: Strategic regional development with the Zukunftsagentur Rheinisches Revier (ZRR)

In the German state of North Rhine-Westphalia, the Ruhr area has developed its economy over the 19th and 20th centuries around a monolithic structure. The latter was based on coal production and coal-consuming heavy industries, accounting for 50% of the 1980 GDP of the region (NewClimate Institute, 2022). Structural policies at the national level in the 1960s have spawned regional development and economic diversification from the 1980s. The emergence of academic and innovation hubs to attract new businesses were key factors for restructuring the economy and upheaving it. The growing network of universities in the region since the 1960s is seen as an essential facilitator of innovation programmes like the Dortmund Technology Park established in 1985, and supported the restructuring of the region over the next decades (NewClimate Institute, 2022). Nowadays, universities and research hubs in Aachen, Dortmund and Essen are developing climate tech programmes, continuing to bring technology-based industries and competences to the region.

The Regional Development Agency for the Rhineland Mining Area (ZRR) is an intermediary coordination body created in 2014 including an array of local stakeholders like trade unions, business associations and local municipalities. The agency's mandate is to coordinate a strategy for the region's economic development beyond coal after having identified potential regional development paths and supporting project development through technical assistance. The ZRR thereby develops and implements the regional Economic and Structural Programme

(WSP), identifies and supports projects eligible for public funding, brings together public and private stakeholders and informs the wider public on ongoing regional transformation processes. Its wide range of activities allowed this body to become an essential coordinator of economic diversification in the region, following wider national climate targets (Wuppertal Institute, 2022). Its geographic mandate covers the area of the Rhineland coal mines, including the city of Aachen.

Success factors

- **Strong funding mechanisms:** The ZRR channels funds from federal, regional and European sources for a just transformation of the region's economy. It is in charge of allocating EUR 14,8 billion to sustainable development projects in the region by 2038 (Bezirksregierung Köln, 2023). The early years of the agency were marked by a difficult financial situation, but the stabilisation of its funding over the medium- and long-term were key enabling conditions for the agency to effectively spur regional development (European Commission, 2020).
- **Bottom-up approach:** The shift to a more bottom-up approach in just transition governance is an essential success factor in the Ruhr region, where regional actors such as local authorities, businesses, civil society and research institutions have become active drivers of the economic diversification. The creation of the ZRR is consistent with new bottom-up governance experimentation dynamics starting in the 1990s, after the lack of success of top-down resource allocation from the federal government to regions until the 1980s (NewClimate Institute, 2022).
- **Cross-sector collaboration and consensus:** The early start of the agency in 2012 and its progressive focus on coal phase-out has allowed it to create strategic linkages between actors of the transition in the region. This network structure supported the agency in generating growing consensus among actors on the need to think sustainably beyond the coal phase out and coordinate their efforts (European Commission, 2020).

Challenges

- **Transparency:** The allocation of public funds through the ZRR has been criticised by civil society organisations (CSOs) for being untransparent. The criteria of selection for supported projects are not publicly available, which raised some concerns among civil society organisations that sustainable regional development was not always prioritised in those processes (Krüßmann and Kräling, 2024). It is crucial that such a strategic structure involved in planning the region's development

clearly discloses how projects are selected, so as to avoid claims of misuse of public funds and draw legitimacy from civil society and from local municipalities' endorsement.

- **Community engagement:** Civil society participation is not institutionalised, in that it is not represented in the governing body of the agency. Even though public participation is sought after through platforms like conferences, dialogues and meetings between the agency and CSOs, civil society stakeholders have expressed concerns about the disproportionate involvement of certain social groups, and on the results of these consultations not being adequately integrated in decision making (Riley-Dittmann, 2023). It is recommended that civil society is integrated into governing bodies and have a permanent mandate in the agency's committees (Ruhr Universitaet Bochum, 2023).

02 SUPPORTING WORKERS IN THE TRANSITION

2.1 EARLY RETIREMENT AND COMPENSATION SCHEMES

Regions transitioning away from coal and/or de-industrialising their economies have historically been hit by job losses and related socio-economic consequences. In monolithic economies, de-industrialisation and phasing-out from coal may result in economic distress, due to a lack of economic diversification, i.e. the difficulty of supporting the development of new sustainable sectors. Former coal and industry workers face high unemployment after job losses due to their workplaces closing down, as they are often older and lack relevant skills (European Commission et al., 2024). This dwindling economic dynamic, in turn, weakens communities, leading to population decline and social disintegration.

Many European countries implement early retirement schemes and compensatory measures to mitigate the negative consequences of the transition on former coal and industry workers' lifepaths. Support instruments targeting younger workers usually rely on activation policies to channel them back to the labour market **(→ 2.2 Retraining and employability support)**. Older workers, on the other hand, often benefit from early retirement schemes as they approach the legal age of retirement and experience more hurdles to diversify their skillset.

Spain: Early retirement for coal miners through the National Plan del Carbón

Spain has had a tradition of coal mining since the 18th century, mainly in the northern part of its territory. Its commitment to climate neutrality by 2050 and its alignment with EU legislation has led the national government to plan the phase- out of coal by 2025 and adopt a Plan for Coal covering the period 2019-2027 (Government of Spain, 2018).

Several iterations of the national Plan for Coal (Plan del Carbón) have provided support to former coal miners in Spain since 1990. The latest deal was struck in 2018 between the Spanish government and workers' unions and foresees the allocation of EUR 250 million for the just transition in mining regions (Government of Spain, 2018). The agreement was reached as 26 uncompetitive coal mines were shut down, resulting in 1,677 direct job losses and uncounted indirect consequences over other jobs (IndustriAll, 2018). Through this plan, early retirement schemes were made available for miners over 48 years of age or having worked for over 25 years in the coal industry, which encompasses around 60% of miners. Younger miners receive a severance payment of EUR 10,000 and 35 days of pay for each year of service. Miners with a work-induced lung disease received additional payments.

Success factors

- **National commitment to support coal miners:** These schemes have been received positively by unions and regional governments, given the extensive support they offer to former miners. The latest 2019 Plan for Coal is inscribed in a long history of coal policies destined to address the

negative socio-economic consequences of coal mines shutting down, which demonstrates the commitment of the Spanish government to a consistent and coherent approach to tackling the just transition in that sector (World Resources Institute, 2021).

- **Broader Just Transition Framework:** Early retirement and unemployment schemes for former coal workers must be part of a broader regional transformation, fostering economic diversification and sustainable job opportunities to reactivate former mining regions. Spain is addressing this through its Just Transition Strategy, developed soon after the Plan for Coal (Government of Spain, 2019). This framework intends to meet the challenges faced by the mining regions, where unemployment is on the rise and young people are migrating to more dynamic regions (del Río, 2017).

Challenges

- **Disincentive for work:** Concerns emerge that the support schemes could be too generous compared to average wages, disincentivising workers to return to the active labour market. This raises the wider issue of limited public budgets in the face of high unemployment rates (World Resources Institute, 2021). Other activation policies are an important component of support schemes for younger coal and industry workers. Early retirement schemes however remain an essential mechanism for older workers whose age may limit their ability to re-enter the labour market by developing new skills (European Commission et al., 2024).

- **Alleviating coal companies from their duties:** With public authorities intervening in supporting workers in the just transition, there is a risk that mining companies who used to pay for such support schemes are alleviated from that task (Reitzenstein, Heilmann and Popp, 2021). In that case, the Polluter Pays Principle might be at risk **(→ 3.1 Restoration of land)**.

2.2 RETRAINING AND EMPLOYABILITY SUPPORT

Supporting workers in adapting to new, sustainable economic sectors is essential for a regional just transition. Compensation policies like severance payments or early retirement benefits are key, but they leave out the issue of reskilling workers who are yet further away from their retirement age. Without the right support, workers from fossil fuel-intensive industries are likely to face hurdles to reinsert onto the regional labour market, starting with a lack of adequate skills.

Parallel to passive support policies for older workers, activation policies are cornerstones of regional policies to incentivise workers to re-enter the labour market. Reskilling and upskilling programmes can facilitate a smoother integration for former workers from fossil fuel-intensive industries.

Trenčín, Slovakia: Retraining and employability support for former coal workers

Slovakia had committed to end coal mining and burning by end 2023. This translated into closing the two coal-fired power plants in Nováky and Vojany. This comes with major socioeconomic consequences for former coal workers, especially coal miners working in the supply of these plants. The Nováky power plant is located in the Trenčín region, in the north-western part of the country.

To address the impact of the national phase out, the Trenčín self-governing subnational region, together with Slovakia's largest mining company Hornonitrianske bane Prievidza (HBP), implemented reskilling and employability support for former coal mine workers. The support programme was launched in 2023 and had over 700 participants as of mid-2024 (Regional Government of Trenčín, 2025). It consisted of personalised career support for mine workers to adapt to the job market, but also of reskilling and upskilling courses to develop new professions. The retraining programme included general courses on job search and job application for workers who often never underwent such processes before. The retraining courses aim to develop new careers, including photovoltaic and solar panel installation, electrical work, barbering or gardening (European Commission and Directorate-General for Regional and Urban Policy, 2024). The policy started as a project in Upper Nitra for the former workers of an HBP mine and is funded by the EU's Just Transition Fund with EUR 12 million. It is now considered for further diffusion based on the demands of other companies in the region.

Success factors

- **Targeted and comprehensive programmes:** The trainings targeted former mine workers, focusing on skills and competences that were aligned with their professional paths and needs. At the same time, the programme considered the needs of the regional labour market, in order to best support the regional integration of workers (Regional Government of Trenčín, 2025). It also involved local contact centres that offer advice and foster a sense of community and direct contact to the participants, which was identified as a factor for success.
- **Proactive planning:** The proactive planning around the programme, notably its implementation before the closure of the mines, allowed for the workers to prepare for new professional paths before losing their jobs (European Commission and Directorate-General for Regional and Urban Policy, 2024). Activation policies like the reskilling of the workforce need to be planned proactively, as opposed to reactive policies that are implemented once workplaces have already been shut down or

that industries have drastically decreased their activities in the region. This allows workers to plan their future careers with anticipation, while mitigating the psychological costs associated with the loss of their job (European Commission et al., 2024).

Challenges

- **Scalability of the project:** The reskilling programme has been built on a special governance structure involving both regional authorities and the large employer HBP. The latter agreed to keep affected workers on the payroll of the company during the reskilling programme. This structure raises the question of the replicability of the programme in other regions, as it relies on negotiations between local authorities and private employers (European Commission and Directorate-General for Regional and Urban Policy, 2024).
- **Mismatch between training programmes and regional labour demand:** Reskilling programmes in Europe face common challenges, particularly their misalignment with regional labour demand. This can be due to a lack of suitable jobs matching new skills and insufficient regional economic diversification, with local economies failing to provide adequate opportunities. Gaps can also emerge when training programmes are not designed in alignment with regional labour demand. Thus, reskilling alone is insufficient for reintegrating former coal workers. Policymakers must actively create green jobs through economic restructuring and gear retraining programmes towards filling gaps in the existing regional labour demand (NewClimate Institute, 2022).
- **Quality of jobs:** Reskilling programmes carry the risk of being too shallow or short and not end up in achieving stable re-employment of participants in quality jobs. Programmes should ensure that workers are trained for new jobs with higher wages, access to collective bargaining and safe and healthy working conditions. This has been identified by CSOs as a major challenge for the just transition in European regions (WWF, 2023; Think 2030, 2024).
- **Adherence of workers:** Often, older workers who can benefit from passive support schemes tend to prefer this option, in contrast to active policies like upskilling and retraining, which might be more difficult to follow from a certain age. This can also be due to a risk of earning lower salaries than the support, and to a higher demand for young workers (European Commission et al., 2024).

03 ENVIRONMENTAL RESTORATION

3.1 RESTORATION OF LAND

Land management is an essential part of the just transition, in that it can represent a heavy burden for local communities and their future development when rehabilitation and environmental restoration are not adequately planned and executed (Krawchenko and Gordon, 2021). Companies extracting coal or other minerals are required by binding EU directives to accept the liability to restore the land after the end of extraction. The EU imposes the Polluter Pays Principle to companies operating coal mines having caused significant damage to land, water and biodiversity, making them responsible for remediating the environmental damage (European Commission, 2024a). In any case, companies are required to create a closure plan before the beginning of mining operations including a plan to restore the site and manage water safely after closure (European Commission, 2021b). Despite these legal responsibilities, rehabilitating former industrial sites generally entails significant costs, which often result in delays or even abandonment of sites.

A properly rehabilitated extraction site however can represent a considerable asset, helping to diversify the local economy and revitalise local communities. The rehabilitation involves multiple actors, like the operating company, in charge of planning, implementing and financing, short-term labour for the rehabilitation, but also the legislator who sets and enforces the ground rules for closure and revitalisation, as well as actors from the civil society, exerting an influence on such processes (Streit, Tost and Gugerell, 2023). Rehabilitation processes must be embedded in policy frameworks that clarify funding, stakeholder roles, and align with the region's development pathway. The Polluter Pays Principle is crucial for environmental restoration, as abandoned sites can become liabilities and burden local communities. Operating companies must take responsibility for the rehabilitation and policymakers need to embed land restoration in just transition policy frameworks.

Spain: Environmental restoration in the Spanish Just Transition Strategy and the case of As Pontes, Galicia

In the framework of its Just Transition Strategy, the government of Spain has locked nearly EUR 200 million for the restoration of 3,700 hectares of former mining sites. The allocation of these funds is managed by the national Institute for the Just Transition **(→ 4.1 Interplays between the national and the regional level)**. Funding for these measures stems from both European and national funds. Rehabilitation measures financed by European funds amount to EUR 150 million and were launched in 2022. Their objective is to re-naturalise former mines and to enhance socioeconomic development in the selected regions, with a focus on creating new green jobs for former coal miners (Government of Spain, 2023). The national funds are intended to support companies rehabilitate former coal-mining sites following their closure under the national coal phase-out plan.

Before the Just Transition Strategy came into place, Spain already pioneered rehabilitation projects. As Pontes in Galicia was once the largest coal mine in Spain and is now commonly referred to as a best practice example for rehabilitating extractive sites to restore biodiversity and revitalise the local economy. Since the mine's closure in 2008, the open pit site became one of the largest artificial lakes in Spain (Endesa, 2022). Besides re-naturalising a former industrial environment covering nearly 2.400 hectares, the lake has generated a new economic dynamic in the region by attracting outdoor tourism. The rehabilitation project was carried out by the Spanish company Endesa, the operator of the mine and thermal power station it supplied.

Succes factors

- **Local creation of jobs:** EU-funded rehabilitation projects in Spain are foreseen to create about 350 direct jobs, with priority given to former mine workers. This ensures that the new activities related to rehabilitation measures participate to local value creation and employment generation, transforming former coal jobs into green jobs (Government of Spain, 2023). Rehabilitation projects should thus be organised in cooperation with local businesses to enhance skills within local communities and ensure that the project creates long-lasting benefits (European Commission and Beuermann, 2020).
- **Public participation:** In Spain, emphasis is placed on the public participation of local communities in the design of Just Transition Strategy restoration measures. Such measures are paramount to ensure the social acceptance of rehabilitation projects, and guarantee that the projects align with local needs and values.
- **Cultural heritage:** Recognising the region's cultural and industrial heritage is essential when designing and implementing repurposing measures of old coal mines and industrial sites (European Commission and Beuermann, 2020). When feasible, environmental restoration plans should aim to revalue the region's heritage, e.g. by creating cultural venues or museums.

Challenges

- **Funding and regulatory context:** Securing financing is a major challenge in rehabilitation projects, as the financial risks of closing mines or industrial sites often discourage involvement from companies which might make public sector intervention necessary. In Europe, national Mining Acts regulate closures, with which regional governments should align to avoid costs being borne by taxpayers or municipalities (European Commission and Beuermann, 2020). Spain's 1973 Mining Law mandates restoration plans before mining begins, and the 2007 Environmental Liability Law holds companies financially responsible for environmental damage.

→ **Polluter Pays Principle:** The Polluter Pays Principle is crucial in environmental policy but presents challenges in just transition support. It states that polluters should bear the costs of restoring exploitation sites they benefited from. Without strict financial requirements, the public sector and communities may bear the long-term rehabilitation costs (Fiedler and Schrems, 2019). CSOs warn that the EU's Just Transition Fund risks disproportionately funding land restoration without applying the Polluter Pays Principle beforehand (Stępień and Nigro, 2021). As it relies on EU funds for rehabilitation, Spain must ensure polluters contribute to the restoration of former extraction sites.

3.2 TACKLING AIR POLLUTION

Air pollution is an environmental nuisance mainly resulting from transportation, high-emitting industries, agriculture and livestock farming. In urban areas as well as in regions with a prevalence of high-emitting economic sectors, air pollution is an issue majorly affecting the health of local communities and workers. Disadvantaged groups in Europe face greater exposure and health impacts from air pollution, usually due to their lower socio-economic status (Deguen and Zmirou-Navier, 2010).

Reducing air pollution and its associated health inequalities is thus an essential element of a just transition. In industrial and power-generating regions, phasing out coal is an essential step towards reducing air pollution resulting from coal combustion. In urban areas, supplementary measures geared towards the reduction of transport-related emissions are necessary. Air pollution reduction policies need to be designed so as to be socially acceptable, by providing compensations to potentially disadvantaged social groups, by creating social dialogue opportunities and by developing alternative clean transport infrastructure.

Lombardy, Italy: Limited Traffic Zones in urban centres

As one of Italy's most industrialised regions, Lombardy has historically been prone to higher air pollution levels and stands among the most-air-polluted areas in Europe. Over the past decade, it has implemented policies to improve air quality, particularly in Milan. The region's manufacturing, agriculture, dense road network, and urban congestion contribute to pollution, a key concern for local environmental advocates (Maranzano, 2022; Regione Lombardia, 2025).

Area C is a congestion charging scheme covering Milan's inner-city centre since 2012, creating a Limited Traffic Zone (LTZ). It aims to reduce vehicle traffic to decrease the levels of smog and promote more sustainable modes of transport than road and car transport. On weekdays and peak hours, vehicles entering the area need to pay a fee to access the zone, regardless of their pollution level. All net revenues

from the programme are used to promote sustainable mobility, including the expansion of public transport and of soft mobility. The programme has contributed to reduce congestion and air pollution, with the level of pollutants like PM10 and NOx substantially dropping over the last decade (Area C Milano, 2021). The LTZ was expanded in 2019 with the creation of the subsequent policy Area B, now covering 72% of the city's surface.

Success factors

- **Citizens' support:** The policy involved citizens at the beginning of the decision-making process, with residents being asked to vote in a public referendum in 2011 on whether they were in favour of limiting traffic and promoting low-emission transport in the city centre. 79% of them answered positively (C40 Cities, 2015). Given the mobility constraints this policy entails, it is crucial for policymakers to ensure public acceptance from the outset and thus enhance the strength of their mandate.
- **Promotion of clean transportation:** Restricting the access to a densely populated area with high air pollution levels needs to be accompanied by enhanced sustainable urban mobility infrastructures, such as more cycling lanes and efficient and affordable public transportation. Milan has done so with an expansion of its cycling infrastructure and efforts to enhance the affordability of its public transportation network.

Challenges

- **Holistic urban planning:** Policymakers need to act on urban planning to mitigate air pollution's unequal effects. While reducing pollution benefits all to varying degrees, addressing health inequalities requires considering varying exposure levels and holistic policies. Researchers highlight spatial multipolarity and social diversity as key levers to address the root of inequalities (Deguen and Zmirou-Navier, 2010).
- **Uneven air quality:** The positive results of the policy, i.e. the reduction of particulate matter concentrations in the air, are not equally distributed across the Lombardy region, which could further exacerbate health inequalities related to air pollution. While the policies have contributed to decrease certain air pollutants, the PM2.5 pollution is still 24 times the limit recommended by the World Health Organisation (IQ Air, 2025).
- **Social resistance to the policy:** The implementation of the policy sparked resistance among right-wing politicians. They opposed at first the project, qualifying it as an unfair tax on commuters and a burden for businesses within the city centre. Opposition progressively faded over the years as policymakers made adjustments, underlining the necessity to address the socioeconomic impacts of policies tackling air pollution.

04 COORDINATION AND GOVERNANCE

4.1 INTERPLAYS BETWEEN THE NATIONAL AND THE REGIONAL LEVEL

Mitigating the socio-economic impacts on communities, workers and vulnerable groups of a transition towards a climate-neutral economy requires efforts from different government levels. Implementing bodies need to work together across multiple sectors. Those efforts can be facilitated by clear governance models with a strategic oversight of just transition policies.

Holistic policies addressing all the dimensions of the just transition require a clear national strategy outlining the main challenges and opportunities related to the transition. Strategies for a just transition ought to encourage ownership of the just transition among all levels of governance – national, regional and local – and include civil society and economic actors in relevant processes. As outlined by a recent study by the Wuppertal Institute for Climate, Environment and Energy, several elements are key to consider when building a functioning multi-level governance system. Amongst them are the transparency of transition strategies, a clear allocation of responsibilities for key decisions, the identification of windows of opportunity in regions, and flexibility and adaptation to external constraints (Wuppertal Institute, 2022).

Spain: The National Just Transition Strategy and the regional Just Transition Agreements

Historically, Spain's just transition efforts began in response to declining coal production and employment. The government faced resistance against the closure of coal mines from workers and local stakeholders. In 2018, the government reached a deal with trade unions for an updated Plan for Coal, investing EUR 250 million in mining regions from 2019 to 2027 **(→ 2.1 Early retirement and compensation schemes)**. This marked the first step toward a more integrated approach to Spain's just transition.

In 2019, Spain became the first country to adopt a national Just Transition Strategy, part of its Strategic Framework for Energy and Climate (Government of Spain, 2019). This strategy takes a holistic and proactive approach to the transition, implemented through regional Just Transition Agreements (Government of Spain, 2022). Those are co-governance tools involving the national government, regional governments and local authorities. The agreements aim to have an integrated approach to economic diversification, sustainable employment, job loss identification, and local actors' involvement in affected regions. The strategy does not foresee the creation of a dedicated funding pool but provides preferential access to existing programmes like the EU's Just Transition Fund.

Among the Spanish regions with a strong reliance on coal mining stands Asturias. It has been one of the first regions to announce Just Transition Agreements with the Spanish government. To date, Asturias has signed three agreements covering 27 municipalities, aiming to mitigate the effects of the closure of coal mines and of

coal-fired thermal power plants to ensure a just decarbonisation of high-emitting industries like steel, cement and paper (Observatorio de la Transición Justa de Asturias, 2024).

Success factors

- **Transparency:** The Spanish government has created the Just Transition Institute as the implementing body of its national strategy, in charge of identifying relevant measures in collaboration with the regions through the Just Transition Agreements. The Institute communicates regularly on the advancement of the agreements and the measures undertaken. Observers have also underlined that the national ministry in charge, MITECO, has been proactive in communicating transparently about the negotiation processes with the regional governments (World Resources Institute, 2021).
- **Public participation:** Public participation is crucial in designing Just Transition Agreements, with consultations held after a preliminary territorial diagnostic (Fundación 1° Mayo and ISTAS, 2022). Social inclusion is a key focus, with efforts to involve traditionally excluded groups like youth and women. The regional government of Asturias established the Observatory for the Just Transition (OTJA) to promote participation and transparently communicate progress, which is essential as the provision of data and analyses allows to raise awareness and strengthen participation (Arabadjieva, Galgoczi and Van Melkebeke, 2024).
- **Inclusion of non-governmental stakeholders:** Trade unions and corporations from the affected sectors are extensively mobilised in the design of just transition policies, through tripartite agreements with the government on the closure of coal mines and coal-fired thermal plants (Fundación 1° Mayo and ISTAS, 2022).

Challenges

- **Lack of funding:** Inadequate public funding is a common hurdle for effective just transition strategies (World Resources Institute, 2021). In the case of the Spanish Just Transition Strategy, CSOs call for a fiscal reform to include green taxation encouraging more sustainable behaviours and redistributing wealth. CSOs consider that the Polluter Pays Principle has not been enforced by the framing Climate Law and subsequently, by the Just Transition Strategy **(→ 3.1 Restoration of land)** (Cantero, 2021).
- **Limited capacities among local authorities:** Local authorities and municipalities have expressed difficulties around managing major transformative projects on their territories, with limited staff and capabilities (Fundación 1° Mayo and ISTAS, 2022).

→ **Sectoral limitations:** The EU's Just Transition Mechanism faces criticism for prioritising employment policies over structural wealth redistribution. As the Just Transition Strategy in Spain relies to a considerable extent on European funding, it is likely to allocate funding following European priorities. Overall, EU just transition measures mainly cushion coal-related job losses. Their narrow scope lead to neglecting other transitioning industries and deeper inequality issues (Mandelli, 2022).

4.2 MULTI-STAKEHOLDER NETWORKS

While just transition policies ought to be holistic to address the root causes of inequalities, they are also intrinsically linked to local and territorial socioeconomic features. The lack of a holistic strategy risks creating gaps in the identification of priority issues and in the implementation of policies **(→ 4.1 Interplays between the national and the regional level)**. In parallel, the plurality of actors and sectors related to the just transition carries the risk of a fragmentation of policies across different sectors and decision-making levels, leading to inefficiencies, contradictions and disparities.

The plurality of regional economic structures and actors involved in just transition policies calls for strong cooperation between all levels of governance and decision making. Multistakeholder networks are essential for the just transition, as the diversity of socioeconomic inequalities underlines the need to include civil society, trade unions and local communities in territorial transitions. Multistakeholder initiatives also need to promote private sector participation, a key actor of employment and innovation in regional development. It is key that efforts are coordinated and aligned with clearly identified development pathways, for instance to ensure the alignment of workers' retraining with sustainable opportunities on the regional labour market.

North Rhine-Westphalia, Germany / IN4climate.NRW, a platform connecting politics, companies and research institutes

Historically Germany's coal heartland and a key industrial region, North Rhine-Westphalia (NRW) began diversifying its economy in the 20th century following coal crises and a decline in steel industry competitiveness. The region shut down its last hard coal mine in 2018 and foresees to entirely phase out brown coal by 2030, eight years ahead of the national German target (State Government of North Rhine-Westphalia, 2022). Regional programmes played a key role in establishing innovation centres, restoring natural landscapes and developing support programmes for coal workers (NewClimate Institute, 2022). The region now faces challenges related to the decarbonisation of its industrial base to reach climate neutrality.

The regional transformation requires strategic collaboration between NRW's subnational government, industrial businesses and researchers, especially since the region benefits from an interwoven value creation network in its industry

(NRW.Energy4Climate, 2024). The NRW government launched the initiative IN4climate.NRW in 2018 to define development pathways for the region towards decarbonisation in a joint manner with companies and academia, and create economic opportunities in the field. It is a unique platform in Germany fostering knowledge exchange and collaboration between regional political, economic and scientific representatives. It brings together essential actors and creates dialogue spaces for them, but also participates in the formulation of strategies on industrial decarbonisation, notably through its eponymous think tank and scientific competence centre SCI4climate.NRW (Wuppertal Institute, 2022).

Success factors

- **Involvement of the private sector in the decarbonisation:** The platform allowed to enhance buy-in for the transition among private companies, as over 85 companies and associations from industrial sectors like steel, chemicals, cement or building materials have joined the initiative (NRW.Energy4Climate, 2022). The platform is steered by representatives of companies, research institutes, the state government and the IN4Climate.NRW platform, who identify and prioritise topics to form temporary working groups.
- **Adoption of a regional industrial decarbonisation strategy:** The IN4climate.NRW platform initiated the Industry Pact in 2022, which was consolidated and transformed into a permanent strategy for entire value chains in the manufacturing sector in 2024. This deal is the result of a collaborative approach between the working group on Industry and Climate Neutrality and NRW's Ministry for Economic Affairs, Industry, Climate Action and Energy.

Challenges

- **Community engagement:** Multistakeholder initiatives destined to diversify a region's economy and define strategic economic directions might fail to include civil society and local communities and implement solutions that do not resonate with communities' needs. The IN4climate.NRW platform has acknowledged that necessity and is working on how to integrate civil society better (Wuppertal Institute, 2022).
- **Transparency and accountability:** As these networks and initiatives are often based on voluntary commitments, they might lack strong enforcement mechanisms. This could lead to a failure to meet the agreed objectives and reduce the ambition of the network. Power dynamics within the networks should also be carefully looked at and decision-making processes made public, to avoid potential conflicts of interest and inform citizens and civil society as a first step of community engagement.

05 KEY LESSONS LEARNED

Based on the previous case studies, we identified key takeaways per area of focus.

ECONOMIC RESTRUCTURING

- **Strategic planning is crucial for economic resilience.** National coal phase-out plans must be accompanied by region-specific, long-term development strategies to avoid economic stagnation. Effective transitions require proactive planning for labour market shifts and industrial diversification to maintain regional economic stability.
- **Compensation mechanisms for coal phase-out must be transparent and targeted.** If adequately designed and supported by the right enabling environment, compensation schemes can accelerate the phase-out, but they need to be based on up-to-date economic analyses to avoid overpayment. Reverse auctions, as applied to hard coal closures, offer a more cost-effective and transparent alternative to flat-rate payments.
- **Institutionalised coordination bodies can drive economic restructuring.** Regional agencies like the ZRR can play a critical role in coordinating structural change across sectors. These bodies support strategic planning, mobilise multi-level funding, and provide technical assistance to foster sustainable economic development.
- **Bottom-up governance and stakeholder engagement are essential,** as top-down approaches risk missing local needs and undermining legitimacy. The Ruhr region's case study shows that empowering regional actors and facilitating collaboration among municipalities, businesses, and unions strengthens regional ownership of the transition.
- **Transparency and civil society participation are key for legitimacy and adequacy of just transition policies.** Lack of transparency in compensation negotiations and project funding decisions can undermine public trust. Formal inclusion of civil society actors in governance structures is essential to ensure fairness, accountability, and community ownership of transition outcomes.

SUPPORTING WORKERS

- **Tailored approaches are needed for different worker profiles.** Older workers benefit most from early retirement and compensation schemes, especially when re-skilling is unrealistic due to age or health conditions. Younger and mid-career workers are generally targeted by activation policies, such as retraining, career guidance, and job search support, to reintegrate into the labour market.

- **Early retirement can be an effective safety net, when balanced.** Spain's Plan del Carbón shows that well-funded early retirement packages, negotiated with unions and integrated into national frameworks, can build social consensus. Generous benefits may strain public budgets, if not well designed.
- **Retraining must be proactive and regionally embedded.** Slovakia's Trenčín region illustrates the value of starting reskilling programmes before mine closures, allowing workers time to transition and reduce psychological distress. Anticipatory policy design is key to avoiding socioeconomic shocks and allowing workers to make informed life choices. Training content must align with local labour market demand and be co-designed with local employers and institutions to ensure real job placement outcomes. Close coordination with employers enhanced income security and increased programme uptake, highlighting the role of employer engagement.
- **Job quality and long-term outcomes matter.** Training programmes must go beyond basic courses and ensure access to stable, well-paid, and secure green jobs. Without this, transitions may lead to underemployment or precarious work. Metrics for success should include job quality, wage levels, and long-term employment stability.
- **Support schemes must complement economic diversification.** Neither early retirement nor retraining alone ensures regional resilience. They must be part of a broader regional development strategy that fosters new industries and creates actual employment opportunities. Without economic diversification, workers may complete training programmes only to find few suitable jobs in the local economy.
- **Public funding should not replace employer responsibility.** Public schemes risk shifting the burden of transition from companies to taxpayers, undermining the Polluter Pays Principle. Policies should consider mechanisms to maintain or reassign corporate contributions, especially for severance, retraining, and pension schemes.

ENVIRONMENTAL RESTORATION

- **Environmental restoration must be embedded in just transition frameworks.** Land rehabilitation and pollution reduction are not just environmental obligations, they must be integrated into broader social and economic strategies that support affected workers and communities.

- **The Polluter Pays Principle should be rigorously enforced.** While EU law mandates this principle, gaps in enforcement risk shifting the financial burden of restoration onto the public. Strong legal and financial frameworks are needed to ensure companies fund and execute rehabilitation efforts.
- **Early and inclusive planning is critical.** Success depends on early coordination among government, companies, local communities, and civil society. Public participation, as seen in Spain and Milan, builds trust, ensures social acceptability, and aligns projects with local needs and values. Cultural and industrial heritage should also be acknowledged and revalued. Restoration policies that integrate a region's historical identity (e.g. coal mining legacy) help maintain community cohesion and foster pride in transition efforts.
- **Environmental restoration can support economic diversification.** Properly rehabilitated sites can be repurposed for tourism, conservation, or cultural activities, contributing to a post-carbon regional identity and new economic sectors. When planned proactively, rehabilitation projects can offer new green employment, especially for former fossil fuel or industry workers.
- **Targeted funding and legal clarity are essential.** Many regions face challenges in securing funding and navigating complex regulatory requirements. Clear national frameworks are essential to avoid costs shifting to municipalities.
- **Air quality measures must address social equity.** Policies to reduce air pollution can deliver public health benefits, but must be accompanied by investments in affordable and accessible public transport, and should consider uneven pollution exposure and resistance from impacted social groups.
- **Urban environmental policies require holistic, socially sensitive approaches.** While technical solutions (like LTZs) help reduce pollution, their success depends on inclusive urban planning that addresses health inequalities, mobility access, and social resistance.

COORDINATION AND GOVERNANCE

- **National strategies help align regional transition efforts with climate goals.** A clear national framework for a just transition provides direction and consistency, ensuring that regional initiatives and strategies contribute meaningfully to overarching climate and just transition objectives. Regional instruments like Spain's Just Transition Agreements

allow for context-specific solutions, co-developed with local authorities and stakeholders based on territorial diagnostics, and aligned with the national Just Transition Strategy.

- **Just transition governance should foster multi-level coordination.** National frameworks can provide strategies and guidance to regions, but effective governance requires going beyond one-size-fits-all approaches and formalising cooperation. Dedicated institutions can support coordination and implementation across governance levels, such as Spain's Just Transition Institute, which helps bridge national strategies with regional execution.

- **Multistakeholder structures must include civil society to reflect diverse community needs.** Involving actors such as trade unions and businesses in planning and negotiations ensures better relevance to labour and industry needs. Yet, effective governance also depends on the meaningful participation of local communities—alongside technical and economic stakeholders and other context-relevant groups—to ensure socially inclusive outcomes.

- **Transparency strengthens public trust and stakeholder engagement.** Regular updates and open communication on transition plans and decisions help maintain credibility and foster ongoing dialogue with affected communities. Public participation mechanisms increase the legitimacy of transition processes. Structured consultations and forums ensure that transition policies reflect the voices of local populations, including workers, youth, and marginalised groups.

- **Policy alignment across sectors prevents fragmentation and enhances effectiveness.** Coordination among climate, energy, labour, environment, and economic development policies helps avoid conflicting goals and duplicated efforts. Regional platforms can participate to structure collaboration among government, industry and academia stakeholders to shape long-term, sector-specific strategies.

- **Stable funding frameworks are essential for sustained and equitable implementation.** European funding is available for specific territorial initiatives, but lacks breadth in its sectoral as well as geographical scope, excluding various economic sectors from its Just Transition Mechanism (IndustriAll and Syndex, 2021). This shows the limits of the territorial approach to funding and calls for more reliability in access to national public funds for the just transition, perhaps through broader green fiscal reforms that reinforce fairness.

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