D2.1

Current status of the regions

NTUA, BSERC, CAC, AISVJ, FAEN, IRENA, KAPE

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LEGAL NOTICE

ABOUT

Energy transition plans may challenge the social ecosystem of the regions where coal is still king: if energy transition plans don't consider local factors, they may cause higher unemployment rates, aggravated energy poverty, and economic migration. Energy poverty is already a big challenge today in the EU, with coal-dependent regions generally being more affected by the issue.

In the spirit of the EU principle to "leave no one behind" in the transition, JUSTEM addresses the energy transition planning through a double-sided approach: (1) it helps regional authorities to develop 'just' energy transition plans that are sensitive to regional impacts such as job losses and energy poverty; and (2) it helps citizens build their capacity and find their place in a greener economy.

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PROJECT PARTNERS

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ABBREVIATIONS

BGN	Bulgarian Lev
EC	European Commission
EPC	Energy Performance Certificate
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GWh	GigaWatt hours
IDAE	Instituto para la Diversificación y Ahorro de la Energía (The Institute for the Diversification and Saving of Energy)
JTM	Just Transition Mechanism
kWh	kilowatt hour
Mtoe	Megatons of oil equivalent

MW	MegaWatt
MWh	MegaWatt hour
N/A	Not Applicable
NECP	National Energy and Climate Plan
Nox	Nitrogen Oxides
NRRP	National Recovery and Resilience Plan
NUTS	Nomenclature of territorial units for statistics
ODEX	Energy efficiency index of industry
PLN	Polish Zloty
PM	Particulate Matter
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
R&D	Research & Development
RES	Renewable Energy Sources
RRP	Recovery and Resilience Plans
SO2	Sulfur Dioxide
TJTP	Territorial Just Transition Plans
TPP	Thermal Power Plant
TWh	TeraWatt hours
WWF	World Wide Fund for nature

EXECUTIVE SUMMARY

The transition to sustainability is a necessity for humanity to address the climate crisis, but for regions traditionally dependent on fossil fuels, and notably coal, such a transition could pose a threat to their regional development, if the envisaged economic restructuring is not designed based on just and fair principles. Understanding that each regional context entails different realities, in this research, we shed light on the current status of six core coal-dependent regions in the European Union, namely Silesia (Poland), Western Macedonia (Greece), Asturias (Spain), Hunedoara (Romania), Stara Zagora (Bulgaria), and Istria (Croatia), as they progress with the plans to phase-out coal. We provide a background on the context of the regions and the role of coal in their regional development and investigate three axes related to the just transition: stakeholder needs in the regions, the policy context of the transition in respect to the principles of the just transition, and the regional status and indicators of energy poverty. We find that the just transition is associated with numerous stakeholders' needs across multiple dimensions, that most regions had a median performance in terms of their TJTP alignment with the EU just transition ambitions, and that energy poverty is prevalent in most countries and consequently to the regions, with the transition potentially deteriorating their resilience to this threat. Notably, we highlight differences between the regions and particularities that each case presents, which should be considered when moving forward with the transition with and for citizens, especially as we note that the impact of consultations performed so far has not always been clear.

Apart from the main text of this report, which summarises the findings of the status analysis along the three axes described, in the Annex we present summaries for each country (also translated in the national languages), acting as a quick go-to guide to understand the core aspects of the just transition in said regions. A second annex provides elaborations on the core policy documents of each region and their alignment with just transition principles. To accompany this report, we have also produced a series of factsheets and briefs, uploaded in the project's website[1], presenting an overview of the social, economic and policy aspects of the regions. Finally, since this report constitutes a summary of our findings, we have uploaded onto Zenodo[2] a supplementary material file including extended versions of the policy and energy poverty analyses of each region including the assessments from WWF's TJTP toolkit.

The status analysis serves as a reference document for the public and interested parties to understand the context of the just transition in the main coal-dependent regions of the EU, while within the project it will provide guidance to improve the design and implementation of the national/regional—including energy poverty—policies.

[1] https://ieecp.org/2023/07/12/blog-briefs-on-territorial-just-transition-plans-for-the-justem-pilot-regions/
[2] https://doi.org/10.5281/zenodo.10057284

1. INTRODUCTION

Climate change is a key challenge humanity needs to face in the upcoming decades, with global temperature increase already being around 1.1°C above pre-industrial levels (IPCC, 2021). The energy sector and in particular the burning of fossil fuels has been one of the key drivers of climate change, with nations around the world pledging to rapidly reduce greenhouse gas (GHG) emissions, in an effort to reduce temperature rise to "well-below 2°C", a target officially posed by the Paris Agreement. However, the world is not yet on track to achieve said target, creating the challenging need to accelerate mitigation efforts in the coming years to unprecedented scales (van de Ven et al., 2023).

The use of fossil fuels, and in particular coal arguably being the dirtiest among them, apart from leading to increased emissions, has also been traditionally associated with societal growth in the history of humanity. Fossil fuels paved the way for the Industrial Revolution and enabled today's industrialisation leading to increased productivity (Janicke and Jacob, 2013), and the establishment of many innovations, such as steam engines and the railway network (Wrigley, 2013). Countries and regions with abundant resources saw an agglomeration of their economies and enormous employment opportunities, through the creation of industrial clusters to mine and exploit coal, in what is termed as coal-based development (Kalkuhl et al., 2019).

Framing the issue in such terms, a conundrum starts to emerge. On the one hand, rapidly pursuing a green transformation is an inherently positive and vital steps towards ensuring humanity's sustainable future, and coal phase-out is envisaged to be a crucial aspect of such a transition. On the other hand, the speed required to achieve the necessary climate targets poses significant threats to regions dependent on coal, such as inter alia Silesia in Poland, Western Macedonia in Greece, Asturias in Spain, Jiu Valley in Romania, Stara Zagora in Bulgaria, and Istria in Croatia, with societies in these regions ending up facing unemployment and a disruption to their economic development model. At the same time, these traditionally energy-independent regions relying on intra-regional resources face a new reality of energy dependence on external sources. Whether through district heating infrastructure or directly using coal for heating purposes, if the abrupt disruption of energy supply is not addressed, regions may find it difficult to cover their energy needs risking an increase of a raging energy poverty.

As such, understanding that the green transition, if not planned carefully, may also have negative societal impacts is crucial towards achieving a "just transition", where the needs of all citizens are respected and their well-being and an opportunity for a positive future are ensured, as summarised in the "leave no one behind" motto (Sarkki et al., 2022). For this reason, the European Commission has mobilised significant funds through the Just Transition Mechanism (JTM) and its core pillar, the Just Transition Fund, to assist regions negatively affected by the transition to diversify their economies and address key socioeconomic and environmental impacts, while at the same time ensuring the realisation of the European Green Deal. Within this scheme, regions can

receive technical and advisory support, as well as submit their territorial just transition plans (TJTPs) and receive financial assistance and raise private investments.

With regions being at different stages of their transition, including the submission and realisation of their respective TJTPs, while the needs of each society being inherently different based on each local context and the (lack of) progress achieved so far, there is a need to shed light on the current status of the coal-dependent regions, including the stakeholder needs emerging as urgent, as well analyse existing energy and climate regional, including energy poverty, plans from the perspective of the just transition. The purpose of this deliverable is therefore to:

- provide a brief introduction to the six regions of interest for the JUSTEM project (Silesia/Poland, Western Macedonia/Greece, Asturias/Spain, Hunedoara (Jiu Valley)/Romania, Stara Zagora/Bulgaria, and Istria/Croatia);
- perform a systematic literature review to identify and prioritise widely recognised and nuanced stakeholder needs in each region/country;
- analyse national and regional policy documents to shed light on the alignment of the broader energy and climate policy context with the notion of the just transition as also expressed via the 10 principles of WWF's "Toolkit for assessing effective TJTPs";
- gather regional and national statistical data and perform an indicator-based analysis to shed light on the current status of energy poverty in the regions.

2. BACKGROUND INFORMATION ON THE COAL REGIONS

The six regions included in our analysis (Figure 1) constitute areas of significant interest for Europe due to their coal activities largely influencing economic development, and historically providing domestic resources for the whole bloc. With the transition of the coal phase-out unfolding, these regions entail different socio-economic contexts and development (Table 1). In this section, we provide a brief introduction to the specific attributes of each region before proceeding with the core analysis in the following sections.

Figure 1: The JUSTEM coal regions

Table 1: The socio-economic context of each region

	Stara Zagora (Bulgaria)	Istria (Croatia)	W. Macedonia (Greece)	Silesia (Poland)	Hunedoara (Romania)	Asturias (Spain)
Area of the region (km^2)	5,129	2,813	5,482	12,333	1,033	10,603.57
Population (persons)	291,852 (2022)	195,237 (2021)	182,363 (2021)	4,400,000 (2022)	380,105 (2020)	1,005,397 (2022)
GDP (million €)	3,187 (2021)	2,666 (2020)	3,096 (2019)	66,700 (2021)	3,353 (2019)	23,441 (2022)

Age distribution (in working age)	57% (2022)	62.51% (2021)	63.82% (2011)	58.9% (2021)	68.8% (2020)	63.93% (2022)
Unemployment in the region	3.2% (2021)	4.05% (2022)	26% (2020)	4.3% (2021)	3.51% (2022)	13.6% (2023)
Direct employees in the coal sectors (persons)	4,442 (2022)	0	4,556 (2017)	74,500 (2019)	26,432 (2019)	829 (2022)
- of which with higher education (persons)	N/A	0	519 (2017)	14,900 (2019)	370 (2022)	140
Indirect employees in the coal sector (persons)	18,946 (2022)	850 (2021)	1,727 (2017)	56,700 (2019)	N/A	15,672 (2022)

Sources: (NSI, 2023a); (NSI, 2023b); (NSI, 2022); (DZS, 2022a); (DZS, 2022c); (PGZ, 2023); (EIHP, 2022); (Deloitte, 2022); (ELSTAT, 2011); (ELSTAT, 2023); (Government Committee SDAM, 2020); (GUS, 2022); (GUS, 2022a); (GUS, 2022c); (GUS, 2021a); (IBS, 2020); (AJOFM Hunedoara, 2023); (INCE, 2022); (MIPE, 2022); (INE P, 2022); (INE G, 2022); (ITJ, 2022)

Stara Zagora, Bulgaria

The Stara Zagora district is located in the central part of Southern Bulgaria, within the Yugoiztochen region. The district is an administrative and territorial unit, covering 11 municipalities, two of which, Radnevo and Galabovo, host the Maritsa East coal complex. Similar to all other districts in Bulgaria, Stara Zagora has established a District Development Council, which however has limited power; most of the decision-making power lies at the municipal level. Lately the region experiences a decrease in its population and the share of the population of working age, but its GDP is still increasing. For more than 60 years, large-scale industrial coal mining and power generation have been important economic pillars of the district (28% of GDP of Stara Zagora District; Radulov and Nikolaev, 2019), with Maritsa East being among the biggest coal complexes in Southeast Europe (240 km^2). In 2022, the extracted and supplied lignite amounted to 34.3 million tons (Maritsa East Mines, 2023), assisting towards the coal-based generation of more than 13,228 GWh electricity from local power plants (Maritsa East 2 TPP, 2023; AES, 2023). The Recovery and Resilience Plan specifies that the coal sector in Bulgaria would be phased out no later than 2038 (CoM, 2022), both in an effort to decarbonise the power sector, but also in the light of environmental concerns over poor ambient air quality and soil and water pollution (Radulov and Nikolaev, 2019).

Istria, Croatia

The Istria County is identified in the TJTP as one of the two main regions affected by the transition from coal, with the other being Sisak-Moslavina County (Deloitte, 2022). The main regional authority in Istria is the Istria County, which governs 10 cities and 31 municipalities (ISTRIA, 2021). The decision-making structure at the regional level is indirect, which means that all municipalities have a certain level of autonomy and operate both independently and in cooperation with the regional authority, though issuing regional strategic documents which may apply to some or all municipalities. Municipalities and cities have their own development programmes, usually for a period of 5 years. The county shows a population decrease (DZS, 2022b) as a result of emigration to other countries. The GPD per capita of the Istria County was slightly higher than the national one, however facing a significant drop in 2020 compared to 2019. Most of Croatia's previously operational mines were closed in the 1980s, mostly due to unprofitability, while the last coal mine in Tupljak closed in 1999 marking the end of coal extraction in the Istrian region and in Croatia (Labin, 2023). The only remaining active coal-fired thermal power plant is TPP Plomin, located near the city of Labin, with only the Plomin 2 unit (built in 2000) currently operating and generating 1,214.1 GWh in 2020 (EIHP, 2022). The importance of the coal sector in Croatia is very small and diminishing, but certain areas are still extremely affected. TPP Plomin accounts for 9-12% of the annual national electricity demand. In 2020, the coal and coke sector had a 4.7% share in the total national primary energy supply (7.5% in 2015) and a 16.8% share in the final energy consumption in the national industry (20.6% in 2015) (EIHP, 2022). At the same time, key business entities (e.g., suppliers) located in this area employ large shares of the workforce. Initially it was planned to keep Plomin 2 in operation until the expiry of the existing permits, i.e., 2040, after which alternative fuels such as natural gas and hydrogen are considered. Currently decommissioning is envisaged for 2033.

Western Macedonia, Greece

The region of Western Macedonia is among the most notable coal-dependent regions in Greece (along with Megalopolis) and is divided into 4 regional units (Kozani, Florina, Grevena, and Kastoria), with the first two having lignite resources. The main decision-making authority is the Regional Authority of Western Macedonia, which cooperates with local municipalities for spatial-specific issues or with governmental ministries for nationwide issues, such as the Just Transition Plan. Despite the financial crisis of 2008 the GDP of the region steadily increased contrary to the national trend, but since 2013 it started to decrease significantly, whereas Greece's GDP was almost stable in the period 2013-2019 (currently the energy and mining sector accounts for 51.5% and 39.9% of Kozani's and Florina's GDP respectively). At the same time, lignite electricity generation in Greece significantly decreased from 52% in 2012 to just 20% in 2019, indicating that the region's economic activity is strongly linked to activities associated

with electricity generation and lignite in general. Attesting to that is the fact that the number of people employed in the energy and mining sector in the region of Western Macedonia had dropped by around 20%. The population of Western Macedonia has also been constantly dropping. Coal mining in Greece began in the 1950s, and by 1990, 20 lignite-fired power plants had already been constructed, contributing to 72% of total electricity generation, before falling to 50% in 2008 and 20% in 2019 (Nikas et al., 2020). Regarding lignite mining, according to the Greek TJTP (Government Committee SDAM, 2020), production peaked around 2012, before decreasing to 25.6 million tonnes in 2019. According to the Greek government's master plan for delignitisation and based on the provisions of the 2019 National Energy and Climate Plan (NECP) (Hellenic Republic, 2019), the original target for completing the phase-out of lignite in Greece was 2028. Nevertheless, this plan has been disrupted by the energy crisis and delays in the shutdown of the power plants are expected (and increases in lignite production; Liangou, 2022), also pending the latest revision of the NECP in 2023. As with Bulgaria, the Greek lignite-fired power plants entail high levels of pollution (SO_2, PM, and NO_x emissions) due to the low quality of lignite, the operating hours and the age of the infrastructure. In addition, lignite mining has caused several landslides in nearby villages due to increased mining depths.

Silesian Voivodeship, Poland

The Silesian Voivodeship has been the most coal-dependent region in the European Union and a driver of Poland's strong presence in the European coal market. The Voivodeship consists of 17 counties and 167 communes, of which, 49 are urban and 96 are rural municipalities (GUS, 2021b), while 7 sub-regions (Bytom, Gliwice, Katowice, Sosnowiecki, Tychy, Bielski, Rybnicki) are covered part of the transformation process. The decision-making structure in the region is divided into levels: provincial, district and municipal (UMWS, 2022). The Voivodeship is facing a decreasing an aging population, with coal activity however leading to an increasing GDP with a high contribution to the national GDP (around 12%; GUS, 2022a) and a low unemployment rate (despite employment in coal mining declining for years). At the same time workers—especially older—are optimistic that their qualifications will enable them to find another job (IBS, 2021). The history of coal mining in the Silesian Voivodeship dates back to the 18th century. In 2019, mining generated about 7% of the value added in the Silesian Voivodeship (GIPH, 2021), being one of the most important sectors for the creation of the region's GDP. In 2021, hard coal extraction amounted to about 30 million tonnes per year, while the shutdown of some of the mines by 2030 is expected to reduce this amount to 23 million tonnes per year. In addition, the elimination or significant reduction of coal-fired electricity generation by 2030 is expected to decrease from 14 TWh (2021) to 5 TWh (WWF, 2021). As part of the "Territorial Plan for the Just Transition of the Silesian Voivodeship 2030" a timetable for the progressive closure of coal mines by 2050 is envisaged along with a shift to a low-emission economy with a high share of

renewable energy sources and a reduction of energy and resource consumption, supporting the labour market, while at the same time enhancing the role of tourism, and creating the potential for future entrepreneurs to thrive. The significant importance of the mining sector in the region has a negative impact on the environment due to the severe deformation and devastation of the areas caused by the need to expand mining activities and extract coal from greater depths, as well as the deterioration of air quality (WWF, 2021), high amounts of industrial—e.g., from mining—waste (UMWS, 2022a), with consequences for water and soil.

Hunedoara, Romania

The Hunedoara County, a heavily mountainous area, is located in the central-western part of Romania near the Southern Carpathians, and it is one of the 6 counties in Romania (along with Gorj, Dolj, Prahova, Galați and Mureș) to benefit from the Just Transition mechanism, with the Jiu Valley a coal-intensive micro-region being of great interest within the county, since the largest coal deposits in Romania are found in the Petroșani Basin. The administrative structure of Hunedoara County comprises of 7 municipalities, 7 cities, and 55 communes that are highly urbanised, while close to 30% of Hunedoara County's resident population lives in disadvantaged urban areas and close to 7% in marginalised urban areas. The country is facing a continuous trend of demographic decline directly related to the level of economic development, as a result of the county being from 1995 in the process of economic restructuring leading to a downturn in the county's economy (INCE, 2022), which now faces the lowest GDP growth rate in the Vest Region. This has a significant impact on the county's workforce which is one of the most important resources of the county increasing long-term unemployment, while the closure of the coal mines triggered a severe lack of job opportunities and viable alternatives in mining areas. The number of households and individuals receiving a guaranteed minimum income has grown, increasing the population's dependence on existing social services. The carboniferous region was first discovered in 1782, while exploitation started after 1840 (ADR Vest, 2021). The coal mines that are currently operating are found in Lupeni, Lonea, Vulcan, and Livezeni (the first two are on a closure plan and the other two will be closed by 2032). In 2019, coal production amounted to 21.8 million tonnes, which represents a 23.6% decrease in comparison to 2018. In 2017, the share of coal in the national energy mix was 27.5% (INCE, 2022). As with the rest of the coal-dependent regions, coal mining in the Jiu Valley has numerous and diverse negative effects on the society and the environment, including material damage, impacts of pollution on human health, occupational diseases, land degradation and soil pollution/contamination, with nearly 20% of the contaminated sites registered at the national level being located in Hunedoara County.

Asturias, Spain

Asturias is located in north-west Spain and is made up of 78 municipalities, 57 of which are severely or directly affected by the closure of coal mines and the phasing out of coal-fired power plants. The Government of the Principality of Asturias, also known as the Council of Government of the Principality of Asturias, is the executive branch of the General Junta of Asturias, one of the autonomous communities of Spain. It is responsible for the political action, regulation and administration of the government of the autonomous region. The rich coal reserves of Asturias were first mined on an industrial scale towards the end of the 18th century, but this activity reached its full development in the second half of the 19th century under a liberal system that made it possible to create the administrative and legal framework needed for the establishment of a national industry. The expansion of mining activity in the second half of the 20th century led to the construction of a significant number of coal-fired power plants in the region. As a result, the coal industry in Asturias employed 100,000 people in the 1950s. This made Asturias an attractive destination since the secure and stable supply of coal-based electricity in Asturias has supported the development of an important electricity-intensive industry, with the industrial sector becoming a major economic factor in the region, including sectors like steel, cement, ceramics, chemicals and pulp and paper, which are currently operating and contributing to the region's industry and GDP (Suárez, 2023). Based on this, the evolution of the GDP in Asturias during the last 20 years shows a gradual increase, slightly being affected by the financial and the COVID crises and quickly returning to pre-crises trends. However, currently the closure of coal mines in Asturias is almost complete, while coal-fired power generation capacity is being rapidly phased-out, with the complete phase-out of the remaining 1,283 MW being expected to be finalised by 2030 (FAEN, 2017; FAEN, 2021), but with a possibility of extension. With coal coal-fired power plants being important not only in terms of electricity supply, but also in terms of the services provided to the grid that are vital for the strong industrial sector of the region, e.g., security and quality of supply, the phasing out of coal and coal-fired electricity generation will have significant implications both on the remaining 850 workers directly employed in the coal-sector in 2022 but also along the whole value chain of the industrial, supply and service sectors, notably, also affecting the Port of Gijon, which is among the largest ports in Spain. With the region being expected to face one of the largest population decreases in relative terms by 2029 in Spain, higher unemployment than the national average—especially considering that Spain has the worst unemployment rate in the EU—the energy transition must not only guarantee the preservation of the Asturias' natural heritage, but also contribute to the reduction of the negative impacts of coal-related activities, electricity generation and related industries, and turn these areas into pleasant living places, providing opportunities for the development of new activities.

3. A LITERATURE REVIEW ON REGIONAL STAKEHOLDER NEEDS

The literature review protocol

Considering the importance of needs-based assessments to advance equity and justice in climate action (Klinsky et al., 2023), in this section we carried out a systematic literature review in each of the six regions presented in Section 2 to identify recognised as well as nuanced stakeholder needs which, if remain unaddressed, could pose significant threats impeding coal phase-out or delegitimising the transition as a whole in the eyes of the society that is affected by it. A key aim of this literature review is first to create a catalogue of stakeholder needs identified within said regions, second to prioritise the needs based on their intensity of appearance in the peer-reviewed literature, and finally to understand how different needs resonate within these national contexts, shedding light on areas that each country needs to focus on.

We employed the search engine "Google Scholar" to conduct the literature review, through 6 dedicated search queries for each region, each containing the keywords for the phase-out of coal, as well as decarbonisation, while no time constraint was imposed in the literature protocol:

- "coal phase out" +"decarbonisation"OR"decarbonization" + "Western Macedonia"
- "coal phase out" +"decarbonisation"OR"decarbonization" + "Stara Zagora"
- "coal phase out" +"decarbonisation"OR"decarbonization" + "Istria"
- "coal phase out" +"decarbonisation"OR"decarbonization" + "Jiu Valley"
- "coal phase out" +"decarbonisation"OR"decarbonization" + "Asturias"
- "coal phase out" +"decarbonisation"OR"decarbonization" + "Silesia"

These six searches led to a total of 276 results, including research papers, scientific reports, master theses, doctoral dissertations and policy briefs. We further screened and filtered them in two steps (first based on the abstracts and titles and second by accessing the full text), following the PRISMA guidelines and the respective flowchart presented in Figure 2, with dedicated inclusion and exclusion criteria referring to the subject of the just transition and the relevance to specific mentions of stakeholder needs. After following these steps, 39 papers were included in the literature review.

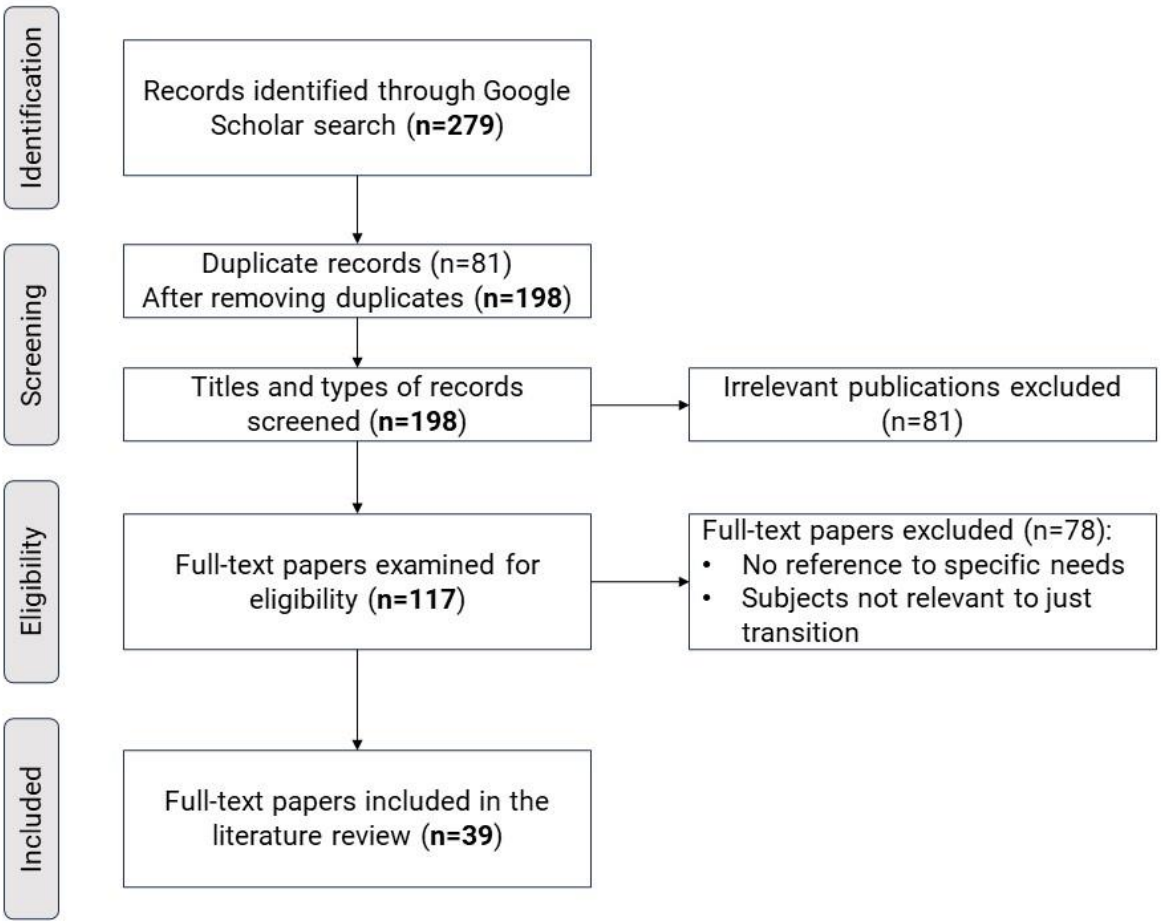


Figure 2: PRISMA flowchart representing the literature review protocol adopted.

Notably, although there was no limit on the timeframe of the results provided by "Google Scholar" nor on the screening and eligibility processes, the papers that were finally included were all published after 2019 (Figure 3), demonstrating that the notion of the just transition and in particular the identification of stakeholder needs has recently started to draw the attention of the scientific community. Additionally, we observed a gradual increase, with publications steadily increasing up to 2022, and showing signs that the trend may continue in 2023, since papers published were more than half of the previous year's respective value, while the identification of relevant literature ended on the 20th of June 2023, just in the middle of the year 2023.

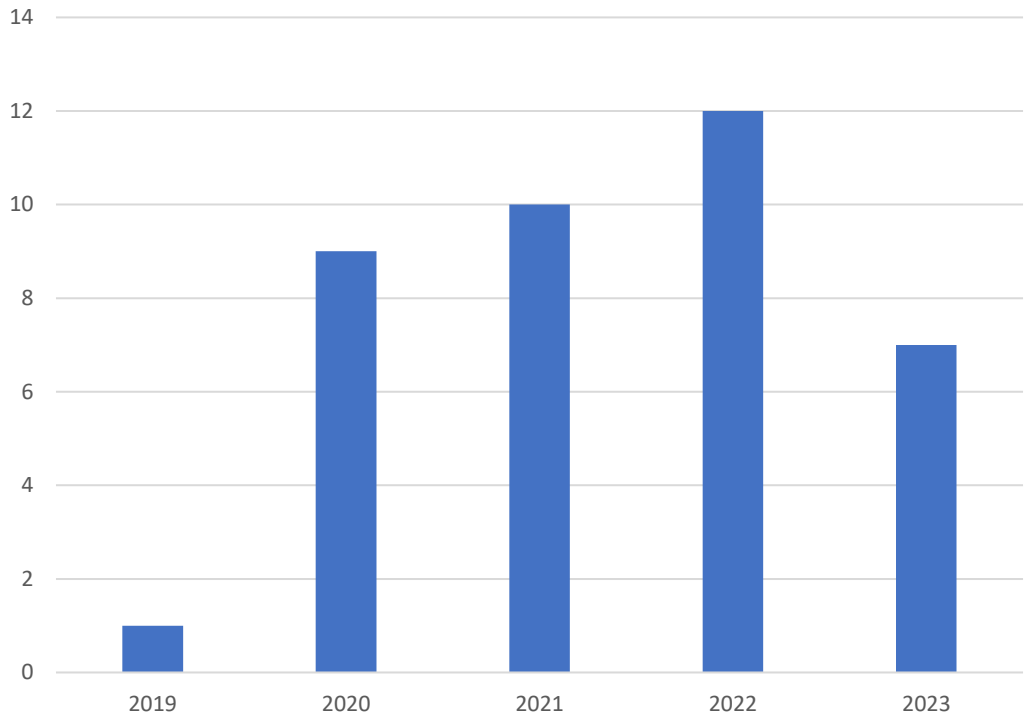


Figure 3: Breakdown of the year of publication for the 39 studies included in the literature review

A stakeholder needs catalogue

Examining the 39 papers included in the literature and extracting mentions of needs relevant to the just transition, we created a catalogue consisting of 25 needs based on all regions (Table 2). We then prioritised these needs based on their number of appearances in the 39 papers (Figure 4), considering that the majority of papers examine multiple needs. In the next paragraphs, we discuss these needs, with closely related needs being grouped, drawing from indicative examples within said papers, that are representative of each issue from a broader regional perspective (i.e., although discussed from the point of view of a specific country, based on the origin of the drawing study, they can be relevant for most regions).

Table 2: Stakeholder needs related to the just transition catalogue

Stakeholder Needs	Brief elaboration
Jobs	Issues related to employment and the loss of jobs of people living in the regions examined
Reskilling	Need for initiatives to reskill coal mine and coal energy plant employees and redirect them to other options

Training	Toned to educate and train people entering the workforce, especially the younger generation on new types of jobs
Employment policies	Request for dedicated policies to boost employment
Investments	Request for public and private investments to assist the implementation of the just transition
R&D	Need to invest in R&D projects that provide more opportunities for the regions during the coal phase-out
Funding	Need for state funding of local projects
Participatory decision-making	Need for more participatory procedures and engagement of citizens in decision-making
Creation of energy communities	Need to establish more local energy communities
Increased social acceptance	Respectfully address the resistance and concerns of local communities on specific policies and technologies to increase acceptance
Political commitment	Need for governments to commit to policies, and avoid reversals and changes in direction
Governance framework	Define a specific governance framework with distinctive roles that enhanced collaboration among the different decision-making levels
Building trust	Need to build trust between citizens and local/regional authorities, as well as enhance the trust in the policies themselves
Energy independence	Need to ensure the energy independence of the region during a coal phase-out and its substitution from local sources
Elimination of energy poverty	Need to protect citizens from energy poverty during the transition
District heating	Issues related to the disruption of district heating networks as a result of coal phase-out

RES and energy storage	Promotion of RES and energy storage facilities
Infrastructure	Need for additional infrastructure to ensure the stability of the energy system and ensure the viability of the just transition
Digital infrastructure	Need for modernisation of infrastructure to include innovative digital technologies (e.g., broadband networks)
Transport infrastructure	Need for transport infrastructure (e.g., fast railway network) to connect coal regions
Rehabilitation of coal mines	Need to rehabilitate and reuse coal mines after phasing out coal
Agriculture	Need for investments in sustainable agricultural projects
Licensing simplification	A framework for addressing licensing procedures (e.g., for RES power plants) and reducing bureaucracy
Spatial planning	Need for spatial planning to avoid impacts on biodiversity and clearly define areas for RES.
Gender equality	Address the gender inequalities that are further deepened by the transition in coal regions

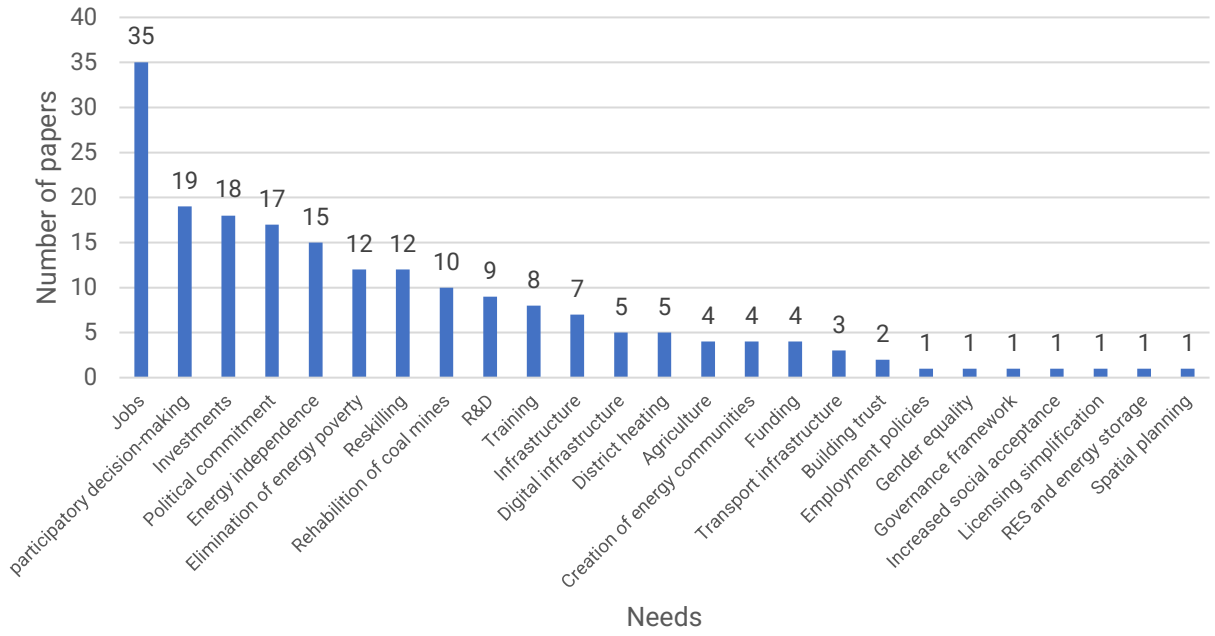


Figure 4: Prioritisation of stakeholder needs based on the number of appearances in the literature

Expectedly, the issue investigated by most—almost all—studies in the literature is that of employment in coal regions, which is a widely acknowledged threat faced by communities in transition, since power plants and mining sites provide both direct as well as indirect and induced employment (jobs supporting the main coal activities and the community around it, respectively), acting as an important aspect of their regional economic development with many companies and workers cooperating with the plants and mines. For example, Pavlov (2022) reported that in the region of Stara Zagora, 15,000 jobs are directly linked to the coal power plants and another 30,000 jobs are indirectly dependent on the power plants' operation. The situation is similar in the rest of the regions as well, although, in the literature we reviewed, a gap in terms of quantified employment impacts was observed. For example, the delignitisation process in the region of Western Macedonia is expected to lead to the loss of more than 10,000 jobs by 2029 (Papadopoulou et al., 2023), some of which are not expected to be restored (Ziouzos et al., 2021). The latter aspect is important as two additional needs closely related to the job losses are reskilling and training, identified in 12 and 8 papers respectively. Although these two issues seem similar, they are examined separately in this literature review since many studies explicitly focused on re-training (reskilling) the people working in lignite/coal sites, whereas the education and training of the general population, not necessarily already employed in the coal sector, was mentioned as a different measure to mitigate employment losses. For example, Primova (2020), who was studying the coal regions of Bulgaria, highlights the importance of reskilling programmes, especially those focusing on green economy jobs, stressing that schools should prepare students for emerging jobs due to the development of high-added value industries in Bulgaria. In the same context, Sokołowski et al. (2022), studying the city of

Wałbrzych in Silesia, mentioned that reskilling programmes are crucial for young miners who will have to find new jobs, commenting that the population of Silesia had employment alternatives other than coal mining due to the region's higher level of education, which stresses the importance of education and training the younger generation to tackle employment loss due to coal phase-out. Lastly, the need for relevant employment policies was also stressed (Pavloudakis et al., 2023).

Although the notion of the just transition has been largely defined by the dominant request for job creation to substitute for employment lost because of the transition, we identified additional needs that are also urgently expressed. Notably, participatory decision-making is the second most studied stakeholder need with almost half the papers included in this literature review mentioning it. For example, Nikas et al. (2020), stress that decision-making should include all people groups affected by the delignitisation process in Greece. Similarly, Sorman et al. (2020), who ran interviews with multiple stakeholder groups, mention that citizens must have all the information needed available to them in order to efficiently participate in decision-making, stating that 51% of women participating in their survey, felt that they are excluded from decision-making regarding the just transition. Voicu-Dorobanțu et al. (2021) stress that achieving Green Deal targets at a subnational level can be significantly boosted if citizens are provided with evidence-based policies and if communities participate in the formulation of solutions. This is in line with preliminary findings from the region-to-region workshop organised by JUSTEM (see the workshop's summary; JUSTEM, 2023), where the majority of participants indicated that citizens are not sufficiently involved in the process. A mechanism that could potentially be of help towards addressing this need, which can be viewed as a separate, yet linked need, is the support for the creation of energy communities. Ziouzios et al. (2021) have recorded that the creation of energy communities is a fundamental aspect of the just transition, while Primova (2020) suggests that the Bulgarian government should adopt measures to allow every citizen to be part of an energy community towards a just transition.

Closely following is the need for both public and private investments, including EU funds, to achieve a just transition. Dragan and Zdyrko (2023) stress the difficulty of maintaining good progress on sustainable development if investments are lacking, with Buzogany and Davidescu (2022) elaborating on similar issues faced in Romania, mentioning that RES growth is not matched by equivalent investments in interconnections and smart grids. Nikas et al. (2020) stress that EU Just Transition Fund resources should be available for Greece, while Doussis (2021) mentions that the amount of funds available for the lignite areas in Greece is not clear, hinting at a request for transparency in the allocation of investments. Related to this is the need to support research and development (R&D) activities (9 papers). Ziouzos et al. (2021) stress that some of the activities required for the just transition of lignite areas in Greece (such as hydrogen production) are knowledge-intensive. Tranoulidis et al. (2022) further comment on this issue stating that the region of Western Macedonia underperforms in

this sector, in comparison with other Greek regions, and that only 11% of the relevant investments are from private companies. Calvo-Gallardo et al. (2022), examining the priorities for Spanish coal regions transitioning to a green economy, mention that R&D in the steel industry and shipbuilding sectors can be beneficial.

Political commitment is also an issue arising, in particular in reference to the importance of steady policies and commitment towards a just transition and how this is going to unfold. Primova (2020) stresses the importance of a better coordination of energy, industrial and agricultural policies towards a deep decarbonisation by 2050. Buzogany and Davidescu (2022) highlight the lack of ambition in Romanian policies regarding the energy transition as a result of past political evolutions within the country as well as the inability to form long-term planning. Notably, Sanz-Hernández (2020), studying the region of Asturias, links the lack of stable policies in Spain with the failure to tackle the emigration of people from coal regions to other regions of Spain.

Two other somewhat intertwined issues that are highly considered crucial stakeholder needs are those of energy independence (15 studies) and the elimination of energy poverty (12 studies), highlighting the importance of local coal resources to the energy sector of the regions studied. In particular, Malec (2022) highlights the difficulty of achieving a just transition if there is a lack of alternative energy sources. Pavlov (2022) indicates that most interviewees in a survey performed considered energy security as the most important issue for the country's power sector. This is expected since energy transitions are largely fuelled by a need to increase energy security, which is the with Poland's energy transition starting in the 90s (Sokołowski and Bouzarovski 2022). Energy independence and the sufficiency of energy resources are consequently linked with reported concerns that the closure of coal power plants may also lead to increased energy poverty, if investments in alternative energy sources are not sufficient (Voicu-Dorobanțu et al., 2021), with stakeholders from most countries sharing such concerns (e.g., Krzywda et al. 2021 for Poland and Kleanthis et al. 2023 for the regions of Western Macedonia). Janikowska and Kulczycka (2021) note an additional concern related to energy poverty, that of gender equality (a single study raising the issue), stating that single women living alone are more prone to energy poverty. A closely relevant aspect, but more context-specific, refers to issues related to the potential shutdown of district heating. Specifically, Papadopoulou et al. (2023) mention that in the region of Western Macedonia, 42,000 households are connected to the district heating plant powered by lignite power plants, indicating that just transition would affect these households. Similarly, Attia et al. (2022) mention that 40% of Polish households are connected to the district heating grid, which is mainly powered by coal.

From an environmental perspective, the rehabilitation of coal mines after the phasing out of fossil fuels has arisen as another important issue (10 papers). In this context, the government of Spain has already made a deal with miners and union workers on the rehabilitation of coal mines toward achieving its just transition (Sorman et al., 2020),

allocating specific funds to this endeavour (Saget et al., 2021). Restoring lignite mines is also recorded as one important issue for Greek stakeholders (Ziouzos et al., 2021). Delving into aspects related to land use, Doussis (2021) and Marinakis et al. (2020) state that improving agricultural production, with the latter focusing on smart agriculture, is an important component of a just transition, while Ziouzos et al. (2021) report aspects related to spatial planning and the simplification of the licensing process, both aiming towards a more sustainable and faster penetration of RES power plants, without hampering the use of land.

Aspects related to infrastructure appear in different forms, namely, general infrastructure (7 papers), digital infrastructure (5 papers) and transport infrastructure (3 papers). In the first general category, Buzogany and Davidescu (2022) state that the permanent lack of infrastructure in Romania is a significant barrier to the just transition. Brauers and Oei (2020), specifically discuss the poor grid and power generation infrastructure in Poland, while on top of this, Rabiej-Sienicka et al. (2022) explicitly stress the importance of digitalization for the Polish infrastructure. Moreover, Primova (2020) highlights the need for road and rail infrastructure to increase the connectivity of coal regions. Doussis (2021) also makes the case for considering RES and energy storage infrastructure as a necessary priority for a just transition.

Finally, additional aspects we identified in the literature focused on the building of trust, increased social acceptance, and the need for a governance framework. Although these issues could have been included in groups such as political commitment, participatory decision-making, and investments respectively, they transcend the borders of a single need and are usually interlinked with multiple categories. Specifically, building trust can be important for achieving a just transition (Ziouzos, 2021; Pavloudakis et al., 2023) in the efforts towards participatory decision-making as well as increased political commitment. In the same context, Ziouzos et al. (2021) also include increased social acceptance, which can have a broader premise depending on the solution/need discussed. The formulation of a governance framework that is trusted by all stakeholders, can contribute to a fair distribution of funds/investments (Pavloudakis et al., 2023) and is linked both with political commitment and participatory decision-making.

Country-level priorities

After the identification of stakeholder needs and the formulation of the extensive catalogue, we perform a country-specific analysis of stakeholder needs, aiming to highlight different priorities in the countries examined based on the difference in the intensity of appearance of each need, this time in the nationally dedicated literature, i.e., the studies within the literature review that focus on each country. From the 39 studies included in the review, the majority referred to Poland and Greece, followed by Spain, and then Romania and Bulgaria with a lower number of papers explicitly referring to

stakeholder needs within the regions (Figure 5). It is noteworthy that no papers were identified examining the needs of the region of Istria (or Croatia in general; we expanded the relevant search query but still failed to produce relevant results), which is a finding on its own, providing evidence that the needs of relevant stakeholders are underrepresented in academic studies. Additionally, some of the studies related to Greece also represented the case of Megalopolis on top of Western Macedonia. The skewed breakdown towards Poland and Greece is an indication of the importance of coal in the two regions and the difficulties posed by phasing out as part of decarbonisation efforts but can also indicate an academic bias towards studying countries with higher shares of coal and higher GDPs within the EU bloc.

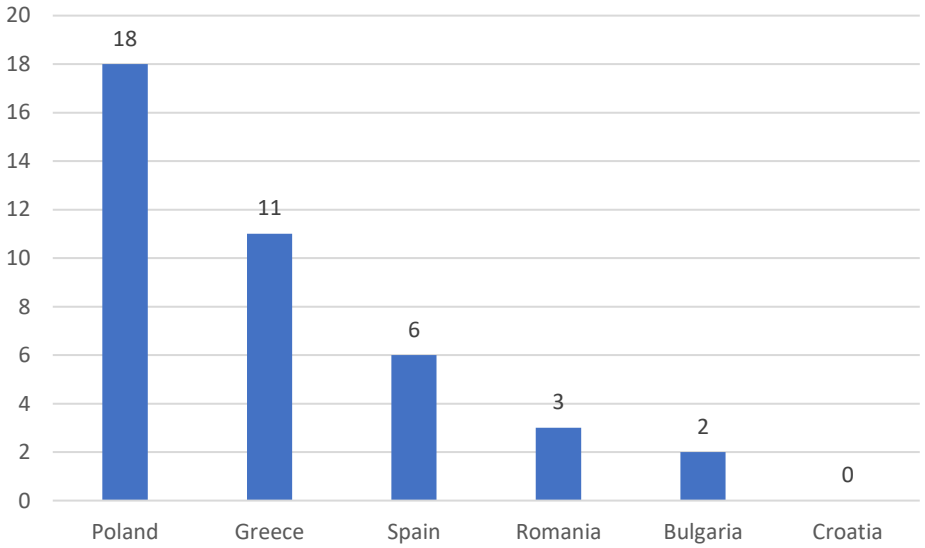


Figure 5: Country-level breakdown of reviewed studies

Although in some cases the number of studies included is small—and in the case of Croatia zero, hence the absence of a relevant sub-section—findings can still provide an indication of how different needs are present within each context based on the differences with the universal prioritisation (Figure 4), albeit detailed elaborations are restricted based on the total number of studies for each country.

Poland

With Poland gathering a large share of the coal phase-out literature, the national needs (Figure 6) are close to the universal needs identified in the universal prioritisation, hence employment appears as the main concern of the stakeholders. Regions in Silesia (e.g., Wałbrzych) demonstrate high shares of unemployment around 20%, compared to a national average of around 4% (Baran et al., 2020), a direct consequence of the jobs lost in the last three decades in the coal sector, reducing from 400,000 to 100,000 employees (Skoczkowski et al., 2020). A big concern in Polish coal regions relates to miners having higher wages than other professions, hence there is limited incentive for coal workers to willingly change professions (Baran et al., 2020). Other stakeholder

needs ranked quite high are participatory decision-making, energy independence and political commitment. In particular, the Polish political landscape consists of a centralised government and ministries with large jurisdictions, indicating a lack of stakeholder participation (Attia et al. 2022). Moreover, concerns over the political commitment have been raised as a result of the Polish government apart from not setting a clear target for phasing out coal, is also vetoing many EU climate change mitigation policies (Brauers & Oei, 2020). On the energy security front, Poland's residential sector consumes 90% of the EU's total coal consumed for residential uses, highlighting the importance of energy independence when coal will be phased out (Sokołowski and Bouzarovski, 2022), especially for households to cover their energy needs and avoid energy poverty.

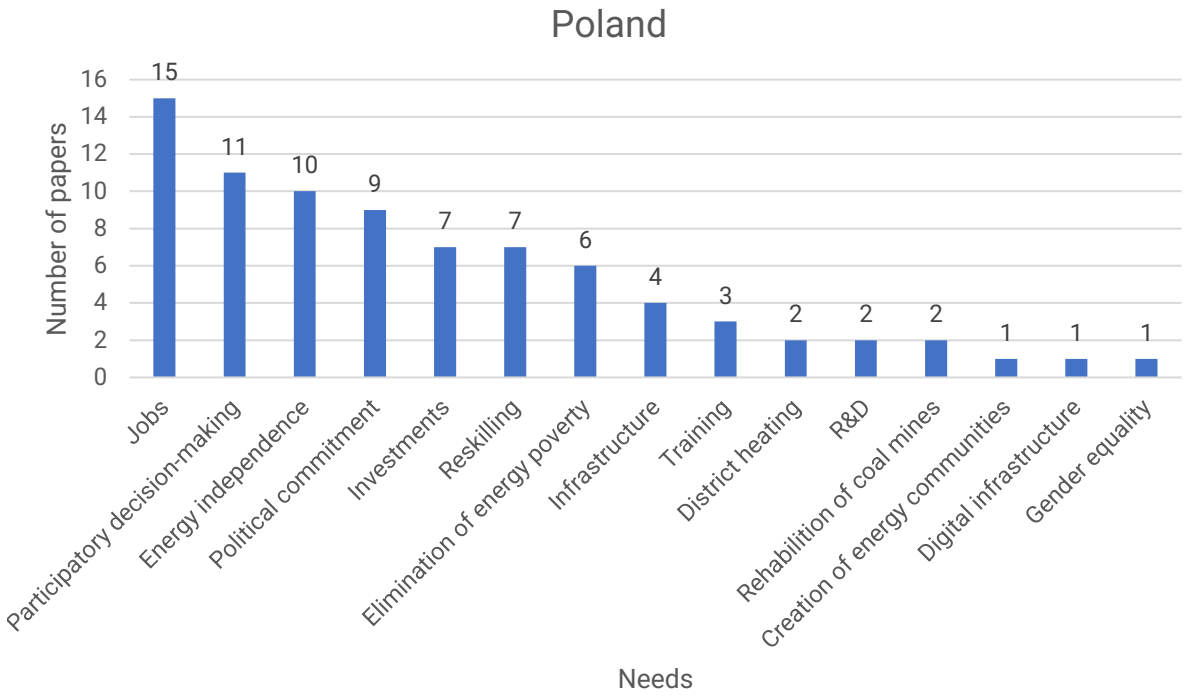


Figure 6: Stakeholder needs in Poland

Greece

As with Poland, employment is the main concern expressed in the Greek literature (Figure 7), being discussed in every national-oriented paper in this review, due to the large dependence of regional economies on lignite mines and power plants. This triggers concerns over the high unemployment rate of the region of Western Macedonia (Tranoulidis et al., 2022), especially in relation to the high share of lignite-related jobs, that direct employment in the sector comprising 6.5% of the total jobs in the Greek lignite regions. Compared however to the universal prioritisation, financial-related needs such as investments, funding, as well as R&D, appear as more urgent in the Greek context, indicating a request for efficient allocation of fiscal and research resources to battle the ongoing deterioration of the regional financial development. Notably, though,

most needs identified in the literature review appear at least once within the Greek context, indicating a large complexity of achieving a just transition in the country.

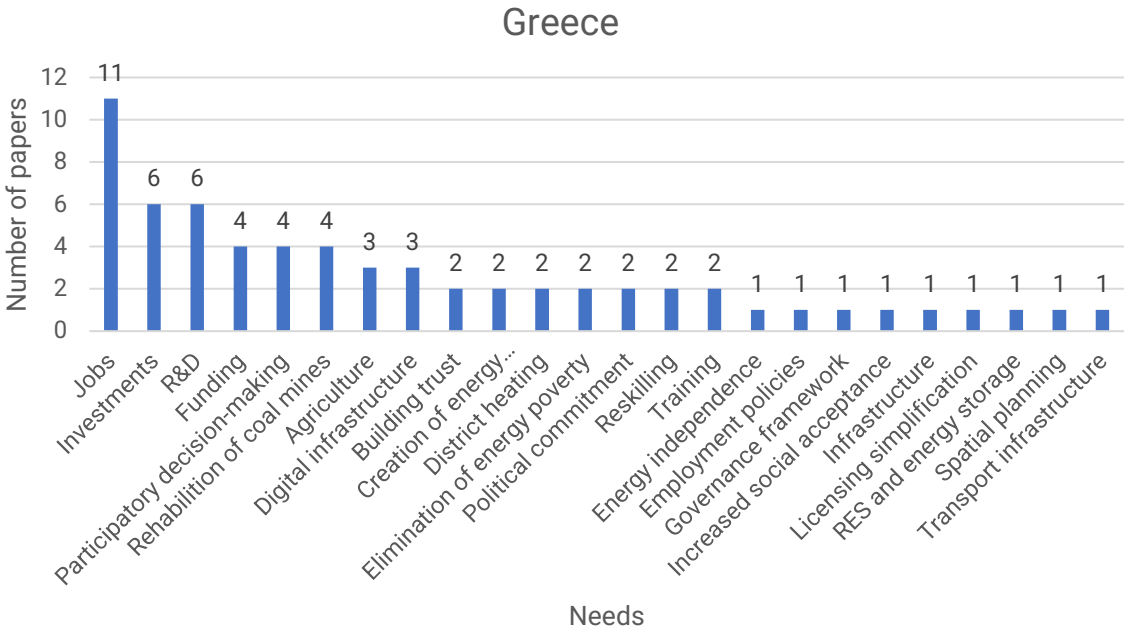


Figure 7: Stakeholder needs in Greece

Spain

Continuing the trend of the previous two countries, employment is also the main concern of stakeholders in Spain (Figure 8). Employment in mines and power plants has been a widely discussed issue in Spain for more than 10 years since demand for Spanish coal has been significantly reduced in favour of cheaper imported coal, which has led to the two biggest mining companies stopping paying their workers in 2010 (Rentier et al., 2019). At the same time, the population of coal-intensive regions has declined by 27.3% in the last three decades (Garha, 2022). The rehabilitation of coal mines is a key topic of discussion for the country's just transition, in the light of governmental initiatives towards this purpose. Lastly, issues such as energy independence, participatory decision-making and investments are analysed, albeit to a lesser extent in Spain, and in particular the Asturias region, indicating some progress as a result of aid schemes to stimulate the regional economy (Garha, 2022).

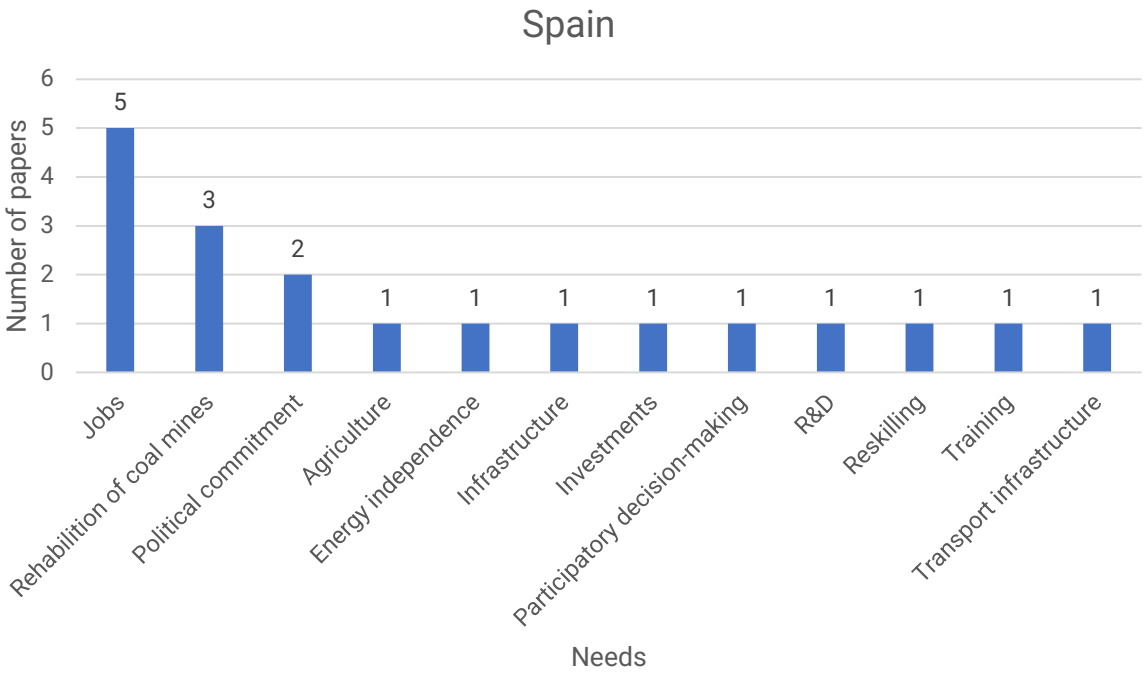


Figure 8: Stakeholder needs in Spain

Romania

Breaking the pattern from the previous cases, employment is a highly considered concern in Romania, albeit not the dominant, with investments and participatory decision-making, being the ones mostly discussed in the national literature (Figure 9). In particular, even the creation of employment opportunities to counteract the up to 6,000 and 15,000 jobs lost in the Vest and Sud-Vest regions respectively (Voicu-Dorobanțu et al., 2021) has been framed as an issue of raising investments (Nicola and Schmitz, 2022), with a lack of allocated resources to entrepreneurs and start-ups being observed (Voicu-Dorobanțu et al., 2021). At the same time, bureaucracy and policy reversals as a result of a lack of ambition and political commitment had slowed down processes related to attracting international investments despite the high interest (Buzogany & Davidescu, 2022). Energy dependence and energy poverty are also demonstrating an interest with Romania being significantly dependent on coal for the country's energy needs since the 1970s (Nicola & Schmitz, 2022), especially during winter months (Voicu-Dorobanțu et al., 2021).

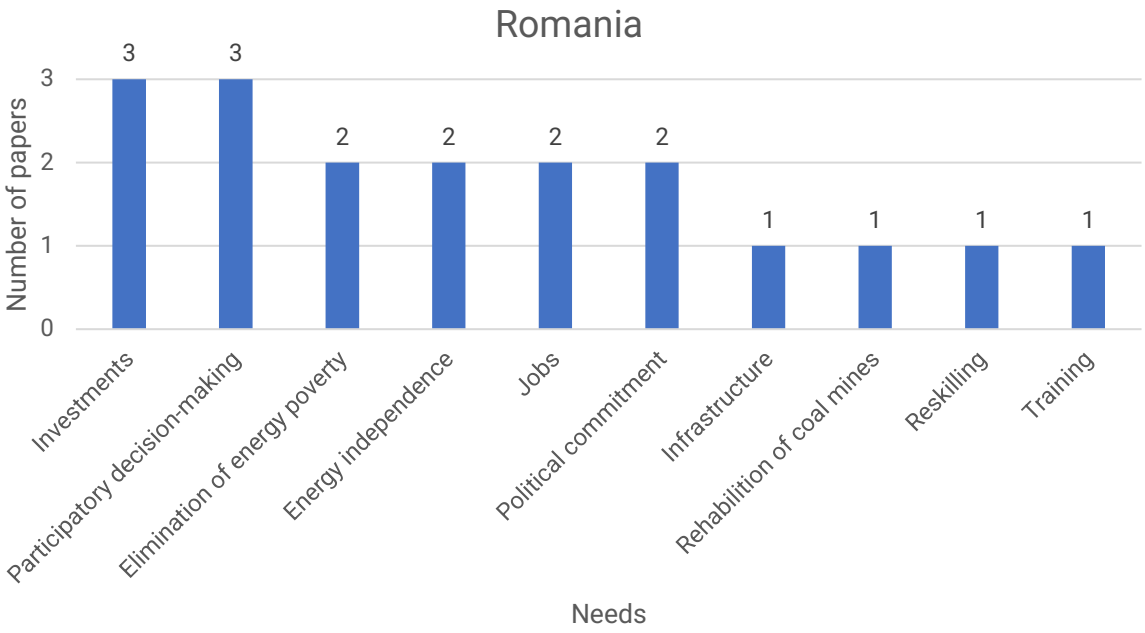


Figure 9: Stakeholder needs in Romania

Bulgaria

Although the low number of studies referring to the Bulgarian case in Stara Zagora is limited, reducing the outcomes that can be deduced by the analysis, employment is still one of the main issues identified with 15,000 direct and almost 29,000 indirect jobs at stake (Pavlov, 2022; Pimova, 2020), while other issues considered of similar importance are the elimination of energy poverty, which notably was not among the highest prioritised aspect in the other countries—albeit always present—and the lack of political commitment (Figure 10). In particular, with energy poverty raging in the country, there is a widespread belief among citizens that the state has a social obligation to ensure affordable electricity (Pavlov, 2022).

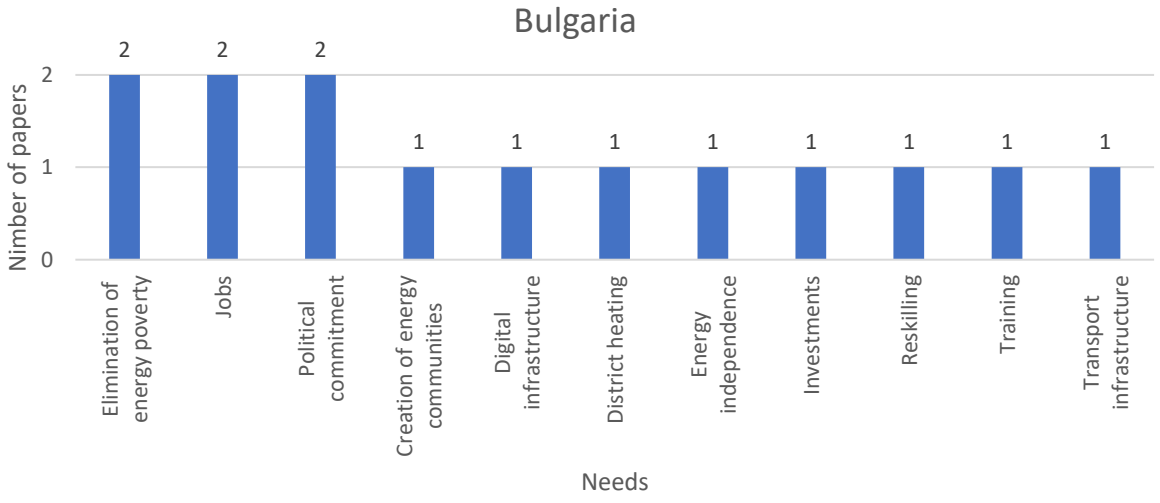


Figure 10: Stakeholder needs in Bulgaria

4. ANALYSIS OF THE CURRENT STATUS OF ENERGY TRANSITION POLICIES

After shedding light on contemporary stakeholder needs present in the coal regions, in this chapter we delve into the national and regional policies relevant to coal phase-out and the broader energy transition in the targeted regions. In particular, we aim to assess the alignment and consistency between the European and national/regional policies, as well as the alignment of the different policies in a country affecting each of the studied regions.

First, we performed a cross-country analysis of national and regional energy transition policy documents. For each region, we assessed the most relevant policy documents at the national level (e.g., National Energy and Climate Plans (NECP), Recovery and Resilience Plans (RRP)), regional level (e.g., Territorial Just Transition Plans (TJTP)), and local level (e.g., municipal energy plans, integrated development plans). In total, we evaluated 37 documents across all six regions/countries against a set of 11 criteria to determine the extent to which the policies related to a given region are consistent with each other and with the EU's Just Transition objectives and funding priorities.

Second, we performed a cross-country assessment of the Territorial Just Transition Plans, presenting an assessment of the TJTPs of the five regions (except for Stara Zagora, Bulgaria, whose TJTP has not yet been approved by the European Commission (EC). We used WWF's toolkit[3] for the evaluation of the TJTPs' consistency with the just transition based on 10 key principles (WWF-EPO, 2021). These principles offer guidance on how to develop an effective plan as well as how to evaluate the quality of the developed plans, providing numerous indicators for each principle that assist towards the scrutinisation of the plans. The principles can help ensure that plans enable the implementation of a truly fair transition to climate neutrality.

In the next two sub-sections, we provide the results of this detailed process from a comparative assessment, while all relevant material for each regional case, notably the evaluation of each policy document against each of the adopted 11 criteria, as well as the detailed evaluation of each TJTP based on WWF's toolkit can be found in Annex II and the Supplementary Material of this deliverable.

Cross-country analysis of regional just transition policies

In all countries, the RRPs and, to some extent, the TJTPs contain the most up-to-date data and measures, as they have been prepared most recently. The other plans were prepared at different times and are therefore usually not fully aligned with the RRPs and

[3] https://just-transitions-plan.wwf.eu/en/intro

TJTPs. Most of the spatial plans, however, follow the objectives of the RRPs as they have also been prepared recently.

In general, all the policy documents reviewed clearly identify the bodies in charge of the transition. In all six countries, the RRPs, TJTPs and regional/local energy transition plans identify the responsible institutions, including ministries, agencies, commissions, and regional/local administrations, as briefly elaborated in Section 2.

The active involvement of relevant stakeholders from the beginning of the policy development process is crucial for the effectiveness and efficiency of the policies. Different forms of stakeholder consultation were carried out in all countries, but the degree of involvement varied. In Croatia, Greece, Spain, Poland and Romania, the plans report that stakeholders were often involved in the discussion from the early stages. However, the impact of this consultation was not always clear; e.g., in Greece any changes triggered by comments originating from the public deliberation are not evident. In Bulgaria, stakeholders responded to questionnaires after the first draft of the plans, without face-to-face meetings for public discussion and without feedback on whether their proposals had been accepted. Contrary, in Spain and Poland the deliberation process followed a more structured approach, with the establishment of a coordination body (Spain), clear deadlines for the engagement period (Poland) and the formulation of tripartite social dialogues (both countries). Considering the importance of public participation as expressed in the high prioritisation of the relevant need in Section 3, authorities need to exchange deeper with citizens and adopt more transparent processes, so that the impact of consultation is evident. This will increase the legitimacy of the process and the plans themselves in the eyes of the public.

Setting the date and trajectory for phasing out coal is key to planning the transition. All countries have plans to reduce coal use. Full phase-out dates range from 2028 (Greece) to 2049 (Poland) (Figure 11). However, not all countries have interim targets, while in many cases the timeline is still prone to changes as a result of the energy crisis triggered by Russia's invasion in Ukraine, which has forced many countries to return to coal, and the upcoming update of the NECPs. In Greece there is a proposed schedule for the decommissioning of each lignite electricity generation plant. In Romania, there is a similar type of schedule, but instead of the concrete plants, the volume of decommissioned capacity (in MW) is specified instead. Finally, in Poland there is a 2030 interim target for the share of coal in electricity generation.

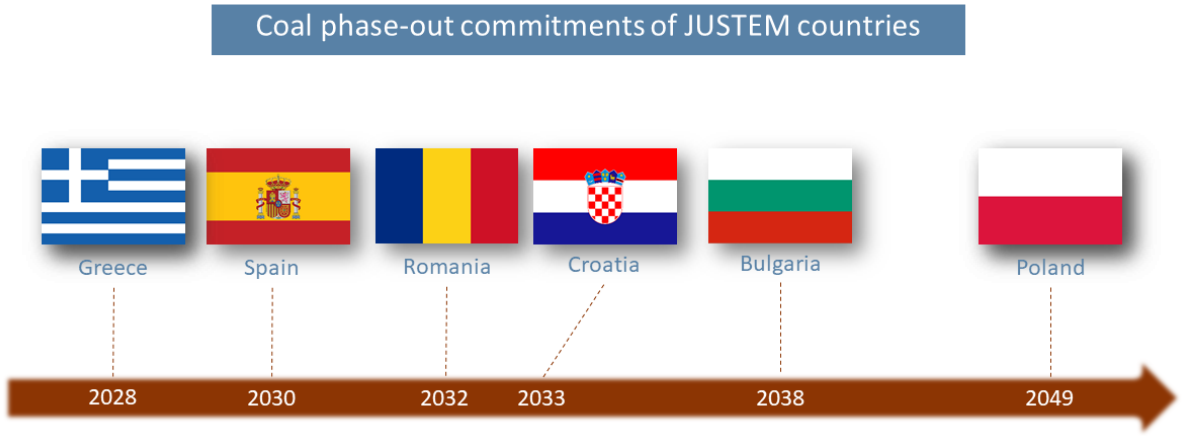


Figure 11: Coal phase-out commitments in the JUSTEM countries

We assessed the policies in terms of their consistency with the Just Transition objectives (European Council, 2023; European Commission, n.d.; European Council, 2023a), namely decentralising energy production, improving energy efficiency and reducing dependence on energy imports, reducing emissions and stimulating employment and growth. Such objectives are present in most plans, the most common being to increase energy efficiency in buildings and industry. Such interventions may assist towards battling energy poverty and increasing the energy independence of the region, through the reduction of energy demand, prevalent needs expressed in Section 3. Interestingly, decentralisation of electricity production is not mentioned as a priority in any country. This may exclude citizens of the coal-dependent regions from actively participating in the future energy system and may limit their inclusion only in the deliberation stage of plans, and not the implementation.

Most assessed plans include policies and timeline in line with the EU just transition objectives. Additionally, most regional and local plans are in line with the national energy transition objectives. Many do not have specific interim targets (annual timetables), but all include measures to achieve a successful energy transition. These involve reduction of emissions, increasing the use of renewable energy sources and energy efficiency, as well as addressing the issue of workers being laid off.

In their plans, all countries include provisions for the increase in electricity production from renewable energy sources (RES) and energy efficiency. Bulgaria and Greece set ambitious targets for energy production from hydrogen. Bulgaria and Poland are relying on the construction of large nuclear power plants. Bulgaria plans to build a large factory for production of batteries with a storage capacity of 6,000 MWh. In Romania, the Environmental Fund Administration (AFM) intends to support 87,500 households through the "Casa Verde Photovoltaic 2023 Program" to further boost residential PV deployment, in addition to the 55,000 systems approved in the two previous funding sessions (AFM, 2023). Some regional plans envisage economic diversification of coal fields, support for individual households to produce electricity for their own needs, and

support for energy cooperatives, which hints that regions and regional documents prioritise the need for decentralisation, which was less prominent in most (nationally developed) plans, as previously explained.

Various impacts are expected to occur in the affected regions by 2030. Policies primarily address the potential increase in unemployment and pressures experienced by vulnerable groups (including the energy poor). Provisions notably include the creation of new jobs, retraining of workers (including those from vulnerable social groups) to work in new industries, assistance to the energy poor (e.g., home energy renovation programmes), and creation of equal opportunities regardless of gender, sexual orientation, nationality, age, disability and other characteristics. In general, however, these measures are not very concrete and most of them are just good intentions. Efforts need to intensify on this front, as employment-related needs are the most important priority faced by all regions (see Section 3).

All countries envisage the creation of comprehensive national policies to address energy poverty and to better protect vulnerable citizens, but there are some notable differences in the measures employed, as a result of the different energy poverty context in each country/region, which will be elaborated in Section 5. The Greek NRRP aims to reduce energy poverty by 75% by 2030, while the Polish NRRP aims to reduce it to a maximum of 6% by 2040. The Spanish government adopted a National Strategy against Energy Poverty 2019-2024, which aims to reduce four energy poverty indicators by 25%-50% between 2017 and 2025, namely: excessive household expenditure on energy, hidden energy poverty, inadequate home temperature and late payment of bills. Romania plans to achieve a progressively increasing annual energy renovation rate of the total building stock (linked to the energy poverty targets) of 2% per year until 2026, 3% per year until 2030, 3,5% per year in 2031-2040 and 4% per year in 2041-2050, as well as the use of RES in subsidised residential buildings. Croatia is implementing an Energy Poverty Alleviation Programme supporting the energy renovation of buildings whose occupants are at risk of energy poverty, which however is not mentioned in the TJTP.

Another serious concern is the use of coal industry infrastructure after the closure of the sector. Most countries have specific plans for the reclamation of coal mine sites. In Bulgaria, the creation of a state-owned reclamation company is expected to employ more than 1,000 workers. In Croatia and Spain, the plans do not address reclamation issues in much detail, although in Spain recent government initiatives have emerged (Saget et al., 2021). Many policy documents envisage measures for the development of new industries in the post-mining areas, such as large photovoltaic parks and hydrogen production.

Most of the policies focus on projects eligible for funding under the Just Transition Mechanism. However, additional funding sources/mechanisms are considered for some investments, with notable mentions including the EU Structural Funds, European

Investment Bank, World Bank, Innovation Fund and the Modernisation Fund, European Bank for Reconstruction and Development, Recovery and Resilience Mechanism, European Regional Development Fund, Horizon Europe, Invest EU Programme, Connecting Europe Facility. These may serve as additional opportunities for regions that have not already considered the full spectrum of options currently available.

Cross-country assessment of the Territorial Just Transition Plans

After a thorough examination of the alignment of just transition policy documents in each region, we evaluate the TJTPs' based on the 10 WWF principles for TJTP assessment[4]. On average, we found that almost all regions had a median performance in terms of their plans' alignment with the just transition, apart from Spain experiencing a better picture (Figure 12). Still, in all cases specific principles and indicators show signs of low alignment with the just transition (details can be seen in Annex II with the detailed evaluation of the plans and the Supplementary Material of this deliverable). In the following paragraphs, we summarise these results in a comparative way at the principle level.

[4] https://just-transitions-plan.wwf.eu/en/intro

Assessment for Croatia (Istrian Region)

Status: Draft Plan
Date of plan: 10.04.2023

Overall Plan Rating

There are also some indicators rated as not consistent with the just transition. These are marked as red on the traffic light system and should be the foremost priorities to address and improve on. The indicators are organised under their corresponding principles in the Annex to this report.

Assessment for Greece (Western Macedonia)

Status: Final Plan
Date of plan: 11.12.2020

Overall Plan Rating

There are also some indicators rated as not consistent with the just transition. These are marked as red on the traffic light system and should be the foremost priorities to address and improve on. The indicators are organised under their corresponding principles in the Annex to this report.

Assessment for Poland (Silesian Voivodeship)

Status: Final Plan
Date of plan: 21.12.2022

Overall Plan Rating

There are also some indicators rated as not consistent with the just transition. These are marked as red on the traffic light system and should be the foremost priorities to address and improve on. The indicators are organised under their corresponding principles in the Annex to this report.

Assessment for Romania (Hunedoara)

Status: Final Plan
Date of plan: 17.03.2023

Overall Plan Rating

There are also some indicators rated as not consistent with the just transition. These are marked as red on the traffic light system and should be the foremost priorities to address and improve on. The indicators are organised under their corresponding principles in the Annex to this report.

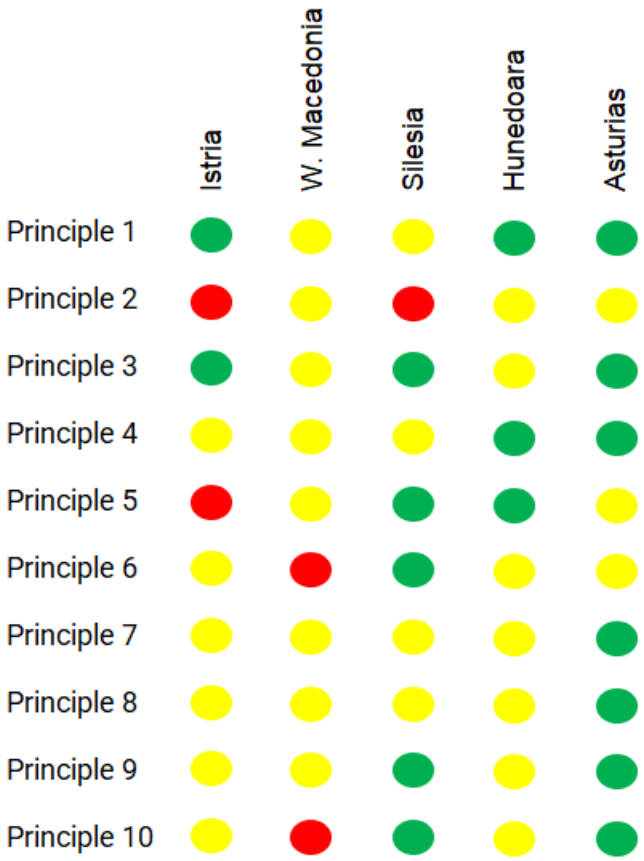
Assessment for Spain

Status: Final Plan
Date of plan: 22.12.2022

Overall Plan Rating

There are a few indicators rated as not consistent with the just transition. These are marked as red on the traffic light system and should be the priorities to address and improve on. The indicators are organised under their corresponding principles in the Annex to this report.

(a) Overall performance



(b) Performance per principle

Figure 12: Overview of the TJTPs' evaluation based on the WWF toolkit.

Principle 1: The TJTP should be sustainable and deliver on long-term, international and EU climate commitments such as the Paris Agreement and EU 2030 and 2050 climate objectives.

Most TJTPs commit to reducing emissions by 55-65% compared to 1990 levels by 2030. Opportunities to increase renewable energy at the regional or national level are identified, but no specific actions, projects or targets are proposed, other than the national targets through NECPs. Opportunities to increase energy efficiency or energy savings in the region are identified and specific actions, projects or targets are proposed. No country was marked as of poor alignment on this principle, but Greece should make sure to enhance the 2030 target on the updated NECP.

Principle 2: The TJTP should not lead to prolonged fossil fuel use or promote false solutions to the transition to climate neutrality. As a guide, coal should be phased out by 2030.

In most countries, except for Greece, the phase-out date for coal is after 2030 (Figure 12). There is no clear solution for the end of fossil fuel subsidies, with the exception of Romania, which indicates 2025. There are no plans to phase out fossil gas in any of the

countries. Croatia and Poland appear to be more prone to misalignment based on this principle.

Principle 3: The TJTP should lead to sustainable economic diversification at the local, regional and national level.

Sustainable economic diversification is encouraged and explicitly recognised in all countries. All indicate a link and the need to comply with the NECP. Croatia does not clearly link investments in sustainable economic diversification with the creation of decent jobs.

Principle 4: The TJTP should address social inequalities, improve interregional solidarity, decrease inequalities and tackle injustices.

Interestingly, the situation regarding this principle is the same in all JUSTEM regions. TJTPs prioritise employment support and job search assistance for: 1) workers who lose their jobs directly as a result of the transition; and 2) other groups of workers, including those who may be indirectly affected. The quality of the new jobs is not an issue that is raised in the plans and consequently, no measures are in place to address this. Social protection and inclusion measures are also not considered, even in cases where inequalities are recognised. Furthermore, the plans either do not consider the impact of the transition on the quality of life or only passively mention some issues, such as improvements in air quality. Finally, the TJTPs fail to recognise the importance of promoting gender equality.

Principle 5: The TJTP should not harm EU environmental and climate objectives and values.

All countries have emphasised environmental protection aspects and do not envisage activities that would have a negative impact on indicators related to biodiversity, air pollution, accessible green space (land take) and water quality. None of the countries include in their plan significantly harmful activities, as defined by the EU taxonomy, or activities that would lead to unsustainable use of natural resources or damage to ecosystems. Yet, when viewed in conjunction with the lack of provisions for fossil fuel gas investments (Principle 2), regions and countries should cautiously move forward, ensuring that the performance on this principle with not deteriorate as the transition unfolds.

Principle 6: The TJTP should respect the polluter pays principle.

Most of the countries identify—or commit to identifying—the entities responsible for existing environmental damage, but it is not clear how the "polluter pays" principle will be respected in investment decisions.

Principle 7: The TJTP should be supported by adequate, coordinated and long-term public and private funding sources.

Most countries rely exclusively on EU funding to implement a just transition (although not limited to the Just Transition Fund and Pillar III of the Just Transition Mechanism). In addition, private funding sources are reported alongside public sources to be used as leverage, relying mainly or exclusively on Pillar II of the Just Transition Mechanism. Croatia does not indicate private sources of funding. Countries and regions need to keep in mind this balance between EU and private funding and further support the latter axis which—except for Spain—appears to be the area of weakness for the plans.

Principle 8: The TJTP should be designed, monitored and evaluated through meaningful partnerships, which engage all stakeholders in an open, inclusive and ongoing process, especially at local level. Social dialogue and collective bargaining should be central pillars of the transition when it comes to the labour market and enterprises.

In most of the countries, except for Spain, the indicators show that there are unclear rules and procedures for stakeholder participation. There are no details of stakeholder engagement plans and no details of how stakeholder views and contributions have been used in consultation. This evaluation raises concerns over the reporting of most reports that claimed to have performed public consultation, yet under scrutiny through WWF's detailed principles, it appears that the processes followed need to improve (e.g., coordination, duration and inclusion).

Principle 9: The TJTP should take a place-based, local approach to strategy design and implementation.

All countries identify the NUTS 3 regions that will need targeted actions, but do not identify specific measures at the NUTS 3 level, focusing instead on general or national level measures. Poland provides a good practice as it takes into account the need for community involvement, indicates how existing and planned community initiatives can be integrated into the TJTP and makes clear provision for engaging and informing the local community.

Principle 10: The TJTP should be developed based on high quality, independent and objective analysis of the challenges and opportunities of the transition for regions.

The indicators and/or data included in the TJTPs are: 1) regionally focused and of high quality, consistent with the fund's objectives to address the socio-economic challenges arising from the transition to climate neutrality; and 2) comprehensive, including both quantitative and qualitative measures. The TJTPs provide for a review process by the Member State, but the process is vague, e.g., does not include a date or assessment of performance so far.

5. ANALYSIS OF THE CURRENT STATUS OF ENERGY POVERTY

Energy-related needs (i.e., energy independence), including energy poverty, emerged among the urgent priorities identified in the stakeholder needs review (Section 3), while the analysis of the transition policy documents (Section 4) highlighted energy poverty as an area incorporating many differences between the JUSTEM coal regions. In this section, we delve into the current status of energy poverty in the six regions, aiming to identify vulnerabilities and potential opportunities to battle energy poverty vis-a-vis the energy transition, since the inevitable energy transformation is perceived as a threat to increasing energy poverty in European coal regions.

Energy poverty is a growing societal challenge in the EU with proven detrimental effects on health, wellbeing, social inclusion, and quality of life of the population, expanding even beyond the domain of housing to larger economic and political problems. Energy poverty is defined at the EU level in the 2023 Social Climate Fund regulation and the revised Energy Efficiency Directive as 'a household's lack of access to essential energy services that provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing social policy and other relevant policies, caused by a combination of factors, including but not limited to non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes' (European Parliament, 2023). The six countries hosting the coal regions of interest to JUSTEM are among the most affected countries in the EU in terms of energy poverty, as indicated in the four basic metrics of energy poverty adopted by the energy poverty observatory (Figure 13). And although significant regulatory efforts are at place to battle energy poverty by inter alia improving energy efficiency in buildings and supporting energy prices (Table 3), energy poverty looms large over any attempt towards economic restructuring.

Towards assessing energy poverty propensity in JUSTEM coal regions, we perform an in-depth analysis of the energy poverty current status to shed light on the underrepresented situation in the regions themselves instead of just focusing on the national level. This presents a significant research challenge due to the lack of regional energy poverty data in most cases. To address this gap, we apply an assessment methodology based on a multidimensional set of indicators that accounts for the multi-faceted nature of energy poverty and is consistent with those recommended by the EU Energy Poverty Observatory (Energy Poverty Advisory Hub, 2022a; 2022b). In this sense, we apply an approach based on exploring the intersection of energy poverty and the multiple factors of regional vulnerability to energy poverty, which vary depending on the availability and relevance of data, is applied (Robinson et al., 2019; Gouveia et al., 2019), and draw from socioeconomic factors to energy indicators and the building stock itself. We collect a range of regional data from European sources (Eurostat, 2015; 2019; 2020; 2022; 2023a; 2023b; 2023c; 2023d; 2023e; ODYSSEE-MURE, 2021; European

Commission, 2023), as well as sources from national statistical offices (details about the national sources can be found in each national case in the Supplementary Material), and perform a comparison of the regions with the respective context on the national level to understand whether the regions face energy poverty harsher than the countries as a whole.

Arrears on utility bills (% of households)		
Country	2021	2022
Bulgaria	19.2	18.8
Croatia	15.2	14.5
Greece	26.3	34.1
Poland	5.2	4.5
Romania	7.3	17.8
Spain	9.5	9.2
EU average	6.4	6.9

(a)

Inability to keep home adequately warm (% of households)		
Country	2021	2022
Bulgaria	23.7	22.5
Croatia	5.7	7.0
Greece	17.5	18.7
Poland	3.2	4.9
Romania	10.1	15.2
Spain	14.2	17.1
EU average	6.9	9.3

(b)

High share of energy expenditure in income (2M) (% of households)	
Country	2015
Bulgaria	11.5
Croatia	12.0
Greece	16.3
Poland	16.3
Romania	16.9
Spain	14.2

(c)

Low absolute energy expenditure (M/2) (% of households)	
Country	2015
Bulgaria	9.4
Croatia	7.5
Greece	12.8
Poland	19.5
Romania	16.8
Spain	13.0

(d)

Figure 13: National status of energy poverty in coal regions across

Table 3: Policies with dedicated provisions to address energy poverty

Country	Definition	National Policies & Programs relevant to energy poverty	Regional Policies
Bulgaria	Official: Under preparation Unofficial: Based on "Vulnerable consumers" (age, health income conditions)	- Integrated Energy and Climate Plan of the Republic of Bulgaria - Long-term National Strategy to Support the Renovation of the National Building Stock of Residential and Non-residential Buildings until 2050 - Recovery and Resilience Plan of Bulgaria - National Strategy to Reduce Poverty and Promote Social Inclusion 2030 - Programme of Microfund and Habitat Bulgaria (microfinance for energy-efficient reconstruction of through interest-free loans for low-income families)	- Winter Supplement Programme "Targeted Heating Aid" - LIFE Programme "Bulgarian Municipalities Working Together to Improve Air Quality" - One-time social aid regulated by the Social Assistance Act
Croatia	Official: No single and accepted definition of energy poverty Unofficial: Based on "Vulnerable customers" (poverty conditions, social position and/or health condition)	- Integrated Energy and Climate Plan of Croatia (UET-5 Adoption and implementation of Programme for Energy Poverty Alleviation and UET-6 Programme to combat energy poverty that includes the use of RES in subsidized residential buildings areas.) - Recovery and Resilience Plan of Croatia (C6.1. Building energy renewal) - National Action Plan of Energy Efficiency (UET-6 as with the Integrated Energy and Climate Plan of Croatia and ENU-4 Energy refurbishment program for family houses)	N/A
Greece	Official:	- Action Plan to Mitigate Energy Poverty	N/A

	No definition Unofficial: Two metrics based on the level of energy consumption and total income of a household	- Long-Term Strategy for the Energy Refurbishment of Private and Public Buildings - Greek National Energy and Climate Plan - Greek Recovery and Resilience Plan - Back-to-back subsidy programmes on household refurbishments - Annual subsidies for the purchase of heating oil (and recently other sources after the energy crisis)	
Poland	Official (*unofficial translation*): Energy poverty refers to a situation where a household run by one or several persons jointly in a single- or multi-person apartment or in a single-family building, where no economic activity is carried out, is unable to secure sufficient levels of heat, cooling and electricity to power appliances and lighting, provided that the household meets collectively the following conditions – has a low income, incurs high expenditures on energy purposes, and resides in a flat or building with low energy efficiency.	- Polish Energy Policy until 2040 (PEP2040) (reduce the occurrence of energy poverty to 6% of households in 2030) - Long-Term Building Renovation Strategy (DSRB) - Co-financing schemes aimed at renovating residential buildings (i.e., Clean Air Program, Thermomodernisation and Renovation Fund and the low-emission fund), with scalable subsidies for projects' eligible costs - Fuel/energy subsidies (poorest households)	N/A
Romania	Early Definitions: Laws no. 121/2014 (inability to meet energy needs) & no.	- The Integrated Energy and Climate Plan of Romania - National Long-Term Renovation Strategy to support the national stock of residential and non-residential	N/A

	196/2016 (difficulty paying utility bills to heat their homes and meet their basic life needs) Current Official (drawing on the definition of vulnerable consumer): "Inability of the vulnerable consumer to cover the minimum energy needs" (minimum energy consumption of a single person/family for optimal lighting, cooling and heating of the home; supporting cooking facilities and providing hot water at home; using communication means that involve energy consumption; and providing medical devices to support life or to improve people's health.)	buildings (Annex to Government Decision no. 1,034/2020) - The Recovery and Resilience Plan of Romania - Annex to Government Decision no. 440/2022 National Strategy for Social Inclusion and Poverty Reduction for the period 2022-2027 (Annex to Government Decision no. 440/2022). - Social assistance (e.g., assistance for heating homes) - A Food Program providing free or reduced-price food for people facing poverty and food insecurity - Centralised heating program (subsidies) - Energy Efficiency Fund - "First Home" Program (financial assistance for the purchase of a home) - "Green Home" Program (subsidies for renewable energy equipment and technologies in households)	
Spain	Official: Energy poverty is the situation in which a household cannot satisfy its basic needs of energy supplies as a consequence of an insufficient level of income, and that may be aggravated by having an energy inefficient building	- Integrated National Energy and Climate Plan (PNIEC) Measure - Action 4.1 to fighting the energy poverty. - IDAE Funds Programme for residential building renovation - Recovery and Resilience Plan of Spain, which develops specific measures of great impact in the fight against inequality - National strategy for preventing and fighting poverty and social exclusion 2019-2023 approved (2019)	PrEE 5000 Program: subsidies corresponding to the Energy Rehabilitation Program in existing buildings in municipalities with a demographic challenge

Assessing energy poverty propensity in JUSTEM regions

Vulnerability factors

Structure of the population and age dependency ratios

Country/Region	Ratio of population aged under 15 and aged 65 and over to population aged 15-64
Total for Bulgaria	60.40%
Stara Zagora Region	63.80%
Total for Croatia	58.00%
Istrian Region	59.90%
Total for Greece	52.00%
Western Macedonia Region	57.00%
Total for Poland	52.70%
Silesian Voivodeship Region	53.50%
Total for Romania	53.30%
Hunedoara Region	52.90%
Total for Spain	51.60%
Asturias Region	60.30%

Figure 14: Structure of population and age dependency ratios

The population structure (Figure 14) in the pilot regions is relatively similar to the population structure at the national level. However, some differences can be observed, with most countries facing a higher non-working (Stara Zagora, Western Macedonia, Silesia, Istria, Asturias; in the case of the former two this is mostly attributed to people aged over 65, an issue also evident in Hunedoara), an ageing (Istria, Asturias), and a shrinking (Asturias, Hunedoara) population. While in most regions the differences are detrimental, in Asturias, our analysis reveals a large share of non-working and ageing population which makes this region the most vulnerable on this axis.

Disposable household income

In most cases, income indicators in the regions are comparable with those at the national level, slightly lower in the case of Stara Zagora (the average annual salary of employed people was BGN 16,673 in 2021 compared to the national average of BGN 18,733, with similar decile trends), and slightly higher for Western Macedonia (annual per capita income of 10,400€ compared to 10,200€ nation-wide), Silesia (monthly per capita disposable household income was 2,061.93 PLN for Poland and 2,179.89 PLN for the Silesian Voivodship) and Asturias (the national average monthly wage was is 2,313.13€ in 2021 and 2,328.49 € for Asturias). However, we observe a notable difference in the Hunedoara Region, with the national average household income being 5,683 lei (1,151.85 €), while at the regional level, this was only 3,227 lei (654.06€), in 2021 according to national statistics. This indicates a markedly low ratio between the regional and the national average household income of 0.56. The JUSTEM coal regions still follow the trends related to population income and are comparable to national levels, with only the Hunedoara Region being the most prone.

Unemployment rate

The unemployment trends largely differ between the countries. In particular, in some cases the regions are among the best-performing in terms of unemployment in their countries, with Stara Zagora being 6th in Bulgaria (3.7% compared to the national average of 5.2% in 2022) Silesia second in Poland in 2021, while in Istria unemployment is almost twice lower than the national average. Contrary, the remaining regions present the reverse trend, with unemployment in Hunedoara being 3.97% and almost twice the national average of 2.0% in 2022, in Western Macedonia 19.8% in 2021 compared to the nation-wide 14.7%, while in Asturias unemployment was 14.39% in 2022 remaining higher than the national average of 12.87%. Greece however joins the better performing countries showing a decreasing trend in unemployment: i.e., in Stara Zagora unemployment fell from 4.4% in 2021 to 3.7% in 2022; in Western Macedonia from 29.7% in 2012 to 19.8% in 2021; in Silesia from 9.6% in 2014 to 4.3% in 2021. Contrary, some warning signs appear for Istria, with unemployment rate being 4.6% in 2019 and 6.1% in 2020. It can be concluded that some JUSTEM coal regions perform better in terms of existing unemployment compared to the national averages with Hunedoara, Asturias and Western Macedonia—despite the latter's improving trend—making an exception, while Istria needs to be careful of the increasing unemployment trend.

Severe material and social deprivation rate

County/Region	Severe material and social deprivation rate
Total for Bulgaria	19.40%
Stara Zagora Region	22.30%
Total for Croatia	6.90%
Istrian Region	3.90%
Total for Greece	16.60%
Western Macedonia Region	10.20%
Total for Poland	2.60%
Silesian Voivodeship Region	1.50%
Total for Romania	25.30%
Hunedoara Region	19.20%
Total for Spain	7.00%
Asturias Region	4.40%

Figure 15: Severe material and social deprivation rate

In 2022 most JUSTEM coal regions—with the exception of Stara Zagora—show lower levels of this socio-economic indicator compared to the national average (Figure 15). Notably, the decrease of the index in Western Macedonia is much faster than the national one, while in Silesia the average rate of economically poor households is lower than in Poland as a whole regardless of the type of economic poverty line - extreme, relative and "legal". In terms of poverty indicators, Stara Zagora presents a slightly higher share of households below the national poverty line (23.1% compared to 22.6% nationally), and almost the same material deprivation (19.8% compared to 19.9% in the country). Albeit small, these differences indicate a vulnerability in Stara Zagora related

to citizens covering their basic needs, despite most JUSTEM coal regions performing better in terms of population in severe material and social deprivation compared to the national averages.

At risk of poverty and social exclusion rate

Most regions perform better on the at-risk-of-poverty indicator than the national average in 2021 albeit to different levels: i.e., 14.5% in Silesia compared 16.8% for Poland; 30.65% in Hunedoara and 34.5% for Romania; and 26.3% in Asturias and 27.8% for Spain in total. In Istria this indicator is measured only at the national level (20.09% in 2021), but estimations place the consumption-based poverty rate in the range of 5.9-11.6% (as such this region is less prone to the aspects reflected in these indicators). Contrary, in Stara Zagora, the value of this indicator was 36.7% in 2021, increasing by 1.1 percentage points compared to 2020, and maintaining this trend in 2022, compared to 31.7% and 32.2% in 2021 and 2022 at the national level, respectively. In Western Macedonia, the risk constantly decreased (similar to the previous indicator), only recently catching the national levels (from 36.5% to 28.9% regionally, compared to 30.3% to 28.3% nationally in the period 2018-2021). Stara Zagora Region and Western Macedonia Region are exposed to higher risk compared to national levels, but most countries must be aware of the high level of this indicator, and notably Romania with the highest value.

Residential building stock

Dwellings by tenure form

Most regions are characterised by high shares of privately-owned households and similar trends to national values. In Stara Zagora, the housing stock in the region is broadly in line with the national housing stock, with the main characteristics being the prevalence of private ownership of housing (95.49%) and the high share of unoccupied dwellings (36.67%). In Croatia, the number of owner-occupied dwellings was around 90% of the total number of dwellings/units in 2021, with also a high prevalence of social housing dwellings (9%), similar to the national patterns. Similarly, albeit to a lower level than the previous two counties, Western Macedonia has a slightly higher percentage of self-owned houses (80.5% compared to the nation-wide 75.9% in 2011; and no significant changes in recent years), while in Asturias privately owned housing constitute 77.2%, similar to the national average. Contrary, Romania is also among the countries with a high share of privately-owned households (around 91.2%), but in Hunedoara only 52.3% of dwellings are owner-occupied, much lower than the national average, while 34.8% of dwellings are rented, expectedly higher than the national average. Silesia shows a markedly different and diverse distribution than the rest of the countries, with more dwellings being owned by housing cooperatives (16.7%), municipalities (18.7%) and private companies (26.3%) than the average for Poland, while on the other hand, there are fewer dwellings owned by individuals (10.6%).

Type of dwellings in cities or rural areas

A high urbanisation rate is observed in our regions. In Bulgaria dwellings in urban areas account for 68.23% and in rural areas for 31.70%, in Croatia, 29.2% of the total population lives in cities, 32.3% in towns and suburbs and 38.4% in rural areas, while in Hunedoara 60.4% of people live in rural areas and 39.6% in urban areas. In the case of Stara Zagora and Istria the patterns are similar to the national level, while Hunedoara show a slightly higher share of urbanisation. In Silesia, the higher urbanisation is much more evident, with 81.4% of dwellings being in urban and 18.6% in rural areas, compared to the national average of 67.8% and 32.2% in urban and rural areas, respectively. Contrary, in Western Macedonia (due to the existence of many villages and few urban centres in the region) and Asturias, the share of urbanisation is much lower than the national values—52.6% and 61.58%, respectively, compared to 70.4% of urbanisation in Greece and 70.39% in Spain. There is also a great divergence in terms of the distribution of buildings between single-family houses and multi-family apartments: in Silesia the share of single-family houses is at a low for the JUSTEM coal regions of 37.1% (compared to 43.6% in Poland), in Greece and Croatia this share is around 50% (in Western Macedonia a slightly higher share is observed), while contrary in Romania 69.8% of people live in single-family houses, and in Bulgaria this share reached the highest value of 85%.

Dwellings by year of construction

With the year of construction constituting an important driver of the energy efficiency of dwellings, in our regions we observe that most buildings are quite old and of low energy performance, increasing vulnerability to energy poverty.

The housing stock in Stara Zagora follows the age pattern at the national level with a share of 85.82% of the dwellings built in the period 1959-1989, and a large share of buildings built before 1959. Also, the introduction of large-panel and other industrial technologies in the mid-1960s is a factor in the deterioration of the overall physical qualities of the housing stock and urban environment, with the share of panel residential buildings in the total number of multi-storey residential buildings being 30.84% for Stara Zagora (also similar to the national average). Additionally, residential buildings with poor energy performance (classes E, F and G; >291, >363, >435 kWh/m^2/year primary energy consumption, respectively) account for 91% of the unrenovated housing stock, based on the Energy Performance Certificate (EPC) framework.

In 2011, 51.2% of dwellings in Western Macedonia were constructed after 1980, a slightly higher share than the national average, which is attributed to the fact that some lignite plants were constructed during the 1980s. Considering thermal regulations came into effect after 1980, this constitutes a benchmark for the energy efficiency of dwellings. Additionally, the building stock presents a significantly poor performance, with around 36% and 38% of national and regional dwellings being classified as 'Category F" based on the EPC framework (and high shares in the E and F categories as

well). Western Macedonia—placed in Climate Zone D—is characterised by cold winters (the heating-cooling degrees of the region for 2022 were around 2,300 whereas the same figure at a national level is around 1,500), requiring heavy energy consumption to cover heating needs (mostly delivered from oil and non-sustainable wood). However, the total primary energy consumed in dwellings is similar for older and newer buildings, indicating that end-users sacrifice their energy needs, and hence are more prone to energy poverty.

Poland has one of the oldest building stocks in the EU, with the average age of residential buildings in the Silesian Voivodship being much higher than the average age of residential buildings in the country, which makes the region's building stock even more energy inefficient., while in the Silesian Voivodship 60% of all residential buildings are built before 1978, 9% is built before 1918 and 9.5 before 1944; these are much higher than the respective national averages, with 50% of residential buildings being built before 1978 in the country as a whole. Older buildings are characterised by high energy demand and require energy renovation, especially single-family buildings, for which solid fuel boilers remain the primary source of heat, while 32% of residential buildings in Silesia are still heated with inefficient solid fuels heat sources. Buildings commissioned in the 21st century are characterised by relatively high energy efficiency, but only 7.5% were built in the last 10 years in Silesia (compare to over 12% in Poland).

In Hunedoara, the majority of dwellings were built before 1990 (60.1%), while only 6.5% of dwellings were built after 2010, slightly higher than the respective national values at 56.7% for buildings built before 1990, and only 9.4% built after 2010. In the country, and similar to most other regions, the year of construction strongly correlates with the energy efficiency status of residential buildings with older buildings having poorer energy efficiency due to outdated construction methods and materials, lack of insulation, and outdated heating systems. In contrast, newer buildings are built to higher energy efficiency standards and have modern heating systems. The average energy performance of Romanian residential buildings is low with 84% of existing housing stock having an energy performance certificate (EPC) of class C or lower. The same applies to Hunedoara with 83% of existing housing stock having an EPC of class C or lower.

Croatia—and Istria closely following the national trends—constitutes an interesting case. At the end of 2018, there were 915,000 residential buildings in Croatia (roughly evenly split between multi-storey apartment buildings and family houses), with a quarter of apartments being up to 10 years old and a quarter being more than 50 years old. However, the average durability of building construction in Croatia exceeds the economic lifetime of buildings (around 50 years), with most external envelope structures having a lifetime of around 30 years. The most expensive elements of the thermal systems, boilers and ventilation units, have a lifetime of up to 15 years. Therefore, even the "newer" apartments on the market are already close to the point

where significant intervention in the heating and cooling system will be required, and the need for significant investment in the exterior envelope is already emerging, contrary to the reality of other regions primarily prioritising older buildings.

In Spain, the residential buildings by year of construction are as follows:

- Built before 1945: 4.12m (16% of the total number of dwellings/units)
- Between 1945-1969: 3.70m (14% of the total number of dwellings/units)
- Between 1970- 1979: 3.41m (13% of the total number of dwellings/units)
- Between 1980-1989: 3.84m (14% of the total number of dwellings/units)
- Between 1990-1999: 3.80m (14% of the total number of dwellings/units)
- Between 2000-2010: 5.16m (19% of the total number of dwellings/units)
- Post-2010: 2.53m (10% of the total number of dwellings/units)

Table 3 summarises key policies targeting at improving the building stock of each country/region with an aim to assist in the battle against energy poverty.

Energy indicators and energy market

Energy prices

The energy crisis fuelled by the Russian invasion in Ukraine constitutes a major turning point for the energy prices in the EU, and consequently the prices in the countries and regions of JUSTEM. In most regions, energy prices for both electricity and fossil fuels (mostly natural gas) are defined at the national level and are part of the competitive market as a result of high levels of liberalisation. An exception to this is Bulgaria, which is expected to achieve the full liberalisation of the electricity market by 2026 to include domestic customers that still remain under regulated prices. This market liberalisation is initially expected to have a significant and in many cases negative impact on households especially for those who are energy vulnerable.

Table 4 presents some notable impacts of the energy crisis on consumer prices in the JUSTEM countries. Apart from Bulgaria already featuring regulated prices (the prices of the main energy carriers are subject to market fluctuations and further contribute to fuelling the rising inflation in the country), the response to this crisis included subsidies (Greece, Poland, Romania; including social tariffs) or a cap in the energy prices (Spain, Croatia).

Table 4: Impact of the energy crisis on electricity and natural gas prices

Country	Electricity		Gas	
	Before the crisis	After the crisis	Before the crisis	After the crisis

Bulgaria	0.0831 to 0.0838 €/kWh	0.0911 to 0.0953 €/kWh *(peak was in 2021)	0.0306 to 0.0374 (€/kWh)	0.0798 to 0.0806 (€/kWh)
Croatia			145 (increase between second half of 2021 and second half of 2022	
Greece	0.11€/kWh to 0.13€/kWh	0.16 to 0.31€/kWh	0.041€/kWh to 0.057€/kWh	0.092 to 0.095€/kWh
Poland	22.7% (increase between 2022 and 2023)		19.8% (increase between 2022 and 2023)	
Romania	17.5% (increase between 2017 and 2021)		33.8% (increase between 2017 and 2021)	
Asturias	40.4 €/MWh	204.4 €/MWh (before cap)	0,089 €/kW/h	0.0897 €/kW/h

Heating fuel shares in the residential sector

The countries represent a different profile in terms of covering heating needs in the residential sector with different fuels emerging as dominant in each case, with the information being summarised in Table 5.

Table 5: Heating fuel shares in the residential sector. Bold represent the dominant fuel in each country

Country	Heating fuel distribution	Notes on regional trends
Bulgaria	district heating: 22.5%, **electricity: 38.5%,** gas: 0.1%, solid fossil fuels: 14.9%, wood: 22.8% in 2011 (electricity increased to 42.77% and primary solid biofuels in the form of wood to 31.25% in 2021)	In the countryside, solid fossil fuels and biofuels in the form of wood are still predominantly used. Electricity is the most widely used heating method in multi-family residential buildings located mostly in urban areas (see 'Type of dwellings in cities or rural areas' indicator) with a high proportion of inefficient heating systems and appliances
Croatia	**natural gas: 584.8 million cubic meters**, electricity: 6.076,9 GWh in 2021.	
Greece	**heating oil: 46.7%,** biomass (wood): 29%, natural gas: 16.9%, electricity: 5-6% in 2020	The regional units of Kozani and Florina consumed 2.7% of the total heating oil consumed nationally (1.7% of Greece's population residing in

		these two regional units). This highlights an increased demand for heating oil in this region due to its cold winters
Poland	**coal fuels: 25.0%,** natural gas: 18.4%, electricity: 13.9%, liquid fuels: 3.0% in 2020.	
Romania	**natural gas: 47.3%,** wood: 22.5%, district heating: 18.1%, electricity: 7.4%, coal and coke: 4.3%, LPG: 0.2%,	In rural areas (see 'Type of dwellings in cities or rural areas' indicator), wood is the most widely used heating fuel, accounting for 52.4% of all residential heating fuel consumption, followed by natural gas with a share of 33.3%. In urban areas, natural gas is the most commonly used heating fuel, accounting for 61.7% of all residential heating fuel consumption, followed by district heating at 18.5%.
Asturias	**biomass: 31.04%,** natural gas: 28.12%, diesel: 25.90%, electricity: 8.12%, and GLP: 5.54%.	

Energy efficiency trends for households

In Bulgaria, final energy consumption in 2018 was only 16% higher than in 2000, despite significant economic growth over the same period. In 2018, GDP was 84.6% higher compared to 2000, and 14.6 % above the pre-crisis level of 2008. The reduction of final energy intensity was 37.1% over the period 2000-2018. From 2000 to 2018 the overall energy efficiency in Bulgaria (measured by the ODEX index; aggregates energy efficiency gains by end-use) improved by 36.2%. The progress in the residential sector for the same period was 17.7%. From 2000 to 2018, actual energy consumption for space heating in the housing sector decreased slightly by about 7.6% under significant growth of household expenditure (87.8%). Electricity consumption for large electricity appliances decreased by 10.9% as cooking consumption decreased by 37.1%. However, the consumption of air conditioning increased almost two-fold by 95.5%. It can be concluded that in total, energy consumption in the residential sector was reduced to some extent, but the effect is counterbalanced to improve thermal comfort by greater use of air conditioning. Due to air conditioning being more energy efficient, energy savings are observed during the period. Final consumption of the residential sector is stable with an increase of only 0.04 Mtoe over the period 2000-2018. Two main effects tend to increase energy consumption: larger homes (a 0.35 Mtoe impact) and other

effects (a 0.13 Mtoe impact; which includes improved thermal comfort). Energy savings allow a 0.44 Mtoe decrease in energy consumption.

In Croatia, energy efficiency progress in 2000-2014 was 1.38% per year and in 2014-2019 was 1.49% per year. In 2018, final energy consumption amounted to about 6.8 Mtoe, 12.2% above the 2000 level. The household sector had the largest share remaining roughly at the same level in the period from 2000 to 2018. During the same period, energy efficiency for end consumers, measured by ODEX, increased by 21.4% (1.3% per year). The largest increase in energy efficiency benefits was achieved in the industry sector (2.2% per year), followed by the household sector (1.4% per year) and the transport sector (0.8% per year). The positive trends in these sectors can be explained by the introduction of various regulations and financial incentives.

In the period 2000-2014, Greece achieved an annual improvement of energy efficiency by 2.31%, which was among the highest in the EU, whereas in the period 2014-2019, it demonstrated almost no progress with an annual improvement rate of only 0.031%, among the lowest in the EU. More specifically, energy consumption in Greek dwellings has dropped from 1.2 toe/dwelling to around 1 toe/dwelling. This reduction mainly took place in the period 2008-2014 with an annual decrease rate of 4%, and was largely driven by the severe financial crisis that the country faced during these years. A more detailed examination of the Odyssee-Mure database shows that although Greece is characterised by mild winters, around 60% of household energy consumption is related to space heating. Moreover, electrical appliances account for another 20% with water heating and cooking accounting for the remaining 20%. Although Greece is known for its warm summers, energy consumption for air conditioning seems negligible. Another interesting trend is the fact that although energy consumption has significantly decreased in Greece between 2000 and 2019, electricity consumption has slightly increased. This phenomenon mainly demonstrates that, due to the financial crisis, many households reduced their heating oil consumption—still the dominant carrier—and preferred electrical appliances for heating. It is also important to mention that Greece is ranked as one of the least energy-intensive countries regarding energy consumption for heating since its average consumption was 10 koe/m^2 in 2000 and around 7.5 koe in 2019. This 25% drop was driven by an annual 1.5% decrease rate (both in consumption per dwelling and consumption per m^2). Lastly, regarding electricity consumption, Greece has a slightly higher average consumption than the EU average, which mainly increased from 2000 to 2019 due to an important increase in air condition energy consumption from 30 to 130 kWh per dwelling.

In Poland, according to the Odyssee-Mure database, the dynamic of the ODEX indicator for the households is 85.5 (2010), 80.4 (2015), 77.5 (2018), 77.2 (2019), and 77.0 (2020).

In Romania, according to the Odyssee-Mure database, the energy efficiency of Romanian households has been improving steadily over the past two decades. The ODEX index shows that the energy efficiency of households in Romania increased by

38% between 2000 and 2019. This improvement is attributed to various factors, including the implementation of energy efficiency policies, the increased availability of energy-efficient technologies, and a growing awareness of the importance of energy efficiency. However, despite this positive trend, energy efficiency of Romanian households still lags behind that of many other EU countries. According to a study by the EC, Romania ranks 22nd out of 28 EU member states in terms of energy efficiency, with a score of 51 out of 100. One of the main challenges for improving energy efficiency in Romanian households is the poor condition of the residential building stock, which is often poorly insulated and has outdated heating systems. This is compounded by a lack of adequate maintenance and renovation opportunities, which can make it difficult for households to invest in energy efficiency measures.

In Spain, according to the Odyssee-Mure database, the ODEX index in households is 2.57 for the period 2000-2014 and 0.417 for the period 2014-2019. Final energy consumption in the Spanish residential sector amounts to 15.227 ktoe, derived largely from electricity (40%), gas (25%), renewable energy (18%) and oil products (17%).

Reflections on regional energy poverty

Energy poverty indicators at the national level reveal that the countries included in the analysis are among the most prone regions in the EU. This is especially relevant for Bulgaria and Greece. At the same time, the selected energy poverty indicators monitored by Eurostat on an annual basis show significant volatility, which is related to the global energy crisis and the war in Ukraine. This applies to a large extent to Greece, Romania and Spain. Although among the countries with the worst energy poverty indicators, Bulgaria has maintained relatively stable levels in these turbulent times since it is the only country in the analysis with a regulated energy market for households; albeit this is associated with fears of a raging inflation. We found that most regions closely follow national trends, but with some notable deviations. This analysis of the current status implies that, as a minimum, the regions are at least as prone to energy poverty as the corresponding nations, while there are specific energy poverty indicators that each region may be more vulnerable than the nations as a whole. Similarly, albeit to a lesser extent, there are axes where regions outperform the national average. In the next paragraphs we discuss these deviations, aiming to enable regions exploit opportunities and shield themselves from deteriorating conditions, which are bound to happen as the transition unfolds and which will consequently aggravate energy poverty to worse levels that the already poor national levels.

Romania, Poland and Spain have adopted definitions of energy poverty, while Bulgaria, Croatia and Greece have yet to do so. A comprehensive and well-functioning policy framework to tackle energy poverty is in place in Poland and Spain. Across the countries included in the analysis, there is a variety of policy instruments to combat energy poverty, which includes the protection of vulnerable households and especially

improving energy efficiency of the existing housing stock. National sustainability and resilience plans stand out as the most relevant and powerful operational policy instruments to tackle energy poverty, having the greatest potential to support Just Transition Plans in JUSTEM regions in addressing energy poverty.

The selected set of socioeconomic vulnerability indicators of the population reveal the potential (in)ability of JUSTEM coal regions to resist unfavourable conditions, and specifically to counteract energy poverty. The assessment of these set of indicators shows that all JUSTEM regions are characterised by an existing tendency of a growing population below working age, as well as an ageing population trend. In addition, the region of Asturias is notably facing a shrinking population. This is happening even before the active changes associated with the ongoing transition of these regions and the expected loss of jobs as a result of the coal phase out. Such trends act as a clear signal that the situation in the regions is expected to sharply deteriorate especially for the most vulnerable groups of the non-working population, and notably among the growing elderly population.

The levels of disposable household income in JUSTEM regions are still comparable, and in some cases slightly higher than the national average. This suggests that, at least in relative terms, the introduction of measures related to the economic restructuring of these regions could maintain relative stability in terms of disposable incomes, but only under the condition of such compensation dynamics. If this does not take place in the short term, a sharp impoverishment of households can be expected, with corresponding consequences on the ability of households to meet their expenditures, including those related to meeting their energy needs.

In recent years, most JUSTEM regions have been characterised by declining unemployment rates—even at levels lower than the national ones. However, this trend is expected to change sharply as the process of economic restructuring unfolds, like in the regions of Western Macedonia, Hunedoara and Asturias, where these processes have already started. This will further decrease the capacity of households to meet the costs associated with their energy needs.

Most JUSTEM coal regions still perform better in terms of population in the severe material and social deprivation index compared to the national averages. At the same time, JUSTEM coal regions are at high risk of poverty or social exclusion due to the transition and coal phase-out. Specific targeted measures within the social safety net should be envisaged and implemented to ensure a smooth and just transition for JUSTEM regions.

The condition of the housing stock and household energy efficiency in the JUSTEM regions is another key component in the assessment of the risk of increasing energy poverty. The tenure form of housing is among the main determinants of the ability of occupants—also based on their socioeconomic profile—to take responsibility for the

technical condition, energy performance and maintenance of their homes. The prevalence of private ownership of housing could become a serious obstacle to maintaining dwellings and improving their energy efficiency in view of the clear negative projections for the deterioration of the economic and social status of their occupants. In the case of a sufficiently significant rental housing stock, like in the case of Silesia and Hunedoara, these negative expectations are more related to the projected inability to pay rent and hence the deterioration of the overall housing conditions.

We reveal that both multi- and single-family households can be potentially problematic in terms of the capacity of their occupants to maintain them and improve their energy efficiency. At the same time, the uneven distribution of housing in urban and rural areas further aggravates the situation in the regions. Both main types of dwellings need to receive particular attention and targeted interventions with the policy instruments available in the respective countries to improve their energy efficiency with targeted support to ensure a good living standard.

In terms of energy efficiency, most dwellings in the JUSTEM regions are in the D, E, F and G classes of the EPC framework, entailing the worst energy performance. This is a serious problem because it implies high energy consumption and therefore prohibitive energy costs to ensure a good standard of living for the residents. There is a clear need for large-scale energy renovation of the existing housing stock to reduce energy bills. However, this process should be accompanied by financial incentives for households in view of the analysis already conducted on the vulnerability socioeconomic indicators.

'Energy prices and their affordability for households' is another key indicator for determining energy poverty. As a consequence of the global energy crisis and the ongoing war in Ukraine, the prices of covering essential household energy needs have shown a sharp increase, and consequently, a significant deterioration in energy affordability, accompanied by urgent government measures to support households.

In addition, heating needs in the regions are delivered and secured largely by carbon-intensive fuels. The penetration of renewables—and to many regions electrification in general—in the residential sectors of the regions is minimal or almost non-existent, which further aggravates the situation and requires specific policy interventions. This is also associated with additional negative environmental impacts such as air pollution, which add to the overall situation of the pollution-laden industries in the regions.

Household energy efficiency in the examined regions has shown some improvement in the last decade, but still fails to meet modern standards. The main factors are the outdated household appliances and heating systems, as well as the relative lack of knowledge about energy efficiency of the occupants.

6. CONCLUSIONS

In this report, we aimed to shed light on the current status of the coal phase-out in six coal-dependent regions, namely Silesia in Poland, Western Macedonia in Greece, Asturias in Spain, Jiu Valley in Romania, Stara Zagora in Bulgaria, and Istria in Croatia. After providing a brief background on the context of the regions and the role of coal in their regional development, we have investigated 1) recognised and nuanced stakeholder needs in the regions; 2) the policy context of the transition and how aligned policy documents are to the principles of the just transition; and 3) the regional status and indicators of energy poverty.

First, through a systematic literature review, we identified 25 different, yet largely intertwined stakeholder needs across the following dimensions:

- Employment-related (jobs in general, training, re-skilling)
- Financial needs (investments, funding, R&D)
- Social-oriented (participation, political commitment)
- Environmental (rehabilitation of mines, impact on agriculture)
- Energy-related (independence, energy poverty)

Although the loss and creation of jobs was the most prominent and urgent topic, the variety of different needs highlights the multifaceted nature of just transition. Notably, the need to engage citizens and stakeholders in participatory decision-making received significant attention, indicating that people want to further engage in the process. Most countries presented similar trends, with Poland acting as a driver in the assessment of the urgency of topics, while slight deviations referred to Greece and Romania giving higher importance to financial aspects, Spain to rehabilitation, and Bulgaria to energy poverty. However, in each country more than 10 needs were always relevant, again highlighting the complexity of the topic.

Delving into the policy documents relevant to the just transition, we noted that stakeholder consultations were carried out during the development of the just transition policy documents, but the impact of these consultations was not always clear. Considering the high importance of the relevant to participatory decision-making need, consultations with citizens need to engage deeper while the process needs to become more transparent. All countries have plans to reduce coal use and have set coal-phase-out dates, most regional and local plans are in line with the national energy transition objectives, while most assessed plans include policies and set a timeline that is in line with the EU's just transition ambitions and include projects eligible for funding under JTM. Still, almost all regions had a median performance in terms of their TJTP alignment with the EU just transition ambitions. At the same time, not all countries have interim targets, and this makes the transition less predictable. Among the impacts expected in the affected regions by 2030, policies primarily address the potential increase in unemployment (the dominant need) and pressures faced by vulnerable

groups, with our analysis however indicating that the regional needs transcend the myopic view that 'the just transition is only about jobs'. All countries address energy poverty, but while some countries/regions have comprehensive and concrete plans, others have rather general texts in their plans.

Based on the importance of energy-related, including energy poverty, needs in our analysis, and the not-always-adequate response to energy poverty in the broader policy documents, we also performed an indicator-based statistical analysis on energy poverty itself as an increasingly important threat faced by the examined regions as the transition unfolds. Energy poverty is prevalent in most countries, despite a wide range of policy instruments at place, while not all countries have an official definition yet. Regions follow national trends, yet some perform worse, and to a lesser extent better, than the national average, which puts them at high risk of poverty or social exclusion. Notably, there is a clear trend towards a growing non-working and aging population, which coupled with the poor energy performance of buildings in the regions, the uneven distribution of housing in urban and rural areas and the currently raging energy prices should act as a warning that the situation may quickly deteriorate. This is despite the overall good performance of the regions in terms of unemployment and the comparable to the national values, disposable household income.

Finally, although most regions face some similar challenges, we highlighted that there are significant differences in each context that should be considered in planning an effective and tailored just transition. Through the results of this report, we aimed to provide a comprehensive document including all the necessary information to help understand the local context of the regions and comprehensively reflect on their efforts to pursue climate action as well as secure an economic restructuring that will strengthen and not hinder regional development. Additionally, the current status and the respective assessments serve as a basis for the coming JUSTEM outputs, such as recommendations to improve the design and implementation of the national/regional policies and project pipelines supporting the regions' transition and design detailed energy poverty alleviation plans for JUSTEM coal regions.

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Annexes

ANNEX I: SUMMARIES OF THE STATUS FOR EACH REGION (INCLUDING TRANSLATIONS IN THE NATIONAL LANGUAGE)

Stara Zagora (in English)

Stara Zagora is the Bulgarian region studied in JUSTEM with coal being an important pillar of its economy, accounting for 28% of the region's GDP. The region has one of the biggest coal complexes (Maritsa East) in southeast Europe, which in 2022 produced 34.3 million tons of coal and generating over 13,000 GWh of electricity. The importance of coal in the energy sector is also evident from the fact that although the region's population is ageing and decreasing, its GDP is still increasing. The Bulgarian RRP aims to phase out coal by 2038 in order to decarbonise the power sector.

The importance of coal is also reflected in the Bulgarian literature reviewed in which employment, energy poverty and political commitment were indicated as the main stakeholder needs. Regarding employment, there are around 44,000 direct and indirect jobs linked to the coal sector which can be threatened by the region's transition. Energy poverty is also an important issue.

An important indication of the significance of this problem is the fact that 23.1% of households in Stara Zagora region are below the poverty line, whereas this percentage is 22.6% at a national level. Moreover, the at-risk of poverty and social exclusion rate has increased to 36.7% in 2021, in comparison with the other regions examined, where this rate has decreased. Additionally, this rate was 5 percentage points lower at a national level. Another aspect depicting the region's problematic situation is the fact that almost 86% of residential buildings were built between 1959 and 1989, and the share of prefabricated buildings in the total number of multi-storey residential buildings is 30.84%, leading to a staggering 91% of non-renovated buildings being ranked in the E, F and G classes regarding their EPCs. This is very important considering that more than 95% of dwellings in Stara Zagora region are privately owned. Although natural gas prices more than doubled during the energy crisis, households were not significantly affected since the main heating energy source is electricity, whose prices remained almost stable.

Stara Zagora (in Bulgarian)

Стара Загора е българският регион, изследван от JUSTEM, в чиято икономика въглищата са важен стълб, генериращ 28% от регионалния БВП. На територията на региона е разположен най-големият въглищен комплекс в югоизточна Европа – Марица изток, в който през 2022 г. са добити 34.3 милиона тона въглища и са произведени 13,000 GWh електроенергия. Значението на въглищата в енергийния сектор е видно и от факта, че въпреки застаряването и намаляването на населението в региона, неговият БВП продължава да расте. Планът за възстановяване и устойчивост на България предвижда постепенно прекратяване на използването на въглища и декарбонизиране на електроенергийния сектор до 2038 г.

Значението на въглищата за България е отразено също така и в разгледаните литературни източници, които сочат заетостта, енергийната бедност и политическата ангажираност за главни нужди на заинтересованите страни. По отношение на заетостта, около 44,000 преки и непреки работни места, свързани с въгледобивния сектор, може да бъдат застрашени от прехода в региона. Енергийната бедност също изпъква като сериозен проблем.

Важна индикация за значимостта на този проблем е фактът, че 23.1% от домакинствата в регион Стара Загора са под линията на бедност, докато на национално ниво този процент е 22.6%. Нещо повече, равнището на риска от бедност и социално изключване се е увеличило до 36.7% през 2021 г. в сравнение с другите изследвани региони, където този дял е намалял. Освен това този показател е с 5 процентни пункта по-нисък на национално равнище. Друг аспект, който представя проблемната ситуация в региона, е фактът, че почти 86% от жилищните сгради са построени между 1959 и 1989 г., а делът на панелните сгради в общия брой на многоетажните жилищни сгради е 30.84%, което води до внушителните 91% от необновените сгради, които са отнесени към класове E, F и G по отношение на техните енергийни характеристики. Това е много важно, като се има предвид, че повече от 95% от жилищата в регион Стара Загора са частна собственост. Въпреки че цените на природния газ са се увеличили повече от два пъти по време на енергийната криза, домакинствата не са значително засегнати, тъй като основният източник на енергия за отопление е електричеството, чиито цени остават относително стабилни.

Istria Region (in English)

The Croatian coal region studied in the context of JUSTEM is Istria County since it is the only region that still has a coal power plant, namely Plomin 2, near the city of Labin. The role of coal in Croatia is considerably shrinking compared to other coal regions in the EU, with the power plant of Plomin 2 producing around 9-12% of the annual electricity demand in Croatia. A key point of the region's context is that coal mining has been terminated in Istria and in Croatia in general since 1999. As a result, there is a lack of scientific evidence examining stakeholder needs for Croatia. This does not mean that regional stakeholders face no urgent challenges in Istria, but the fact that the role of coal has diminished may turn the spotlight off this region, which poses the threat of underestimating potential negative impacts still ongoing.

Notably, there are important omissions from Croatian policies, such as the lack of a clear link of investments in sustainably diversifying its economy and creating decent jobs. Similarly, the Croatian TJTP fails to indicate private sources of funding and sets a vaguer timeline regarding fossil fuels phase-out, not including a natural gas phase out, while at the same time there are provisions for investments in waste incineration, and an underrepresentation of social aspects. Employment is also one important issue in Istria since the unemployment rate in the region has increased from 4.6% to 6.1% in just one year, a trend that the region must carefully monitor.

An important issue arising from Croatia's national planning documents is energy poverty, which is addressed by the Energy Poverty Alleviation Programme aiming to refurbish the dwellings of people threatened by energy poverty. This targeting of energy-poor households is important since the overall building stock is already better than most coal regions, with 90% of houses being owner-occupied and 25% of them being constructed in the last ten years. In particular, Croatia is the only country studied that its building renovation programme aims specifically at energy-poor households. However, the lack of an official national definition of energy poverty makes it difficult to target households that are indeed energy poor.

Istria Region (in Croatian)

U kontekstu EU projekta JUSTEM Istarska županija je analizirana kao jedna od hrvatskih regija i dalje ovisna o ugljenu, ponajviše zbog TE Plomin 2 u blizini grada Labina – posljednje termoelektrane na ugljen u Republici Hrvatskoj. Uloga ugljena u Hrvatskoj znatno se smanjuje u usporedbi s ostalim regijama u EU ovisnima o ugljenu, iako TE Plomin 2 i dalje proizvodi oko 9-12% godišnje potrebe za električnom energijom u Hrvatskoj, što predstavlja značajan udio.

Ključna točka u kontekstu regije je činjenica da je rudarstvo ugljena u Istri i Hrvatskoj općenito prekinuto od 1999. Kao rezultat, postoji nedostatak statističkih podataka koji ispituju potrebe dionika u Hrvatskoj. To ne znači da se regionalni dionici ne suočavaju s hitnim izazovima u Istri, ali činjenica da se zastupljenost ugljena kao korištenog energenta smanjuje može skrenuti pozornost s ove regije, što predstavlja mogućnost podcjenjivanja potencijalnih negativnih utjecaja koji su još aktivni.

Primjetno je da postoje značajni propusti u hrvatskim strateškim dokumentima u kontekstu pravedne tranzicije, kao što je nedostatak jasne strukture i mogućnosti ulaganja u održivu diverzifikaciju gospodarstva i stvaranje novih radnih mjesta. Slično tome, u Teritorijalnom Planu Pravedne Tranzicije za Republiku Hrvatsku nisu navedeni privatni izvori financiranja i postavljen je nedovoljno precizan i jasan vremenski okvir postupnog ukidanja fosilnih goriva, ne uključujući postupno ukidanje prirodnog plina, dok u isto vrijeme postoje odredbe za ulaganja u spaljivanje otpada i nedovoljna zastupljenost socijalnog aspekta. Zaposlenost je također jedno od važnih pitanja u Istri budući da je stopa nezaposlenosti u regiji u samo godinu dana porasla sa 4,6% na 6,1%, trend koji bi se u regiji trebao pozorno pratiti.

Važno pitanje koje proizlazi iz hrvatskih nacionalnih strateških dokumenata je energetsko siromaštvo, te se njime bavi Program za smanjenje energetskog siromaštva s ciljem obnove stambenih prostora ljudi s povećanim rizikom od energetskog siromaštva. Ovakav fokus na energetski siromašna kućanstva važan je budući da je ukupni fond zgrada u regiji u boljem stanju od većine regija ovisnih o ugljenu, s 90% kuća u vlasništvu korisnika stambenog objekta, dok je 25% od te brojke izgrađeno u posljednjih deset godina. Konkretno, Hrvatska je jedina ispitana zemlja čiji je program obnove zgrada usmjeren specifično na energetski siromašna kućanstva. Međutim, nedostatak službene nacionalne definicije energetskog siromaštva otežava definiranje kućanstava koja su doista energetski siromašna.

Western Macedonia (in English)

Western Macedonia is the most coal-dependent region of Greece with coal resources being located in Kozani and Florina, where the energy & mining sector accounted for 51.5% and 39.9% of the regional GDP respectively. The economic importance of lignite was also evident during the financial crisis when the national GDP significantly decreased, whereas the region's GDP continued to increase. On the contrary, after 2013 the region's GDP started decreasing in contrast to the national GDP which remained stable. This regional GDP decrease is linked to lignite mining and electricity generation since lignite-powered electricity generation dropped from 52% in 2012 to 20% in 2019. This phenomenon has also led to a decrease in lignite-related employment by 20%. However, the Greek NECP, among the countries studied, is the only one that proposes a coal phase-out before 2030, although plans may have been disrupted due to the energy crisis.

The significance of employment in lignite regions is also evident in the literature review conducted, which indicated that employment is the most prioritised stakeholder need. The Greek just transition also requires important funding and investment initiatives as well as R&D projects. Nevertheless, according to the reviewed literature, just transition in Greece seems slightly more complex since the Greek literature was the one that highlighted the highest number of needs. Another need that was also examined was the elimination of energy poverty and in this direction, the Greek NRRP aims to reduce energy poverty by 75% by 2030.

Regarding some social and economic factors related to energy poverty, the region has a slightly higher disposable household income than the national average. On the other hand, the unemployment rate is 5.1 percentage points higher than the national unemployment rate indicating the impact of the already ongoing coal phase-out. Nevertheless, the severe material and social deprivation rate is quite lower in the region (10.2%) than in Greece generally (16.6%), with the at-risk of poverty and social inclusion rate being at the national level, demonstrating a faster decrease rate than the national rate. Regarding the building stock, Western Macedonia is characterised by 38% of F-classified dwellings (with the national rate being around 36%), which is an important issue since the region is characterised by a quite colder climate than the rest of Greece. Another important takeaway is that energy consumption in old and newer buildings ranges at the same levels, indicating that consumers sacrifice their energy needs, and are thus more prone to energy poverty. The phenomenon of energy poverty surged during the energy crisis in Greece since electricity, natural gas and heating oil prices surged. Lastly, it is important to mention that Greece had achieved one of the highest rates of annual energy efficiency improvement, namely 2.31%, but this was due to the financial crisis during the period 2008-2014 when there was an annual decrease of 4%.

Western Macedonia (in Greek)

Η Δυτική Μακεδονία αποτελεί την πιο εξαρτημένη από τον λιγνιτή περιοχή στην Ελλάδα με τα λιγνιτικά τους κοιτάσματα να βρίσκονται στην Κοζάνη και τη Φλώρινα, όπου ο τομέας της παραγωγής ενέργειας και εξόρυξης αντιστοιχεί στο 51,5% και 39,9% του τοπικού ακαθάριστου προϊόντος αντίστοιχα. Η οικονομική σημασία του λιγνίτη ήταν επίσης εμφανής κατά την οικονομική κρίση όπου το ΑΕΠ της Ελλάδας μειώθηκε σημαντικά ενώ το ακαθάριστο προϊόν της Δυτικής Μακεδονίας συνέχισε να αυξάνεται. Αντιθέτως, μετά το 2013 το περιφερειακό ακαθάριστο προϊόν ξεκίνησε να μειώνεται ενώ το ΑΕΠ της χώρας παρέμενε σταθερό. Η μείωση του περιφερειακού ακαθάριστου προϊόντος είναι συνδεδεμένο με την εξόρυξη λιγνίτη και την παραγωγή ενέργειας δεδομένου ότι η ηλεκτροπαραγωγή από λιγνιτικές μονάδες μειώθηκε από 52% το 2012 σε μόλις 20% το 2019. Αυτό το φαινόμενο έχει επίσης οδηγήσει σε μία μείωση των θέσεων εργασίας που συνδέονται με τη βιομηχανία του λιγνίτη κατά 20%. Παρόλα αυτά, το ελληνικό ΕΣΕΚ, μεταξύ των χωρών που εξετάζονται, είναι το μόνο που προβλέπει την απολιγνιτοποίηση πριν το 2030, σχέδια τα οποία έχουν διαταραχθεί από την ενεργειακή κρίση. Ωστόσο, η Ελλάδα πρέπει να ενισχύσει τον στόχο της για το 2030 στο ανανεωμένο ΕΣΕΚ.

Η σημαντικότητα της απασχόλησης στις λιγνιτικές περιοχές είναι επίσης εμφανής από τη βιβλιογραφική ανασκόπηση που έγινε στα πλαίσια του έργου, η οποία ανέδειξε την απασχόληση ως την πιο προτεραιοποιημένη ανάγκη των εμπλεκομένων, η οποία αναφέρεται σε κάθε επιστημονική αναφορά/δημοσίευση. Η δίκαιη μετάβαση στην Ελλάδα απαιτεί επίσης σημαντικές χρηματοδοτήσεις και επενδύσεις καθώς και έργα έρευνας και ανάπτυξης. Παρόλα αυτά, σύμφωνα με την βιβλιογραφική ανασκόπηση, η δίκαιη μετάβαση στην Ελλάδα εμφανίζεται ελαφρώς πιο σύνθετη δεδομένου ότι η ελληνική βιβλιογραφία ήταν αυτή που τόνιζε τον μεγαλύτερο αριθμό αλλαγών. Μία άλλη ανάγκη που εξετάστηκε ήταν η καταπολέμηση της ενεργειακής φτώχειας και προς αυτήν την κατεύθυνση, το ελληνικό σχέδιο για την ανάκαμψη και την ανθεκτικότητα στοχεύει στη μείωση της κατά 75% έως το 2030.

Όσον αφορά κάποιους κοινωνικούς και οικονομικούς δείκτες που συνδέονται με αυτήν, η Δυτική Μακεδονία έχει ελαφρώς υψηλότερο διαθέσιμο οικιακό εισόδημα από τον εθνικό μέσο όρο. Από την άλλη, η ανεργία είναι 5.1 μονάδες υψηλότερη από την ανεργία σε εθνικό επίπεδο υποδηλώνοντας την επίδραση της ήδη υπό εξέλιξη απολιγνιτοποίησης. Ωστόσο, ο δείκτης σοβαρής στέρησης υλικών αγαθών και κοινωνικού αποκλεισμού είναι αρκετά χαμηλότερης στη Δυτική Μακεδονία (10,2%) σε σχέση με τον εθνικό μέσο (16,6%), με τον δείκτη για τον κίνδυνο αντιμετώπισης φτώχειας και κοινωνικής ένταξης να είναι στα εθνικά επίπεδα, σημειώνοντας όμως μία πιο γρήγορη μείωση σε περιφερειακό επίπεδο. Όσον αφορά το κτιριακό απόθεμα, το 38% των κτιρίων στη Δυτική Μακεδονία έχουν ενεργειακό πιστοποιητικό κατηγορίας Ζ (ενώ σε εθνικό επίπεδο αυτά τα κτίρια ανέρχονται στο

36%), το οποίο είναι ένα σημαντικό ζήτημα δεδομένου ότι η περιοχή χαρακτηρίζεται από ένα αρκετό πιο κρύο κλίμα σε σχέση με την υπόλοιπη Ελλάδα. Ένα ακόμα σημαντικό συμπέρασμα είναι ότι η ενεργειακή κατανάλωση σε παλιά και νεότερα κτίρια κυμαίνεται στα ίδια επίπεδα, δείχνοντας ότι οι καταναλωτές θυσιάζουν τις ενεργειακές τους ανάγκες, όντας πιο ευάλωτοι στην ενεργειακή φτώχεια. Το φαινόμενο της ενεργειακής φτώχειας χειροτέρευσε κατά την ενεργειακή κρίση στην Ελλάδα δεδομένα ότι οι τιμές του ηλεκτρικού ρεύματος, του φυσικού αερίου και του πετρελαίου θέρμανσης αυξήθηκαν ιδιαίτερα. Τέλος, είναι σημαντικό να αναφερθεί ότι η Ελλάδα έχει επιτύχει ένα από τα υψηλότερα ποσοστά ετήσιας βελτίωσης της ενεργειακής απόδοσης στην ΕΕ, με ποσοστό 2,31% το οποίο όμως κυρίως οφείλεται στην οικονομική κρίση την περίοδο 2008-2014 κατά την οποία σημειώθηκε ετήσια μείωση της τάξης του 4%.

Silesia (in English)

In the context of JUSTEM, we examined the region of Silesia, which is the most coal-dependent region in the EU. Although the region's population is decreasing and ageing, its GDP is increasing due to the high contribution of coal, accounting for 7% of the value added in the whole region. The importance of coal is also evident from the fact that coal phase-out is scheduled for 2049 (latest in the EU) with only an interim target for 2030, namely decreasing coal-generated electricity from 14TWh to 5TWh, without any provisions on the phase-out of gas.

The importance of coal is also reflected in the literature review conducted in the project's context, which highlighted the importance of employment as the most discussed stakeholder need in the Polish context. Specifically, there are areas in Silesia where the unemployment rate is five times higher than the national average (4%), directly connected to the 300,000 coal-related jobs lost in the last three decades. This problem has been magnified by the fact that mine workers had high wages leading to a reduced interest in finding a new job. Despite this tendency, the TJTP does not consider the quality of new jobs or include measures to address the issue, apart from general claims on the attractiveness of new jobs. The importance of coal is also highlighted by the fact that 90% of the EU's coal consumed for residential uses is consumed in Polish households, indicating the importance of energy independence during the coal phase-out. Moreover, the Polish policy landscape lacks participatory decision-making procedures as characterised by a very centralised government, which has also shown insufficient commitment towards mitigating climate change. However, as part of the region's TJTP, social dialogues were established, engaging labour unions and social partners in the development of the plan.

Another issue discussed by many scholars is the need to face energy poverty, due to the high usage of coal in Poland. In this direction, the Polish NRRP aims to reduce energy poverty to a maximum of 6% by 2040. Regarding social indices, the average disposable income in Silesia is slightly higher than the national average, with unemployment experiencing a significant decrease by 5.3 percentage points in 7 years. Nevertheless, Silesia is characterised by a wide diversity in the form of ownership of dwellings, with houses being owned by housing cooperatives, by municipalities, by private companies, and owner-occupied dwellings. The age of the building stock of the region is also a significant issue with more than 78% of buildings being constructed before 1978, with the national average being around 50%. These old buildings require a high amount of energy, with 32% of residential buildings still using inefficient solid fuel heat sources, with coal being the most used fuel for heating, which can be an important issue to tackle during the country's coal phase-out. Lastly, it is noteworthy that Silesia is the most urbanised region examined in this project with an urbanisation rate of around 81%.

Silesia (in Polish)

W ramach projektu JUSTEM przeanalizowaliśmy region Śląska, który jest najbardziej zależnym od górnictwa węgla kamiennego regionem w UE. Chociaż populacja regionu spada i starzeje się, jego PKB rośnie ze względu na wysoki udział wydobycia węgla, który stanowi 7% wartości dodanej w całym regionie. Znaczenie węgla jest również widoczne w kontekście planowanego na 2049 r. (najpóźniej w UE) odejścia od węgla, przy czym na 2030 r. wyznaczono jedynie cel pośredni, a mianowicie zmniejszenie ilości energii elektrycznej wytwarzanej z węgla z 14 TWh do 5 TWh, bez żadnych przepisów dotyczących odejścia od gazu.

Znaczenie węgla znajduje również odzwierciedlenie w przeglądzie literatury przeprowadzonym w ramach projektu. Wskazał on, że zatrudnienie jest jednym z najczęściej dyskutowanych wyzwań przez interesariuszy w Polsce. Szczególnie na Śląsku istnieją obszary, w których stopa bezrobocia jest pięciokrotnie wyższa niż średnia krajowa (4%), co jest bezpośrednio związane z utratą 300 000 miejsc pracy związanych z górnictwem węgla kamiennego w ciągu ostatnich trzech dekad. Problem ten został spotęgowany przez fakt, że pracownicy kopalni mieli wysokie zarobki, co prowadziło do zmniejszonego zainteresowania znalezieniem nowej pracy. Pomimo tej tendencji, TPST nie bierze pod uwagę jakości nowych miejsc pracy ani nie uwzględnia środków mających na celu rozwiązanie tej kwestii, poza ogólnymi stwierdzeniami dotyczącymi atrakcyjności nowych miejsc pracy. Znaczenie sektora węglowego podkreśla również fakt, że 90% węgla zużywanego w UE do celów mieszkalnych jest zużywane w polskich gospodarstwach domowych, co wskazuje na znaczenie niezależności energetycznej podczas procesu odchodzenia od węgla. Co więcej, w polskim krajobrazie politycznym brakuje partycypacyjnych procedur decyzyjnych, ponieważ charakteryzuje się on bardzo scentralizowanym rządem, który również wykazał niewystarczające zaangażowanie w łagodzenie zmian klimatu. Jednak w ramach regionalnego TPST ustanowiono dialog społeczny, angażując związki zawodowe i partnerów społecznych w opracowywanie planu.

Inną kwestią omawianą przez wielu badaczy jest potrzeba stawienia czoła ubóstwu energetycznemu ze względu na wysokie zużycie węgla w Polsce. Mając to na uwadze polski KPO ma na celu zmniejszenie ubóstwa energetycznego do maksymalnie 6% do 2040 roku. Jeśli chodzi o wskaźniki społeczne, średni dochód do dyspozycji na Śląsku jest nieco wyższy niż średnia krajowa, a bezrobocie odnotowało znaczny spadek, o 5,3 punktu procentowego w ciągu 7 lat. Niemniej jednak Śląsk charakteryzuje się dużą różnorodnością pod względem formy własności mieszkań, z których wiele jest własnością spółdzielni mieszkaniowych, gmin, firm prywatnych i mieszkań zajmowanych przez właścicieli. Wiek budynków w regionie jest również istotnym problemem, ponieważ ponad 78% budynków zostało zbudowanych przed 1978 rokiem, przy średniej krajowej wynoszącej około 50%. Te stare budynki wymagają dużej ilości energii, a 32% budynków mieszkalnych nadal korzysta z nieefektywnych źródeł ciepła

na paliwa stałe, przy czym węgiel jest najczęściej używanym paliwem do ogrzewania, co może być ważną kwestią do rozwiązania podczas odchodzenia od węgla. Na koniec warto zauważyć, że Śląsk jest najbardziej zurbanizowanym regionem badanym w ramach tego projektu, ze wskaźnikiem urbanizacji wynoszącym około 81%

Hunedoara (in English)

The region studied in the context of JUSTEM is the Hunedoara County, and specifically the area of Jiu Valley, a micro-region having the richest coal resources in Romania. One of the main issues that the County faces is a decreasing population due to the economic restructuring of the county leading to the lowest GDP growth in the Vest region. This phenomenon has led to increased long-term unemployment with coal mine closures worsening the situation. Despite the closure of mines, coal remains an important fuel for Romania's electricity sector accounting for 15.5% of the national energy mix in 2022, with significant environmental impact, since nearly 20% of contaminated sites in Romania are located in the Hunedoara County.

Low employment and environmental deterioration are two extremely important issues for said region, with the literature review conducted in the project's context further suggesting that investments are a key stakeholder needs contributing towards increasing employment in the region. Moreover, the inconsistency of participatory decision-making processes is another issue highly concerning stakeholders a lot, reflected also in the fact that the impact of stakeholder consultation is not evident in Romanian planning documents. This issue is also evident in the cross-country assessment of the TJTPs since the indicators show that there are unclear rules and procedures for stakeholder participation, yet the plan's performance is noticeably strong in reference to the alignment to long-term paths, and consideration of social and environmental objectives. Moreover, Romania's NECP, contrary to most other countries, specifies the volume of decommissioned capacity instead of the elaborating on the plants closing, but at the same time Romania is the only country that sets a specific year for the termination of fossil fuel subsidies. A key caveat is the fact that the plan does not foresee a revision process if poor performance is identified or ensure consistency with the upcoming revision of the NECP.

Energy poverty was also indicated as an important problem in coal regions in the Romanian literature which is also evident from statistical data since the regional average disposable income in the Hunedoara County is almost twice as low as the national one in Romania. Moreover, the unemployment rate in the region is almost 4%, double the national rate. The situation for Hunedoara County is worsened by the fact that although Romania is characterised by a 91.2% share of privately owned houses, this share drops to 52.3% in said region. Lastly, it is important to mention that Romania's main heating fuel is natural gas, which combined with the fact that Romania ranks 22nd out of 28 EU member states in terms of energy efficiency can become a significant concern for poor regions (e.g., Hunedoara County) if natural gas prices increase in the future.

Hunedoara (in Romanian)

Regiunea studiată în contextul proiectului JUSTEM este județul Hunedoara, și mai precis zona Văii Jiului, o microregiune având cele mai bogate resurse de cărbune din România. Una dintre principalele probleme cu care se confruntă județul este o scădere a populației ca urmare a restructurării economice a județului care a condus la cea mai scăzută creștere a PIB-ului din regiunea Vest. Acest fenomen a dus la creșterea șomajului pe termen lung, iar închiderea minelor de cărbune a agravat situația. În ciuda închiderii minelor, cărbunele rămâne un combustibil important pentru sectorul electric al României, reprezentând 15,5% din mixul energetic național în 2022, cu impact semnificativ asupra mediului, deoarece aproape 20% din siturile contaminate din România sunt situate în județul Hunedoara.

Ocuparea redusă a forței de muncă și deteriorarea mediului sunt două probleme extrem de importante pentru regiunea respectivă, analiza literaturii efectuată în contextul proiectului sugerând în continuare că investițiile reprezintă o nevoie cheie a părților interesate care contribuie la creșterea ocupării forței de muncă în regiune. Mai mult, inconsecvența proceselor de luare a deciziilor participative este o altă problemă care preocupă foarte mult stakeholderii, reflectată și în faptul că impactul consultării părților interesate nu este evidentă în documentele de planificare românești. Această problemă este, de asemenea, evidentă în evaluarea trans-țară a PTTJ, deoarece indicatorii arată că există reguli și proceduri neclare pentru participarea părților interesate, totuși performanța planului este considerabil de puternică în ceea ce privește alinierea la căile pe termen lung și luarea în considerare a obiective sociale și de mediu. Totuși, PNEC din România, spre deosebire de majoritatea celorlalte țări, precizează volumul capacităților scoase din funcțiune, în loc să dezvolte planurile privind închiderea centralelor, dar, în același timp, România este singura țară care stabilește un an anume pentru încetarea subvențiilor pentru combustibili fosili. Un avertisment cheie este faptul că planul nu prevede un proces de revizuire dacă este identificată performanță slabă sau asigură coerența cu revizuirea viitoare a PNEC.

Sărăcia energetică a fost, de asemenea, indicată ca o problemă importantă în regiunile carbonifere în literatura română, ceea ce este evident și din datele statistice, deoarece venitul disponibil mediu regional în județul Hunedoara este aproape de două ori mai scăzut decât cel național în România. Astfel, rata șomajului în regiune este de cca. 4%, aproape dublu față de rata națională. Situația pentru județul Hunedoara este înrăutățită de faptul că, deși România se caracterizează printr-o pondere de 91,2% a caselor în proprietate privată, această pondere scade la 52,3% în regiunea respectivă. În sfârșit, este important de menționat că principalul combustibil pentru încălzire al României este gazul natural, ceea ce combinat cu faptul că România se află pe locul 22 din 28 de state membre UE în ceea ce privește eficiența energetică poate deveni o preocupare semnificativă pentru regiunile sărace (de exemplu, județul Hunedoara), dacă prețurile gazelor naturale cresc în viitor.

Asturias (in English)

Asturias is the Spanish region examined in this project, with a significant portion of its municipalities being affected by the phase-out of coal as well as mine closures, with since the region employing up to 100,000 in the coal sector the 1950s. The abundance of coal resources in the region boosted its economy by attracting and powering the steel, cement, ceramics, chemicals and paper industries. Therefore, although coal mines are closing and the coal phase-out is almost completed the region's, GDP has increased in the last two decades. However, there should be significant effort to ensure that the completion of coal phase-out does not spread in these industries. The Spanish Government has set a target to complete its coal phase-out by 2030 (1,283 MW of coal power plants are still operating). Nevertheless, the region of Asturias will face a high population decrease by 2029 (which is also ageing) and is characterised by a higher employment rate than the Spanish national rate; hence the energy transition should focus on reducing the negative impacts of a coal phase-out.

Employment is among the most studied stakeholder needs in Spanish literature, with scholars highlighting the important population decrease in coal regions in Spain. Another issue highly examined is the rehabilitation of coal mines in the region. On the other hand, issues such as energy poverty, participatory decision-making and other issues, although examined, are not the main focal point of scholars. Specifically, the Spanish government has proposed a specific plan to alleviate energy poverty by 2025, reflecting that this issue is somehow tackled in the region. Moreover, the Spanish government seems to have started to tackle the issue of the coal mines' rehabilitation with specific initiatives. The aforementioned initiatives of the Spanish government are also positively assessed by the WWF toolkit since the Spanish TJTP is the only one (among the five examined) that was assessed with a higher rank. This also derives from the fact that Spanish plans are the only ones that indicate specific rules and procedures for stakeholder participation, including the establishment of social dialogues, a coordination body and a transparency portal.

Regarding energy poverty and other social indices, apart from the higher unemployment rate, the situation in Asturias is slightly better than the national average. For example, the average disposable income is slightly higher than the national average and the at-risk of poverty and social exclusion rate is slightly lower than the national average.

Asturias (in Spanish)

Asturias es la región de estudio española en este proyecto. Asturias dispone de una proporción muy alta de municipios afectados por la eliminación gradual del carbón, así como por el cierre de minas y de centrales térmicas de carbón. En la década de 1950 la región empleaba hasta 100.000 personas en el sector del carbón. La abundancia de recursos carboníferos propició la instalación de hasta cinco centrales térmicas en la región, atrayendo a la industria electro-intensiva del acero, el cemento, la cerámica, los productos químicos y el papel, lo cual supuso un impulso a su economía. Esta industria ha conseguido, a pesar de que el proceso gradual de eliminación del carbón casi se ha completado en la región, que el PIB haya aumentado en las últimas dos décadas. Es por ello que un esfuerzo singular ha de realizarse en Asturias para garantizar que este proceso de descarbonización no afecte a la continuidad de sus industrias. El Gobierno español marcó el año 2030 como límite para completar dicho proceso de descarbonización de la producción energética (en la actualidad 1.283 MW procedentes de centrales eléctricas de carbón siguen en funcionamiento). Asturias ha de sumarse también el reto de contener el elevado descenso demográfico previsto hasta 2029, en un contexto regional de envejecimiento poblacional y con una tasa de empleo superior a la media nacional. Todo ello demuestra cómo la región se encuentra en un proceso de transición energética y justa para Asturias y está trabajando en minimizar los impactos negativos que la eliminación gradual del carbón, el cierre de las minas y de las centrales térmicas están produciéndose o podrían ocasionar.

Publicaciones académicas destacan el desempleo como una de las necesidades más acuciantes de las regiones del carbón, y como derivada primera la consecuente disminución de la población en estas regiones de España. Cuestiones como la pobreza energética o la participación ciudadana también son foco de atención. E gobierno español ha propuesto un plan específico centrado en mitigar la pobreza energética con un alcance 2025, instrumento que tiene aplicación en la región. En particular, en Asturias, la restauración de minas y escombreras de carbón, como forma de curar estas heridas abiertas del territorio, es una cuestión sobre la que se pivotan esfuerzos y dedicación, esfuerzos a los que se suma el gobierno español, apoyado por el Instituto para la Transición Justa (ITJ). El conjunto de iniciativas mencionadas es valorado positivamente por el conjunto de herramientas de WWF, siendo el Plan Territorial de Transición Justa (TJTP) de Asturias el que obtuvo una calificación más alta entre los cinco examinados. Esta valoración es consecuencia de haber incluido en el Plan, a través de un órgano de coordinación y un portal de transparencia, procedimientos para incorporar en su definición y evaluaciones posteriores la participación abierta de todas las partes interesadas, incluyendo también el diálogo social.

La situación de Asturias frente a cuestiones como el número de personas en situación de pobreza energética u otros indicadores sociales, y a excepción de la tasa de desempleo, es ligeramente mejor que la media nacional. Por ejemplo, la renta media

disponible es ligeramente superior a la media nacional y la tasa de riesgo de pobreza y exclusión social es ligeramente inferior a la media nacional.

ANNEX II: ALIGNMENT OF POLICY DOCUMENTS WITH THE JUST TRANSITION PRINCIPLES

Summary of just transition policy documents affecting the transition of the Stara Zagora Region

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
1.	Responsible agency/authority for the development of the document	The Government through the Deputy Prime Minister for European Funds and the Minister of Finance. Connection with art. 22 of Regulation (EU) 2021/241 of the European Parliament and of the Council of 12.02.2021	The Government and Ministry of Environment and Water. This Plan has been prepared in accordance with the requirements of Regulation (EU) 2018/1999	Developed by the municipal authorities. The plans cover a 7-year period (2021-2027) and bring together in one document the elements of the municipal development plans and integrated plans for urban regeneration and development that were in place during the period 2014-2020.	Developed by the municipal authorities. Long-term (10 years) and short-term (3 years) programmes.	Developed by the Ministry of Regional Development and Public Works in accordance with the National Concept for Spatial Development for the period 2013-2025. The Strategy covers the period 2021-2027. Adopted by

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
						the Council of Ministers on 16.11.2022
2.	Stakeholders consulted in the development of the document	Public discussions of the plan and the environmental impact assessment report were held and all stakeholders had the opportunity to participate in them. Submitted comments on the plan were published on the government's website.	Public discussions of the plan and the environmental impact assessment report were held and all stakeholders had the opportunity to participate in them. Submitted comments on the plan were published on the	The plans are required to be discussed and agreed upon with the authorities and organisations concerned, economic and social partners, citizens and representatives of legal entities relevant to the development of the municipality.	No public discussions held	Public discussions and environmental impact assessment held.

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
			government's website.			
3.	Outlined developments in coal demand and supply, including coal phase-out date	Provides for the development of a plan to phase out coal-fired power plants by 2038 and a regulatory cap on their carbon dioxide emissions from 1 January 2026.	Bulgaria will make maximum use of the existing potential of the country's indigenous coal, in compliance with environmental requirements, as it can provide a resource for the production of electrical energy for the next 60 years.	Reducing the use of fossil fuels for heating and increasing the use of gasification and RES; improving the energy efficiency of municipal buildings and building installations.	As far as the promotion of the use of RES in public and private sectors is concerned, the replacement of stoves and boilers burning coal and briquettes with biomass installations is encouraged.	The strategy only highlights the high proportion of fossil fuels used (especially for domestic heating) and suggests gasification as one of the best alternatives.
4.	Alignment with the Just Transition's	The plan includes 57 investments and 47	The plan defines the country's main	The plans formulate the municipalities' vision for	The programmes define the main goals at the municipal	There are 3 strategic

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
	objectives: decentralising energy production, improving energy efficiency and reducing dependence on energy imports, reducing emissions, and stimulating employment and growth	reforms. The main goal is to reduce the carbon footprint and energy intensity of the economy and to help the green transition by taking measures to increase the energy efficiency of buildings and promoting the production of energy from renewable sources.	goals for stimulating low-carbon development of the economy, developing competitive and secure energy and reducing dependence on fuel and energy imports.	their development over the stated period and define strategic objectives, such as creation of conditions for sustainable and balanced economic growth and energy transition, improving of living standards, investing in human capital, environmental protection and adaptation to climate change.	level, i.e. reduction of energy consumption and improvement of energy efficiency, achievement of economic growth, reduction of dependence on imported fuels and diversification of energy supply, reduction of CO2 emissions and improvement of air quality, etc. and the measures to meet the goals.	priorities: 1. Support for the sustainable and smart economy in the region; 2. Improvement of living standards and educational level of the population, 3. Territorial cohesion and integrated urban, rural and coastal development.
5.	Does the plan meet the goals of the energy transition and the transition	Commitments to reduce greenhouse gas emissions from coal-fired power	The plan envisages the use of coal until 2060. The use of local coal reserves	The plans follow the goals and strategies of the National Development Programme "Bulgaria	In general, the objectives of these programmes are synchronised with the national objectives and aim	The objectives and priorities for the development of the SER in the

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
	schedule at the national level? Targets for 2020s/short-term, 2030/mid-term, 2050/long-term	generation by 40% by 2025, but without closing coal-fired power plants.	has a future as a stabilising energy source. The power plants are seen as a guarantor of Bulgaria's energy security and the competitiveness of the Bulgarian economy.	2030", the updated National Spatial Development Concept for the period 2013-2025, NRRP, the Integrated Territorial Strategy for SER, as well as the EU policy goals by 2027.	to contribute to their achievement, but they are more pragmatic and address specific regional problems.	period 2021-2027 are in line with the objectives and strategies of the National Development Programme "Bulgaria 2030", the updated National Spatial Development Concept for the period 2013-2025, as well as the EU cohesion and regional development policies after 2020.

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
6.	Available clear evidence of a transition process	In the period 2020-2030, the share of RES in gross final energy consumption increases from 20.18% to 24.73%. In 2020-2025, the increase is mainly due to the construction of new RES capacities, while in 2025-2030 it is due to measures to increase energy efficiency in the final energy consumption. After 2030, a further development is expected and in 2040	The plan proposes the RESTORE project, which aims to contribute significantly to the solving of the energy storage problem by purchasing, installing and commissioning of a national infrastructure of electrical energy storage facilities with a total charging energy capacity of 6,000 MWh.	The plans take into account the inevitability of the green transition and the need to transform and adapt the economy to the new conditions, to retrain the workforce and to minimise the negative social consequences of the transition. However, there are no concrete measures at local level to specifically tackle this issue.		The strategy outlines that the region should follow the green and low-carbon development, which will require interventions and policies by investing in energy transition, green and blue investments, circular economy, adaptation to climate change, prevention and risk management.

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
		the share of RES will be close to 28%.				
7.	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health impacts, (energy) poverty,...?	There is no such information	There is no such information	Impacts, such as job losses, health issues etc. are reported as general threads. As regards reskilling, it is usually addressed within the framework of support and encouragement measures for local business development and overcoming of local poverty issues.	There is no such information	There is no such information

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
8.	Outlined concrete activities/measures for regions and people to address the social, economic and environmental impacts of the transition. For example: what could be done with the industry buildings and land after mining? Or does the document outline concrete infrastructural projects?	It is planned to create a state-owned company for the conversion of coal-mining areas, which will employ workers who have been laid off for a long time as a result of the energy transition. More specifically, the company will be in charge of the reclamation of the lands of Mini Maritsa Iztok and the thermal power plants in the region.	There are no measures in the plan	Land recultivation, using of post-mining lands for extreme tourism	Municipality of Galabovo discusses the creation of a municipal utility cluster (RES Programme, 2020a)	There is no such information

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
9.	Proposed concrete projects that are eligible for JTF support	Supporting scheme for the deployment of at least 1.4 GW of RES with storage in Bulgaria through the purchase, installation and commissioning of a national electricity storage infrastructure with a total capacity of 6,000 MWh. The facilities will be strategically distributed evenly over the territory of Bulgaria, close to the installed and soon to be installed	There are no specific projects in the plan, only goals and measures to reach these goals	The Municipality of Stara Zagora lists project ideas within the different priority measures that could be supported by JTF. These include promoting the accelerated development and growth of local economy through services for business, digital connectivity and improved technology , innovation hubs; support for the sustainable energy transition, RES utilisation; promoting innovation and education, lifelong learning, retraining and qualification; developing green infrastructure and	There are no such projects	Creation of new industrial zones/parks with a focus on green, high-tech industries that create sustainable employment and guarantee high wages

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
		renewable generating capacities.		supporting circular economy.		
10.	Outlined investment opportunities of projects beyond the JT mechanism	The plan considers financing opportunities from the EU structural funds, the European Investment Bank, the European Bank for Reconstruction, the World Bank, the Innovation Fund and the Modernisation Fund.	The plan considers financing opportunities from the EU structural funds, the European Investment Bank, the European Bank for Reconstruction, The World Bank, the Innovation Fund and the Modernisation Fund.	State and municipal budgets, private investments, Operational programmes, NRRP, EU programmes	State and municipal budgets, EU programmes, Operational Programmes, ESCO, public-private partnerships, various national funds	National public financing, ERDF European Climate Foundation, CF, EAFRD, EMFF, international financing institutions, funds from natural and legal persons, NGOs, etc.
11.	Available measures for dealing with vulnerable groups	Pilot project for the provision of aids for people with	The plan foresees: provision of adequate	Dealing with vulnerable groups in a more general way, directed towards	E.g. Radnevo municipality sees the engagement of energy poor households in	There is no such information

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
	(e.g. energy poor households) and gender-related issues. For example, is there information on the gender balance in involvement in decision-making?	permanent disabilities. Providing digital literacy training and creating an adult learning platform	protection of energy poor citizens through targeted heating subsidies; implementation of a mechanism to protect vulnerable consumers at the start of the process towards full liberalisation of the electricity prices for final users, including households; renovation of the buildings, resulting in removing households identified as	improving the quality of social services and active municipal policies for training and retraining in professions of local importance	energy communities and initiatives for social support of vulnerable groups (RES Programme, 2022)	

		NRRP (CoM, 2022)	NECP (ME, MOEW, 2020)	Municipal Integrated Development Plans (Stara Zagora Municipality, 2022; Radnevo Municipality, 2021; Galabovo Municipality, 2021)	Municipal programmes to promote the use of RES and biofuels (Stara Zagora Municipality, 2020; Galabovo Municipality 2020; Radnevo Municipality, 2022)	Integrated Territorial Development Strategy of South-East Planning Region (SER) (MRDPW, 2022)
			income risk from the group at risk of energy poverty			

Summary of just transition policy documents affecting the transition of the Istria Region

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
1.	Responsible agency/authority for the development of the document	The Government in cooperation with the Ministry of Finance, aligned with the Government Program of the Republic of Croatia 2020 - 2024, the National Reform Program 2019, Special Recommendations Council of the EU (Country-specific recommendations - CSR) within the framework of the European Semester for 2019 and 2020, the Action plan for the participation of the Republic of Croatia in the exchange rate mechanism (ERM II) and the National Development Strategy of Republic of Croatia until 2030	Integrated NECP (12/2019): Ministry of Environmental Protection and Energy, in accordance with Article 12 of the Act on the Strategic Planning and Development Management System of the Republic of Croatia (Official Gazette No. 123/17) Updated Integrated NECP (draft by June 2023, final version by June 2024): Ministry of Economy and Sustainable Development, managed by two administrations - Administration for Climate Activities and the	Deloitte ltd. in cooperation with the Ministry of Regional Development and EU Funds, Istrian County and Sisak Moslavina County and Aurora – Regional coordinator of the County of Istria for European programs and funds.	Ministry of Economy and Sustainable Development, in accordance with the provisions of Article 8 of the Act on energy efficiency (Official Gazette, No. 127/14, 116/18, 25/20, 41/21) and provisions of Article 5 of the Ordinance on the System for Monitoring, Measuring and Verifying Energy Savings (Official Gazette, No. 98/21 and 30/22). Measures implementation planned in accordance with the Integrated National Energy and Climate Plan for the Republic of Croatia for the period from 2021 to 2030, with the Long-Term Reconstruction Strategy of the National Building Stock until 2050 (Official Gazette, number 140/20) as well as special programs energy renovations that are adopted on the basis of the Law on Construction (Official Gazette, No. 153/13, 20/17, 39/19 and 125/19) (p.5)

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
			Administration for Energy.		
2.	Stakeholders consulted in the development of the document	Public hearing of the plan was held (VRH, 2021a) and all stakeholders had the opportunity to participate in the discussion. Draft version published in March 2021, proposal published 29 April 2021 and final version adopted in July 2021.	Public discussions and workshops for Integrated NECP plan development were held (E-counselling, 2020) and all stakeholders had the opportunity to participate in them. The submitted comments on the plan were published on the government's website. In March 2023, several workshops were held for development of an Updated Integrated NECP. Workshops were implemented by the Ministry in cooperation with the Regional Energy	Public discussions and interviews held in December 2020 and January 2021, workshops with stakeholders involved in TJTP held in March 2021, public online submission of project ideas was available until March 2021 (ESIF, 2022).	Public discussions held and all stakeholders had the opportunity to participate in them. The submitted comments on the plan were published on the government's website (E-counselling, 2022).

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
			and Climate Agency of North-West Croatia (REGEA) within the LIFE - NECPlatform project (MINGOR, 2023).		
3.	Outlined developments in coal demand and supply, including coal phase-out date	There is no such information	Cole and coke import decreasing at an average annual rate of 3% during the period 2012-2017 (p.17); Power plant electricity generation capacities in the period 2020-2030 regarding coal constant at 192 MW (p.58); Coal and natural gas TPPs are not expected to be technologically advanced except in the context of the development of carbon capture and storage, CCS (p.182); Electricity transmission grid in the Plomin 2 TPP	Refers to COP26 Glasgow announcement to phase out coal-fired power generation by 2033 (p.2), plans to implement photovoltaics for individual consumption in Plomin, plans to modernise technology and transition from coal and petcoke to RES, and 53% reduction in GHG/t cement emissions (2030 relative to 1990) for Holcim, together with the development of carbon capture technology (p.6)	Increased use of all energy sources for direct consumption from 2014 to 2020, except coal and coke (p.9)

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
			planned by the observed period (referring to 2030) (p.202)		
4.	Alignment with the Just Transition's objectives: decentralising energy production, improving energy efficiency and reducing dependence on energy imports, reducing emissions, and stimulating employment and growth	The plan includes reforms and investments aimed at developing green and digital transition, employment and skill development, and education. 10.2% of the budget for energy transition, 4% for labour market stimulation and social protection (p.4)	The objectives will be achieved through the five key dimensions of the Energy Union: 1. energy security, 2. internal energy market, 3. energy efficiency, 4. Decarbonisation, and 5. research, innovation and competitiveness (p.4)	Refers to the Croatian National Development Strategy 2030 strategic goal 8: Environmental and energy transition towards climate neutrality with two priority policies – preservation of natural resources and fight against climate change, and achieving energy self-sufficiency and transition to clean energy, refers to other strategies (NECP) in relation to RES development (p.1)	The main objective is to increase energy efficiency through horizontal measures and measures in the building, public, industrial and transport sectors.
5.	Does the plan meet the goals of the energy transition	Refers to achieving the goals set in NECP (p.180)	According to the energy transition implementation target,	GHG reduction of at least 43% by 2030 compared to 2005, GHG reduction	The estimated level of primary energy consumption in 2030 is 9.32% less than compared to 2014. Estimated direct

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
	and the transition schedule at the national level? Targets for 2020s/short-term, 2030/mid-term, 2050/long-term		the total energy consumption is estimated to be reduced by 16% by 2050 compared to 2017. National supply capacity is estimated to increase to 55.2% in 2030, and decrease to 51.7% in 2050. (p.69) Planned GHG reduction targets by 2030 in the ETS sector of at least 43% compared to 2005 and in the non-ETS sectors at least 7% compared to 2005 (p.52)	of at least 61% at EU level for the ETS sector compared to 2005 and at least 16.7% for non-ETS sectors at EU level, 36.64% RES in gross final energy consumption by 2030, 0.4% increase in employment rate by 2030. GHG reduction by 64-74% by 2050 compared to 1990 (p.3)	energy consumption for 2030 is 10.04%more compared to 2014 (p.18)
6.	Available clear evidence of a transition process	Use of hydrogen and new technologies to decarbonise the energy sector through installation of 10 MW electrolysers by 2026 (p.21), annual energy renovation rate of total building stock (linked to energy poverty targets)	Increase the share of RES in the gross final energy consumption from 28.6% in 2020 to 36.4% in 2030 (p.54), increase the share of RES in electricity from 47.0% in 2020 to 63.8% in 2030 (p.55) through the	Decrease GHG emissions from 75.2% in 2018 to 65% in 2030, increase recycled communal waste in total waste from 25.2% in 2020 to 55% in 2030, increase the share of RES in the gross final energy consumption	Lists 32 measures to be implemented over the period 2022-2024 (approx. EUR 1.36 billion) with brief descriptions of project activities, budgets, timeframes, target groups and regional application coverage.

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
		increased to 2% per annum by 2026, 3% per annum by 2030, 3.5% per annum in 2031-2040 and 4% per annum in 2041-2050 (p.22)	establishment of ETS standards, capacity building for regional energy and climate agencies, various development programmes (Green Infrastructure Development in Urban Areas Programme, Circular Spatial and Building Management Development Programme, green infrastructure and circular spatial management projects), etc. (p. 80-133)	from 28.0% in 2018 to 36.4% in 2030 (p.1)	
7.	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health	There is no such information	There is no such information	There is no such information	There is no such information

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
	impacts, (energy) poverty,...?				
8.	Outlined concrete activities/measures for regions and people to address the social, economic and environmental impacts of the transition. For example: what could be done with the industry buildings and land after mining? Or does the document outline concrete infrastructural projects?	No such activities/measures are available.	No such activities/measures are available	No such activities/measures are available	No such activities/measures are available
9.	Proposed concrete projects that are	C3.1. Education system reform (p.903), C4.1. Improvement of employment measures	OIE-3 Promoting the use of RES for production of electrical and thermal energy - provide financial	Operation 1: Support the establishment of sustainable production technology hub of Istria,	UET-6 - Programme to combat energy poverty, including the use of RES in subsidised residential buildings areas

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
	eligible for JTF support	and legal framework for the modern labour market and the economy of the future (p.973)	incentives for the development of RES projects for electricity and heat production. Encouraging the use of RES for electricity and heat production will be implemented at the national level (p.115-116)	Operation 2: Development of agriculture and food processing industry in Istria County, Operation 3: Implementation of the programs oriented toward future-oriented competencies, Operation 4: Investment in circular economy advancement through building and equipping recycling yards, including activities related to connecting to communal, telecommunication and electric energy infrastructure, Operation 5: Increasing destination attractiveness and development of touristic and related products through conservation, revitalisation, promotion and development of	and areas of special state care for the period 2021-2025 (p.32) ENU-4 - Energy refurbishment program for family houses in 2021-2030 period (p. 33) (also targeting energy poverty), ENU-13 - Education in the field of energy efficiency (p.39), ENU-19 - Increasing energy efficiency and use of RES in production industries (p. 50)

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
				cultural products and services based on mining and industrial heritage, Operation 6: Increasing destination attractiveness and development of touristic and related products through cultural heritage services (investments in old city cores), Operation 7: Implementation of programs of re-skilling and education of adults (socially endangered persons, persons in unfavourable position) emphasising technological courses and occupations in line with local economy development guidelines, Operation 8: Developing and equipping educational institutions aiming to improve	

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
				educational programs for student competencies, Operation 9: Mobilise ETS sector to reduce the share of regional GHG emissions in the total national account through direct investments that contribute to CO2 emission reduction, Operation 10: Mobilise ETS sector to reduce the share of regional GHG emissions in the total national account through investment in production innovation for SMEs (p.15-15, 20)	
10.	Outlined investment opportunities of projects beyond the JT mechanism	Financing procedure: the Ministry of Economy in cooperation with the HAMAG-BICRO agency will carry out calls for grants funds to entrepreneurs - HAMAG-BICRO financial	EU funds (not determined which), funds of regional/local self-government units, funds collected through auctions	Not mentioned.	Environmental Protection and Energy Efficiency Fund, APN - agency for legal transactions and real estate mediation, ESIF funds (recovery and resilience operational program), Plinacro, EEA financial mechanism (p.5-6)

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
		instrument of interest rate subsidies in addition to existing instruments guarantees are carried out in cooperation with other financial institutions (banks and leasing companies) (p.486-487) The plan considers existing HBOR's (Croatian Bank for Reconstruction and Development) support programs for financing (p.488)			
11.	Available measures for dealing with vulnerable groups (e.g. energy poor households) and gender-related issues. For example, is there information on the gender balance in	Measure C1.1.1. R4-I1 "Support to companies for the transition to energy and resource efficiency economy" takes into account all parameters of equality and has no negative impact on gender equality, the possibility of employment of vulnerable	UET-5: Adoption and implementation of the Programme for energy poverty alleviation - alleviation of energy poverty and its degree of vulnerability; setting up an energy poverty	No such activities/measures are available	UET-6 - Programme to combat energy poverty, including the use of RES in subsidised residential buildings areas and areas of special state care for the period 2021-2025 (p.32) ENU-4 - Energy refurbishment program for family houses in 2021-2030 period (p. 33) (also aimed at energy poverty)

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
	involvement in decision-making?	groups or discrimination of any kind species. (p.449) C3.1. Education system reform – reforms and investments will be aligned with the principles of the 2nd and 3rd European Pillar of Social Rights, which relate to gender equality and equal opportunities, through the inclusion of measures that contribute to promoting these principles (p.903). C4.1. Improvement of employment measures and legal framework for the modern labour market and the economy of the future (p.973) C6.1. Building energy renewal - Through programs of energy renovation of the housing	monitoring system (p.169)		

		NRRP (VRH, 2021)	NECP (MEPE, 2019)	TJTP (Deloitte, 2022)	National Action Plan of Energy Efficiency (2022-2024) (MINGOR, 2022)
		sector, work will be done on the reduction of energy poverty, and special care will be taken of energy renovation of cultural heritage buildings (p.1141-1143)			

Summary of just transition policy documents affecting the transition of the Western Macedonia Region

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
1.	Responsible agency/authority for the development of the document	The Government through the Deputy Minister of Finance. Moreover, Law 4738/2020 legislated the Special Coordination Service of the Recovery Fund. Simultaneously, the correct management of financial assets during the development of the plan is controlled by the Budgetary Control Committee.	The NECP was developed by the Ministry of Environment and Energy and will be closely monitored by the governmental committee for Energy and Climate, which was assembled by the Greek Ministerial Council Act 31/30.09.2019, as well as the interministerial committee for Energy and Climate.	The plan was developed by the Coordination Committee of the Just Transition Plan, established by the Ministry of Environment and Energy. Members of this Committee are regional prefects of the regions of Western Macedonia and Peloponnese. The implementation of the plan is managed by the Governmental Committee for the Just Transition of the region of Western Macedonia and the Municipality of Megalopolis, which consists of the Minister of Environment and Energy, the Minister of Finance, the Minister of	The plan was developed by a company of geology engineers, who were assigned by the Managing Authority of the Operational Programme of Western Macedonia.	The plan was developed by the Chemical Process and Energy Resources Institute and the Municipality of Eordaia.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
				Development and Investments, the Minister of Home Affairs, the Minister of Agricultural Development and Food and the Deputy Minister of Development and Investments, responsible for public investments and the NSRF.		
2.	Stakeholders consulted in the development of the document	Before the draft version of the plan was completed, suggestions from many ministries were collected. After the plan was completed, the Economic and Social Committee was asked to examine the plan and run a deliberation process among its members. Then, the Committee arranged a series of meetings with the representatives of	Before the Plan was finally drafted, four rounds of consultation took place in the Greek Parliament, each round examining different aspects of the Plan. At the same period, a deliberation process was also taking place, in which stakeholders such as social partners and civil society members participated. Moreover, during the plan's development, a	An open call for consultation was published to academic institutions, social and professional partners and entities related to the public sector and municipal/regional administration. Furthermore, a forum was organised, focusing on the energy transition of Western Macedonia and Megalopolis. Furthermore, many	The draft was subject to a deliberation process on the website of the regional authority of Western Macedonia. Moreover, the draft was sent to similar institutions such as regional units and municipalities. Analytically, the Plan includes a thorough list of stakeholders that may be involved in the consultation of the Plan	There was no deliberation process for the composition of the Plan but the Plan proposes to organise a deliberation process with local stakeholders to thoroughly discuss and further define the Plan's objectives and actions.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
		various institutions. Moreover, the plan was available for a deliberation process through the Ministry of Finance website, in which research centres, companies, representatives of civil society and citizens participated.	workshop for municipalities and regional authorities took place, in which 86 representatives participated. Apart from that, many deliberation processes took place such as a workshop for institutional and market stakeholders as well as NPOs. Afterwards, a press conference took place focusing on the plan's targets. Furthermore, a workshop dedicated to Research and Innovation was also organised. Then, the initial document was uploaded to a deliberation website, so that stakeholders could make comments and suggestions. Moreover, meetings with RES market stakeholders took place to examine the	workshops were organised with the participation of stakeholders from the energy sector. Moreover, the head of the Coordination Committee visited lignite regions and briefed the regional political parties as well as representatives from working centres, technical chambers, workers' associations, academic institutions etc. In these visits, multiple suggestions were collected. In this context, collaborations with PPC and universities also took place. Lastly, meetings with the team of the Labour Employment Office were organised in order to examine the available reskilling	during its implementation.	

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
			updated targets for RES penetration. At the same time, many institutions participated in the interministerial committee submitting their suggestions. Afterwards, the plan was once again uploaded to the deliberation website for a second round of consultation. Lastly, the Plan was presented in an event co-organised by the Bank of Greece, where stakeholders were able to make further suggestions. During this whole period, the Greek government was also communicating with other countries to exchange expertise by signing memoranda of understanding.	programmes. Then, the Plan was presented to the Coordination Committee as well as the technical teams of the regional authorities of Western Macedonia. Lastly, the Plan was published on a web platform, where a deliberation process took place, in which people could make their suggestions.		

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
3.	Outlined developments in coal demand and supply, including coal phase-out date	Axis 1.1. (Transition to a new environmental-friendly energy model) adopts the delignitisation target for 2028, as proposed in the Greek NECP and the Master Plan for delignitisation.	The Plan aims for a phase-out by 2028, proposing a schedule for the decommissioning of each lignite electricity generation plant. The Plan also proposed that a Master Plan for Just transition would be composed in 2020.	The Plan proposes an analytical timeline for the phase-out of each lignite-fired power plant, with the target to achieve total phase-out by 2028. Moreover, the Plan includes data for the demand for lignite for the period of 2010-2019 as well as the electricity generation from lignite power plants in the same period and the operational costs for lignite mines.	There is no such information	The Plan outlines the extraction capability of each mine in Western Macedonia but there is no further information on lignite phase-out.
4.	Alignment with the Just Transition's objectives: decentralising energy producti	Axis 1.1. includes also socioeconomic and environmental actions towards the rehabilitation of lignite regions in the context of just transition. Moreover, the National Plan for Just Transition is mentioned in the plans aiming for the	The plan proposes the creation of energy communities and the increase of prosumers to facilitate the decentralisation of the energy system. In the same context, it also suggests the modernisation of the distribution network and	The Plan envisages promoting the employment of unemployed and young people, focusing on the reskilling of local workers. Moreover, the Plan suggests several actions that will boost economic growth (e.g., the construction of an	There is no such information	The plan aims to increase the energy efficiency of public and private buildings. Moreover, the Plan proposes actions regarding energy efficiency in the transport and agriculture sectors

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
	on, improving energy efficiency and reducing dependence on energy imports, reducing emissions, and stimulating employment and growth	alignment of the two plans. Furthermore, Axis 1.2 and 1.3 aim to improve the energy efficiency of the building stock, aiming to improve energy efficiency by at least 30% to the refurbished buildings.	the construction of energy storage units. Furthermore, the Plan introduces various actions towards energy efficiency such as building refurbishments. The plan also aims at diversifying the energy imports of the country, through increased RES penetration and increased e-mobility. Energy imports are expected to significantly decrease by 2030. The main aim of the Plan is to reduce emissions by 40% by 2030, meeting the EU's targets (at the time of the plan's conception). Lastly, the Plan also has some provisions regarding new RES-induced jobs.	industrial park focusing on the manufacturing of e-vehicle parts and a rehabilitation clinic). Lastly, the Plan aims to develop some RES electricity generation plants as well as energy storage facilities.		(e.g., seminars on eco-driving and the improvement of irrigation systems). Furthermore, the Plan proposes the installation of RES plants. Lastly, the main objective of the plan is to achieve CO_2 emissions reduction by 40% by 2030.
5.	Does the plan meet the	The plan does not make any further commitments on GHG	The Plan set the country's targets for GHG emissions, setting a	The plan does not set any further goals regarding energy	There is no such information	The plan aims to reduce the municipality's CO_2

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
	goals of the energy transition and the transition schedule at the national level? Targets for 2020s/short-term, 2030/mid-term, 2050/long-term	emissions reduction but it aims to align with the NECP which has set a goal to reduce GHG emissions by 40% by 2030.	target for a 40% decrease by 2030. Moreover, the Plan mentions a higher goal for 2050 with the ambition to reach carbon neutrality.	transition but adopts the targets set in the NECP.		emissions by 40% by 2030, adopting the national target set by the NECP.
6.	Available clear evidence of a transition process	The plan does not have any further goals but since it aims to be aligned with the NECP and the National Plan for Just Transition it adopts their objectives,	The main aim of the plan is to reduce emissions, hence leading to an energy transition. It proposes relevant measures in various sectors such as	The Plan proposes an analytical timeline for the decommissioning of lignite power plants and also proposes some investments supporting a clean	There is no such information	The plan does not have any further goals but since it aims to be aligned with the NECP, as it has the same emissions

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
		namely RES must account for 65% of electricity generation by 2030 and complete delignitisation by 2028.	electricity generation (e.g., increased RES penetration), households (e.g., improved energy efficiency), transport (e.g. higher penetration of e-vehicles) etc. An example of this transition is the delignitisation pathway set in the Plan, aiming for total delignitisation by 2028 and for 65% RES in electricity generation.	electricity generation mix.		reduction target (40% by 2030) and also proposes RES and energy efficiency actions.
7.	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health impacts,	There is no such information	There is no such information	The lignite phase-out will lead to 5,660 lost jobs but the investments in the region will create around 6,000 jobs, of which 47% will require some level of reskilling.	There is no such information	There is no such information

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
	(energy) poverty,...?					
8.	Outlined concrete activities /measures for regions and people to address the social, economic and environmental impacts of the transition. For example: what could be done with the	The plan includes actions such as the rehabilitation of the lignite mines in Ptolemaida, the improvement of lifelong learning and the actions towards reskilling, which can benefit workers in lignite regions. Moreover, the NRRP proposes actions towards the further deployment of RES power plants.	There are no specific measures aiming at these regions but the Plan proposes that regions in transition can get higher funding from the European Regional Development Fund.	The Plan proposes actions for the rehabilitation of the mining fields of Western Macedonia as well as the lignite power plants. Moreover, the Plan proposes a series of reskilling activities, especially for jobs in the agriculture, tourism and administration sectors. Lastly, the plan proposes 4 specific actions regarding electricity generation and energy storage in the region of Western Macedonia (e.g., the installation of 2GW of PV power plants).	The Plan proposes actions related to the lignite mines such as the composition of a study that examines the economic activity in the region after the transition.	The Plan suggest the installation of a natural gas CHP unit to accommodate the district heating needs that used to be covered by lignite plants.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
	industry buildings and land after mining? Or does the document outline concrete infrastructural projects?					
9.	Proposed concrete projects that are eligible for JTF support	Enhancement of energy storage of up to 1380 MW (pump storage-batteries). Increase of the installed capacity in existing substations of the network. The aim is to address the congestion of the distribution grid that prevents further growth of RES plants, thus, enabling the increased penetration	There are no specific projects in the plan, only goals and measures to reach these goals. Nevertheless, the Plan proposes the composition of a Master Plan for delignitisation and just transition.	The installation of 2GW PV power plants. Green hydrogen plant Energy storage facilities Field for energy technology and research The plan proposes several institutions that can contribute to the	There is no such information	The Plan proposes energy efficiency actions in municipal, household and tertiary sector buildings. The Plan suggest the installation of RES power plants.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
		of RES in the energy mix. Reinforcement of energy saving actions of households, aiming at energy savings of at least 30%. Similar actions are also proposed for tertiary sector buildings (public and private). The reform of active labour market policies (ALMP) aims to maximise the effectiveness of the ALMP toolbox through the redesign, strengthening and overall revamping of its ALMP portfolio. It is coupled with significant investments, e.g., in programmes that subsidise employment in the private sector for the unemployed.		reskilling of local workers.		

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
		Through a set of wide-ranging reforms and investments, the overarching objective is to increase the effectiveness, efficiency and relevance of the lifelong learning system, and reinforce upskilling and reskilling practices across sectors.				
10.	Outlined investment opportunities of projects beyond the JT mechanism	The plan considers financing opportunities from the European Investment Bank, the European Bank for Reconstruction and Development, the Mechanism for Resilience and Recovery Transition, the National Strategic Reference Framework and Greek financial institutions.	The plan considers financing opportunities from the European Regional Development Fund, the European Investment Bank, the Horizon Programme, the Invest EU programme, the Connecting Europe Facility Programme, the National Strategic Reference Framework, the Special RES Account, the National Fund for Energy Efficiency, a	The plan considers financing opportunities from European Structural and Investment Funds, the InvestEU programme, the EU's Cohesion Fund, the Recovery and Resilience Fund, the National Strategic Reference Framework and Greek financial institutions.	The plan considers financing opportunities from European Structural and Investment Funds, the EU's Cohesion Fund, the National Strategic Reference Framework, Regional Operational Programmes, the Green Fund, EU Initiatives (e.g. the Interreg Europe programme), the LIFE programme and the Special Development Programme.	The plan considers financing opportunities from the municipality's own resources as well as national and European finance scheme.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
			special financing tool in the context of the 4th round of the EU-ETS, the Public Investments Programme as well as national and international financial institutions.			
11.	Available measures for dealing with vulnerable groups (e.g. energy poor households) and gender-related issues. For example, is there information on the	Provision of funding mechanisms for the energy refurbishment of vulnerable households (but no specific breakdown is provided between funds for overall refurbishments, and funds for refurbishments for energy poor households). Moreover, the plan includes actions for reskilling vulnerable social groups in order to (re)enter the job market. Lastly, the plan includes Axis 3.4. aiming to create equal	The financing framework for energy refurbishment programmes, that are envisaged in the Plan, will be enhanced in order to promote the support of vulnerable and energy-poor households. Moreover, the Plan aims to reduce energy poverty by 75% by 2030.	No such information is available	The Plan prioritises infrastructure that is used by vulnerable groups (e.g., regarding the protection of buildings from floods). Moreover, the Plan proposes warning systems focusing on vulnerable groups.	The Plan proposes that the Municipality organises awareness campaigns regarding health hazards from climate change, focusing on vulnerable groups.

		NRRP (Greek Government, 2021)	NECP (Hellenic Republic, 2019)	TJTP (Government Committee SDAM, 2020)	Regional plan for climate change adaptation (Region of Western Macedonia, 2019)	Sustainable Energy and Climate Action Plan (Municipality of Eordaia, 2016)
	gender balance in involvement in decision-making?	opportunities regardless of someone's gender, sexual orientation, nationality, age, disabilities and other characteristics.				

Summary of just transition policy documents affecting the transition of the Silesian Region

		NRRP (MKS, 2021)	National Energy and Climate Plan 2021-2030 (MKS, 2019)	Strategy for responsible development (SRD, 2017)	Development strategies of the Voivodeship , (UMWS, 2020a), (UMWS, 2021), (UMWS, 2021a)	Low-carbon economy plans/policies (UMWS, 2020)	Territorial Just Transition Plan of the Silesian Voivodeship 2030 (UMWS, 2022)
1.	Responsible agency/authority for the development of the document	Notice by the Minister of Climate and Environment of 2 March 2021 on the State Energy Policy until 2040.	The National Energy and Climate Plan 2021-2030 (NECP) was adopted by the European Affairs Committee at its meeting on 18 December 2019.	Resolution No. 8 of the Council of Ministers of 14 February 2017 on the adoption of the Strategy for Responsible Development until 2020 (with a perspective until 2030).	The Development Strategy of the Silesian Voivodeship "Śląskie 2030" was adopted by the resolution of the Silesian Regional Assembly No. VI/24/1/2020 of October 19, 2020. The Regional Innovation Strategy of the Silesian Voivodeship 2030 was adopted by Resolution of the Management Board of the Voivodeship No. 1554/246/VI/2021 of June 30, 2021.	Resolution of the Board of the Silesian Voivodeship No. 2873/194/VI/2020 of 9.12.2020	Resolutions of the Management Board of the Silesian Voivodeship No. 2326/383/VI/2022 of December 21, 2022
2.	Stakeholders consulted in the development of the document	The development plans were based on detailed forecast analyses as well as consultations and arrangements with numerous	The national plan was developed taking into account the conclusions of inter-ministerial arrangements and public	The development strategy was based on detailed forecasting analyses as well as consultations and arrangements with numerous	Environmental impact forecasts are prepared for the development strategies of the Voivodeship. The draft Development Strategy of the Silesian Voivodeship "Śląskie 2030" together	Environmental impact forecasts are developed for the developed Low-Emission Economy Policies. The draft Low-Emission Economy Policy for	As part of the creation of the document, cooperation was undertaken with the government, local government,

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		stakeholder groups. The project "Polish Energy Policy" was subject to public consultation as part of the strategic environmental impact assessment.	consultations, as well as the conclusions of regional consultations and the recommendation of the European Commission (2019) 4421 of 18 June 2019.	stakeholder groups. Representatives of all Ministries, socioeconomic partners, Voivodeships, institutions and external experts were involved in the work.	with the Environmental Impact Forecast were subject to public consultations.	the Silesian Voivodeship together with the Environmental Impact Forecast were subject to public consultations.	including mining communes, business and non-governmental side, with trade unions, as well as with the scientific and expert side.
3.	Outlined developments in coal demand and supply, including coal phase-out date	There is a plan to phase out coal-fired power plants. In 2030, the carbon share in Electricity generation will not exceed 56%. There will also be a shift away from burning coal in households in cities by 2030, in rural areas by 2040.	The share of coal in electricity generation will be systematically decremented. In 2030, it will reach the level of 56-60% and the downward trend will be maintained by 2040.	The strategy assumes the restructuring of the coal mining sector and the following actions: increasing the efficiency of hard coal mining; adaptation of extraction to the needs of the market.	The strategy assumes the development of new methods of extracting, the use and processing of coal, primarily for energy purposes, application of technologies that significantly reduce emissions from coal combustion.	The Low-Emission Economy Policy for the Silesian Voivodeship has introduced a number of restrictions on the operation of solid fuel combustion installations: eliminating the use of poor quality fuels (mules, fleets, etc.); replacement of solid fuel boilers with energy class 5	The plan assumes limiting the role of coal in the energy sector and the region's economy by 2030. In four mines extraction will be completed or significantly reduced by 2030. Also excluded will be three coal-fired power plants. Decarbonisation will also cover

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						boilers, which will lead to a reduction in coal consumption; increasing the use of district heating networks and natural gas to reduce coal consumption; elimination of solid fuels in agglomerations and cities.	other sectors of the economy.
4.	Alignment with the Just Transition's objectives: decentralising energy production, improving energy efficiency and reducing dependence on energy	The Polish Energy Policy until 2040 includes 12 strategic projects and deadlines for their implementation. The key elements of the document are: energy transition taking into account	The plan includes objectives for 5 pillars: decarbonisation, increased energy efficiency, ensuring energy security, internal energy market and innovation. Each pillar is described in detail with specific	The strategy defines as the main goal the creation of conditions for the growth of income of Polish residents, taking into account the increase of cohesion in the social, economic, environmental and territorial dimensions. The	The strategy includes 4 main strategic objectives related to the development of a competitive regional economy, improvement of employment and education conditions, ensuring balanced territorial development and improvement of the quality of the environment.	The general objective of the Low-Emission Economy Policy is to increase the energy security of the Silesian Voivodeship and ensure efficiency energy, while limiting the negative impact of human activity on	The plan is to replace the zero-emission public transport rolling stock and support for RES investments for the energy sector prosumer. The plan provides for supporting the diversification of the region's

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	imports, reducing emissions, and stimulating employment and growth	electricity self-sufficiency; increasing the use of RES and reducing the use of coal; increasing energy efficiency; improving air quality; reducing energy poverty and creating new jobs and industries; diversification of supplies and development of network infrastructure.	targets and actions.	document indicates specific objectives to achieve the main objective and areas that influence their implementation, including energy (energy security, energy efficiency), environment (environmental quality, emissions) and society (health, education). Each area has been diagnosed and specific objectives, indicators and directions of intervention have been defined. Actions are also indicated, divided into those to be implemented by 2020 and those to		air quality, including, in particular, the reduction of low emissions.	economy and increasing its level of innovation, including the development of the R&D sector in the field of regional smart and technological specialisation.

		NRRP (MKS, 2021)	National Energy and Climate Plan 2021-2030 (MKS, 2019)	Strategy for responsible development (SRD, 2017)	Development strategies of the Voivodeship , (UMWS, 2020a), (UMWS, 2021), (UMWS, 2021a)	Low-carbon economy plans/policies (UMWS, 2020)	Territorial Just Transition Plan of the Silesian Voivodeship 2030 (UMWS, 2022)
				be implemented by 2030.			
5.	Does the plan meet the goals of the energy transition and the transition schedule at the national level? Targets for 2020s/short-term, 2030/mid-term, 2050/long-term	The document precisely indicates the objectives of the energy transition along with the deadlines for achieving individual goals. The following objectives were indicated: reducing the use of coal in electricity generation to max. 56%; at least 23% of RES in gross final energy consumption in 2030; reducing GHG emissions by 30% by 2030 and reducing primary energy consumption by	The plan takes into account the perspective of the 2030 targets. It assumes a reduction in CO_2 emissions in non-ETS sectors by 7% (in relation to 2005) by 2030; achieving 21-23% RES in gross final energy consumption in 2030 and an increase in energy efficiency by 23% by 2030 (compared to forecasts from 2007). Other specific objectives include reducing the	The plan meets the energy transition objectives and the roadmap for the transition at the national level. The strategy assumes the development and implementation of state programs in the area of hard coal and energy until 2020 and reuse of degraded land. In the long-term perspective, the strategy assumes the restructuring of the hard coal mining sector.	The development strategies of the Voivodeship are in line with the objectives of the energy transition. The strategy assumes a gradual reduction of energy production from coal and modernisation of existing jobs in the mining industry by 2040.	The plan meets the energy transition objectives and the roadmap for the transition at the national level. The low-emission economy plan assumes thermo-modernisation activities or new functions to post-mining and post-industrial infrastructure and areas in the coming years.	The plan meets the energy transition objectives and the roadmap for the transition at the national level. It assumes a reduction in hard coal production in mines in Silesia, gradual closure of mines and coal-fired power plants by 2050.

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		23% by 2030. In addition, the indicated long-term goals (until 2040) are: ensuring that all households cover their heating needs with district heating and zero- or low-emission individual sources; increasing the capacity installed in photovoltaics and wind energy by 10-16 GW and approx. 11 GW, respectively.	share of coal in electricity generation in 2030 to 56-60%.				
6.	Available clear evidence of a transition process	The plan assumes an increase in power installed in photovoltaics to approx. 5-7 GW in 2030 and commissioning of the first unit of a	The national plan assumes an increase in the share of RES in heating and cooling by 1.1 percentage points on average per year.	Such information is not included in the document.	Such information is not included in the document.	Such information is not included in the document.	The Plan presents a reduction in hard coal production in mines in the Upper Silesian Coal Basin in the years 2022-2049.

		NRRP (MKS, 2021)	National Energy and Climate Plan 2021-2030 (MKS, 2019)	Strategy for responsible development (SRD, 2017)	Development strategies of the Voivodeship , (UMWS, 2020a), (UMWS, 2021), (UMWS, 2021a)	Low-carbon economy plans/policies (UMWS, 2020)	Territorial Just Transition Plan of the Silesian Voivodeship 2030 (UMWS, 2022)
		nuclear power plant with a capacity of about 1-1.6 GW.					
7.	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health impacts, (energy) poverty,...?	The aim of the document is to reduce the level of energy poverty to a maximum of 6%. According to the plan, the transition should create new opportunities for development and new jobs. New industries are to develop. Individual energy consumers are to be protected from energy price increases and encouraged to actively participate in the transition.	The plan indicates the importance of carrying out a just transition gradually in order to guarantee security, not only in energy, but also in the social dimension. The document draws attention to the high costs of transition in Poland and emphasises the importance of protecting the competitiveness of the Polish	The Strategy describes the assumed increase in indicators showing the degree of implementation of the Strategy for Responsible Development e.g. Corrected Real gross disposable household income per 1 inhabitant according to PPP (purchasing power parity).	The Strategy describes in detail four strategic objectives: The Silesian Voivodeship as a region of responsible economic transition; the Silesian Voivodeship as a region efficiently managed; the Silesian Voivodeship as a region of high environmental quality. Each of these objectives is accompanied by detailed operational targets, which indicate the territorial impact until 2030.	The Low-Carbon Economy Policy presents the assumed effects of achieving operational objectives at the territorial level until 2030.	In the Silesian Voivodeship, three mines will be closed by 2030: Ruda, Bolesław Śmiały, Sośnica. In 2030 there will also be organisational changes in the Ruda and Staszic-Wujek mines. The changes introduced in the mining and energy sectors will result in a significant reduction of jobs and the need to develop new

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		The plan foresees the creation of up to 300,000 jobs in industries with high potential, in particular related to RES.	economy. The need to focus on low-income communities and those exposed to energy poverty was identified.				branches of the economy in order to limit the negative effects of transitions in the area of the labour market.
8.	Outlined concrete activities/measures for regions and people to address the social, economic and environmental impacts of the transition. For example: what could be done with the industry buildings and	Activities are planned in the field of reclamation of mining areas, but also for the economic and social transition of entire coal regions, i.e. Silesia, Lower Silesia, Wielkopolska, Małopolska, as well as the Łódzkie and Lubelskie voivodeships. Support will be provided for development of projects or the	The plan envisages the implementation of measures to counteract the negative effects of transition through special support for development projects, the creation of favourable conditions for conducting and developing business activities, or additional labour	Among the specific objectives of the Strategy, specific actions have been defined to counteract the social, economic and environmental effects of the transition. The projects to be implemented are, e.g. strategy for the transition to a low-carbon economy, raw materials for industry, roadmap	Among the specific objectives of the Strategy, actions have been mentioned, aimed at counteracting the social, economic and environmental effects of the transition, but there is no specific information about them.	Such information is not included in the document.	The plan provides support for investments in the development of renewable energy sources as an important element of diversification of generation sources regional energy mix. The plan assumes land reclamation and use of land as green areas, construction of

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	land after mining? Or does the document outline concrete infrastructural projects?	creation of additional labour market mechanisms.	market mechanisms, as well as modernisation of the sector, investment in low-emission and non-emission sources of power generation.	for transition to a circular economy.			social premises or for economic or other activities.
9.	Proposed concrete projects that are eligible for JTF support	The plan provides for the implementation of special development programs for such regions, e.g. through special support for development projects, creating favourable conditions for conducting and developing business activity, or	The plan provides for the implementation of regulatory changes aimed at improving the development of energy technologies using solar radiation in post-mining areas requiring reclamation, degraded areas or	The objectives of the Strategy will be financed from: public national funds, i.e. the state budget and state earmarked funds, budgets of local government units and other funds of units and organisational and legal forms of the public finance sector.	Such information is not included in the document.	Such information is not included in the document.	The planned activities in this area will translate into production of 145,111 MWh of electricity per year from newly constructed RES installations. The plan envisages a number of smaller activities, e.g. the development of infrastructure, including R&D,

		NRRP (MKS, 2021)	National Energy and Climate Plan 2021-2030 (MKS, 2019)	Strategy for responsible development (SRD, 2017)	Development strategies of the Voivodeship , (UMWS, 2020a), (UMWS, 2021), (UMWS, 2021a)	Low-carbon economy plans/policies (UMWS, 2020)	Territorial Just Transition Plan of the Silesian Voivodeship 2030 (UMWS, 2022)
		additional mechanisms for the development of the labour market, investments in low- and emission-free generation sources.	areas of mining waste landfills.				technological parks or investments in industrial companies: Technology Development Programme of the Voivodeship Silesia.
10.	Outlined investment opportunities of projects beyond the JT mechanism	The programme provides for the development of a mining restructuring plan and the National Just Transition Plan. The activities will be able to count on financial support (i.e. from EU funds) in the total amount of approx. PLN 60 billion.	Such information is not included in the document.	Such information is not included in the document.	One of the financial mechanisms supporting the implementation of projects related to the implementation of the Strategy will be the funds available from the Silesian Development Fund.	Such information is not included in the document.	The actions presented in the plan are complementary to programmes and financial instruments going beyond the JT mechanism i.e. Programme entitled European Funds for Silesia 2021-2027, National Recovery Plan.

		NRRP (MKS, 2021)	National Energy and Climate Plan 2021-2030 (MKS, 2019)	Strategy for responsible development (SRD, 2017)	Development strategies of the Voivodeship , (UMWS, 2020a), (UMWS, 2021), (UMWS, 2021a)	Low-carbon economy plans/policies (UMWS, 2020)	Territorial Just Transition Plan of the Silesian Voivodeship 2030 (UMWS, 2022)
11.	Available measures for dealing with vulnerable groups (e.g. energy poor households) and gender-related issues. For example, is there information on the gender balance in involvement in decision-making?	Assistance will be provided to the territories most affected by the transition process, in particular in terms of the job losses in the sectors of fossil fuel production and use and the need to transform the most polluting production processes. The projects will aim at protecting the workers in the most vulnerable enterprises.	The plan provides for the creation of a comprehensive state policy aimed at solving the problem of energy poverty. The proposed comprehensive public policy will lead to a reduction in energy poverty and increased protection for vulnerable customers.	Such information is not included in the document.	Among the specified objectives of the Strategy is socially sensitive and territorially balanced development, which emphasises social cohesion and territorially balanced development.	Such information is not included in the document.	The plan foresees support for people potentially excluded by the transition by creating conditions for professional development through the acquisition of new and specialised skills, improving qualifications and competences, ultimately enabling a smooth change of place of employment or effective entry into the labour market.

Summary of just transition policy documents affecting the transition of the Hunedoara Region

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
1	Responsible agency/ authority for the development of the document	Romanian Government through Deputy Prime Minister of the European Funds and Minister of Finance. Link with Article 22 of Regulation (EU) 2021/241 of the European Parliament and of the EU Council from 12.02.2021. It was developed through a participatory process	Romanian Government and Ministry of Development, Public Works and Administration (MRDPA). This Plan was drawn up in accordance with the requirements of Regulation (EU) 2021/1060,	Romanian Government and Ministry of Development, Public Works and Administration The strategy is approved by Government Decision 901/2022.	Agency for Regional Development West (ADR Vest)	Hunedoara County Council The document was elaborated by the National Institute for Economic Research "Costin C. Kiritescu" of the Romanian Academy	Romanian Government, Ministry of Investment and European Projects (MIPE)

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		involving local and regional authorities and their associative structures	'A greener Europe'.				
2	Stakeholders consulted in the development of the document	The Government worked with the EC and other EU Member States in the development of the NRRPs. At this stage, stakeholders in Romania were able to express their views and provide suggestions on the necessary investment and	In the process of drafting the SNDD in Romania, several stakeholders were consulted to ensure a broad and inclusive approach to this important topic. 1. Central and local	In accordance with article 8 paragraph (1) of Regulation (EU) 2021/1060, the plan was elaborated by the Romanian Government, in collaboration with the following partners: - regional, local, urban and other public authorities - social and economic partners - civil society organisms (including environmental protection partners, NGOs, and bodies responsible for promoting social inclusion,	The Strategy was under public consultation and was also sent for consultation to six Regional Themed Groups (GTR) and 22 public administration institutions.	The document was under public consultation starting with June 2022.	The Strategy was designed as a document open to active consultation with central and local authorities in Jiu Valley, as well as other stakeholders. Then, the Strategy was subject to political validation (it is published in the Official Monitor no. 745 bis from 25th July 2022).

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		reform priorities. The process of drafting NRRPs in Romania was open and transparent, involving consultation of a broad spectrum of stakeholders, to ensure that the plan is relevant, sustainable, and efficient in addressing the country's economic and social challenges. Since the launch of the consultations	public authorities, including the Ministry of Environment, MRDAPas well as local and regional authorities. 2. NGOs, including organizations working in the fields of environmental protection, human rights, sustainable development and others. 3. Private sector:	fundamental rights and those of persons with disabilities, gender equality and non-discrimination) - research institutions and universities.			

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		in February 2021, 13 public debates have taken place involving 3900 citizens. In total, the MIPE received 1,700 proposals to update the NRRPs, of which 1470 came from public debates.	companies and organi-sations af-fected by sustainable develop-ment poli-cies and measures, 4. Academia and re-search, re-spectively academic institutions, research centers and independent experts 5. The public - consultation of the public is important				

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
			to ensure a participatory and transparent approach 6. Central and local public authorities and institutions, private, academic, scientific, social partners, civil society, as well as members of the Consultative Council for Sustainable				

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
			Development (CCDD).				
3	Outlined developments in coal demand and supply, including coal phase-out date	There is a plan to phase out coal-fired power plants by 2032, and from 1 January 2025 there will be a regulatory cap on their carbon dioxide emissions. Romania's NRRP shows the evolution of energy demand and supply, but no direct reference is made to the date of coal disposal. However, Romania	The SNDD includes a dedicated section on energy and climate change, which addresses the issue of coal use and the transition to renewable energy sources. Regarding the evolution of coal demand and supply, it is noted	The phase-out of coal continued from 1997 and into 2021 with the closure of an installed capacity of 1,695 MW and will continue until closing the whole 4,770 MW capacity of the Energetic Complexes (CE) Oltenia and Hunedoara. However, to maintain safety and stability of the National Electro-energetic System (SEN), some energy groups will constitute a technical reserve during the 2023-2030 period. Thus, by 2032 all coal-based energy production and coal mining will end.	Information not available	The main coal exploitation area in Hunedoara County is the Jiu Valley region. As of 2021, E.M. Lupeni and E.M. Lonea coal exploitations were in the process of closing, while E.M. Vulcani and E.M. Livezeni coal exploitations are planned to be closed by 2032. In 2016, the pit coal resource was 3.9 billion tons. The coal reserves assurance degree	Currently, natural gas resources cover 65% of the national energy demand, while coal is subject to pressure of carbon emissions costs, despite its contribution to the stability of the national energy system. .

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		commits to reduce greenhouse gas (GHG) emissions and develop a low-carbon economy, in line with the EU's objectives of reaching climate neutrality by 2050. According to the NRRP, Romania will reduce GHG emissions by 55 % until 2030 (compared to 1990 levels) and will reach a 30 % share of renewable en-	that Romania has a significant coal production, and that coal consumption has increased in recent years. However, the SNDD stresses that a transition to renewable energy sources is needed to reduce GHG emissions and achieve the Sustain-			from the Jiu Valley Basin is over 38.6 years, which refers to the exploitable pit coal reserves. In 2019, the coal production value was 21.8 million tons. 2015 was the last year when coal exploitation was granted investment funds.	

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		ergy in gross final energy consumption by 2030. There is also a significant increase in energy efficiency and a transition to a circular economy. Regarding coal, Romania's NRRP foresees investments in the modernisation and refurbishment of existing thermal power plants to reduce GHG emissions and improve energy efficiency.	able Development Goals (SDGs). It does not set a precise date for this but highlights the need for a transition to renewable energy sources and a reduction in dependence on coal. The SNDD also details significant investments in renewable energy,				

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		In addition, the use of renewable energy will be promoted, and coal mine closure and rehabilitation projects will be supported. While there is no reference to a precise date for coal removal, Romania's commitment to reduce GHG emissions and develop a low-carbon economy indicates that the transition from coal to	energy efficiency and sustainable transport, with the aim of reducing GHG emissions and improving the economic and social sustainability of the country. Romania will make full use of the existing potential of local coal in the country in line with environmental				

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		renewable energy sources will be a priority for the country in the coming years.	requirements, as they can provide a resource for electricity production for the next 23 years.				
4	Alignment with the Just Transition's objectives: decentralising energy production, improving energy efficiency and reducing dependenc	The plan includes 101 investments and 64 reforms. The main aim is to reduce the carbon footprint and energy intensity of the economy and to help the green transition by taking measures to	Romania aims through this strategy to address the objectives of the 2030 Agenda for Sustainable Development. The strategy underlines that the transition of	The Plan is aligned with the Just Transition objectives at EU level. The following are relevant for Hunedoara County: - coal phase-out for energy and heating agent production - investments in electricity production capacity from RES and combined cycle natural gas-based electricity production	Regional Development Plan was designed based on the main European and national strategic documents, and meets the objectives and investment priorities of the West Region.	This is highlighted in the priority direction of strategic development 2.4. 'Alleviating energy poverty through the development of systems for the production and efficient use of electrical and thermal energy'. The strategic objectives are:	In line with the European Climate Pact, actions for a Just Transition will focus on: - achieving the 2030 and 2050 climate targets - modernisation of the industrial sector based on the principles of the circular economy

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	e on energy imports, reducing emissions, and stimulating employment and growth	increase the energy efficiency of buildings and promote the production of energy from renewable sources. Its aim is to promote renewable energies, improve energy efficiency, reduce dependence on energy imports, reduce GHG emissions and boost employment and growth.	the RES will require interventions and policies through investments in energy transition, green and blue investments, circular economy, adaptation to climate change, prevention and risk management. There are three	ready for hydrogen (CCGT). The social and economic vulnerabilities are addressed in Government Decision no. 24/1998 and, subsequently, in accordance with Government Decision no. 75/2000. Also, integrated territorial investments are foreseen in DRC, art. 28(a), applicable to the 6 cities and municipalities in Jiu Valley - Aninoasa, Lupeni, Petrila, Petroșani, Uricani and Vulcan, and will be supported through Priority 2.	Among the seven pillars of the strategy are green transition and climate change, prosperous, innovation-based, competitive economy and urban sustainable development. Regarding green transition and climate change, the proposed priorities are expansion and modernisation of the	1. Development of capacities in the high cogeneration regime efficiency/integration of renewable energy sources (RES) in thermal energy production for centralised heating systems, according to PNIESC: - increasing the adequacy of the national energy system by putting in operation of new dispatchable power plants; - recommissioning/ rehabilitation/ moderni-	- provision of clean energy at affordable prices - acceleration of the transition to sustainable and smart mobility - ensuring the energy efficiency of buildings - conservation and restoration of ecosystems and biodiversity - reducing pollution to ensure a healthy environment. Just Transition involves development of entrepreneurship and SMEs in specific domains

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			strategic priorities: 1. Support for the sustainable and smart economy in the region 2. Improving the standard of living and education of the population 3. Territorial cohesion and integrated urban, rural and coastal developmen t		environmental infrastructure, protection and conservation of regional biodiversity and polluted sites decontamination , improvement of energy efficiency and RES energy production, and promoting adaptation to climate changes, risk prevention and disaster resilience.	sation/ adaptation of thermal energy transport and distribution systems, under efficient operation conditions and compliance with environmental protection norms; - increasing the number of buildings using SRE technologies for non-conventional heating/ cooling (solar thermal panels, photovoltaic panels and heat pumps), through the	related with strong skilled workers to be employed in these companies. Also, the transition implies objectives regarding implementation of sustainable innovations, capitalisation of cities as "learning devices" to reduce social risks, and investments in technologies and infrastructure with low GHG emissions.

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						implementa-tion of the Long-term Renovation Strategy (SRTL) project. 2. Promoting energy efficiency and ensuring access energy without discrimination: - thermal reha-bilitation of homes, with priority for communities; - affected by poverty; - introduction of smart meters for final con-sumers; - development and applica-tion of a sys-	

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						tem of incentives for promoting electricity as the main source of energy, especially for housing in the semi-urban and rural areas.	
5	Does the plan meet the goals of the energy transition and the transition schedule at the national level? Targets for 2020s/short-term,	Commitments to reduce GHG emissions from coal-fired power generation to 28.1 by 2025, but without shutting down coal-fired power plants.	The results in achieving the SDGs related to the green transition are uneven. Romania was well below the EU average in terms of GHG emissions in	Low GHG emissions and sustainable energy production are targeted in the light of coal phasing-out process regulated through the Emergency Order no. 108/2022, which includes closing the total 4,920 MW coal and lignite-based installed capacity by 2030. The Plan is aligned with the NRRP.	For the first time, West Region of Romania has a Strategy for Regional Development (for the 2021-2027 period), the main instrument for middle- and long-term development of the region. Also, the strategy is	By 2030, 1,800 MW energy production capacity from natural gas is estimated to be phased out (from the total of 3,650 MW). By 31st December 2025, a total installed capacity of 3,780 MW of coal-based energy production will be phased out. By 2032	The strategy is consistent with the objectives of the energy transition..

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	2030/mid-term, 2050/long-term		2018, with an index of 46.8 against 79.3 for the EU. For sustainable cities and communities, Romania has an overpopulation rate of 46.3 %, well above the EU average of 17.1 %. The country's primary energy consumption is approachin		the foundation for all EU-funded, national, and local projects.	it is planned to completely close this type of power plants.	

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			g the EU average, with an index of 90.3.				
6	Available clear evidence of a transition process	Between 2020 and 2030, the share of RES in gross final energy consumption will increase to 34 %. In 2020-2025, the increase is mainly due to the construction of new RES capacities, while in 2025-2030 it is thanks to	SNDD underlines that the region should follow green and low-carbon development, which will require interventions and policies through investments in energy transition,	In 2021, a photovoltaic capacity investment of 750 MW was approved. To reduce GHG emissions, along with a combined cycle natural gas-based electricity production capacities prepared for hydrogen (CCGT) of 1200 MW. By 2024, an additional wind and solar electricity production capacity of 950 MW is planned to be commissioned. Decarbonisation of the energy sector through the gradual closure of mines,	Regarding GHG emissions, there is no data available at regional level. Before 1990, in Jiu Valley there were 15 coal mines with a total of 90,000 employees. Now 2 mines in operation and up to 3000 employees, producing only 5% of Romania's energy by 2018.	In 2017, coal represented only 27.5% of the energy production mix. Starting with 2018, unsubsidised indigenous pit coal production became a marginal source. The only thermal agent using pit coal in Romania (Paroseni) provides 0.5% of the national thermal energy demand (as of 2020).	Currently, only two coal exploitations are fully operating in the microregion Jiu Valley: E.M. Livezeni (850 employees) and E.M. Vulcan (721 employees). By 2027, the Strategy foresees a reduction to a total of 40 employees in both exploitations. However, this is a problematic matter in the absence of a simultaneous implementation of

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		measures to increase energy efficiency in final energy consumption. Further development is expected after 2030 and in 2040 the share of RES will be close to 39 %. The programme provides clear evidence of a transition towards a greener, more digital and more resilient economy. The	green and blue investments, circular economy, climate change adaptation, prevention and risk management.	closing or reconversion of some units production of electrical and thermal energy based on fossil fuels, measures are reflected within the Decarbonisation Act and in Romanian legislation. All investments will contribute to the transition to a low carbon economy (2050) and to achieving related environmental targets. Hunedoara county faces an energy poverty rate of 70% during winter and 45% per year, whereas net average salary was 18% below the national average. To reduce disparities, the Plan proposes installation of			new economic activities to compensate for the lost jobs driven by the coal phase out process.

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		proposed investments in the energy sector, energy efficiency, sustainable transport and the digital sector will contribute to reducing carbon emissions, improving the quality of life and increasing the competitiveness of the Romanian economy.		photovoltaic/ photothermal panels in households.			

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7	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health impacts, (energy) poverty?	Information not available	Information not available	It is estimated a loss of 5,500 workplaces in Hunedoara County. A high number of workers expected to become unemployed are aged between 41 and 60 years old, most of them being the main bread earners for their families. The effects of this phenomenon are decline in the standard of living, higher school dropout rates for early integration in the labour market, widened workforce gender gap, increased vulnerability of disabled workers. Side effects of the Just Transition cater mainly to vulnerable categories, rising inequalities and	Information not available	During 2016-2019 resident population decreased by 15,300 inhabitants. Coal phasing out led to massive job losses, a process that has been manifesting since 1996. Currently, the employment rate is relatively low, and it is expected to further decline in the light of coal exploitations closing planned for the next 7 years. Many of those who are expected to become unemployed are vulnerable because of their irrelevant	The coal phasing out process involved closing 11 of the 15 coal exploitations in Jiu Valley, which led to a dramatic increase of over 50% in the unemployment rate – from the 45,000 employees in the mining sector, 40,000 were laid off. Many of the unemployed workers were the sole bread earners in their families and had no proper possibilities of being employed elsewhere in the region. Motivated

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				extreme poverty. From this point of view, Hunedoara country pertains specific challenges, as Jiu Valley (the main coal mining area of the county) has been strongly affected by the mine closing process since 1995. Poor economic development of the region (alternative to mining) and high poverty worsened ever since, leading to high migration rates, ageing population and low birth rates, and significant social and economic decline.		competencies for the current labour market demand, especially in the context of increasing technologisation and digitalisation of the economy.	by the need to provide financial support for their families, many parents migrated, leaving the children in the care of other family members. This created social problems among the younger generation, Jiu Valley witnessing rising rates of school dropout, drug addiction issues and anti-social behaviours. Secondly, the ageing population (aggravated by low birth rates and high migration of the

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							young population) highlights another stringent issue: poor quality of medical services because of insufficient medical personnel and improper medical equipment. From the environmental perspective, air pollution is a major concern.
8	Outlined concrete activities/measures for regions and people to address the social,	According to Romania's Plan (NRRP), there is no explicit mention of the creation of a state-owned enterprise for the	There are no measures in the plan.	For the Just Transition, proposed initiatives fall under the following categories: - coal phasing out (both for electricity and thermal agent production)	As per the SWOT analysis presented in the Regional Development Plan, key development	The three general development priority directions are the following: 1. Economic development, based on local potential valorisation and	The strategy is based on four pillars of development: 1. Improving the quality of life and creating a healthy and sustainable environment for

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	economic and environmental impacts of the transition. For example: what could be done with the industry buildings and land after mining? Or does the document outline concrete infrastructural projects?	conversion of coal regions. However, the NRRPs provide for several measures and projects to transition regions affected by the coal industry towards more sustainable and environmentally friendly economies. One of these measures is the Reconversion Programme for Miners in the Carbon Regions, which		- investments in RES and natural gas capacity for electricity production - GHG emissions in strategic sectors (production of steel, ammonia, nitric acid and fuels from the counties that are subject of the present Plan) - development of entrepreneurship and SMEs, including sustainable economic diversification - maintaining the level of employment through investment measures in updating skills and/or retraining people in job search, as well as support services and active employment measures	opportunities are the following: - development of niche industrial activities, adapted to the local background - transition of industrial centers into tourist attractions - reconversion of industrial spaces into business incubators - re-launching local agriculture - increasing visibility of the academia environment	innovation (mineral resources, local industrial potential, development of the local business environment, diminishing energy poverty through efficient thermal and electric power production and use, transport and public services infrastructure rehabilitation, development of tourism and cultural heritage, rural space development through agriculture and pluriactivity). 2. Social development	future generations (creating a dynamic and high-performance socio-professional climate for optimising living standards and responsibly ensuring the transition of Jiu Valley towards the green economy) 2. Economic diversification, innovation and entrepreneurship (generation of a diversified economic environment, focused on strengthening the

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		aims to prepare and retrain miners to integrate them into other economic sectors. This programme will be financed by the European Union's Just Transition Fund and will be implemented by the Ministry of Economy, Entrepreneurship and Tourism. In addition, the Programme also foresees several investments in infrastructure and other projects		- investments in green mobility and clean energy at affordable prices - support for the greening and conversion of buildings affected by declining or transforming economic activities - productive investments in large enterprises in areas such as the manufacture of rechargeable batteries, green hydrogen, equipment for energy efficiency of buildings, RES technologies, or biofuels	- connections and partnerships between local authorities, universities, and businesses - strategic, coherent plans for increasing the standard of living and recovering the economic gaps generated by the coal mines closing.	through increasing quality of the human capital, convergence and inclusion (social development through human capital resources and quality of education, reduction of disparities between rural and urban localities based on decently paid workplaces and qualitative educational and health services, higher inclusion rate for vulnerable categories) 3. Sustainable development, in line with circular	growth and competitiveness of SMEs with activities and products with high added value and attracting other enterprises to the region, supported by initiatives in favor of innovation and local entrepreneurship, including the development in micro-region of the entire value chain at the level of the respective industry) 3. Sustainable exploitation of local resources (coherent and sustainable development of

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		that will support the economic development of regions affected by the coal industry, such as modernisation and expansion of transport and energy networks, development of tourism and leisure infrastructure and support for small and medium-sized businesses through funding programmes. Thus, while there is no				economy and climate neutrality principles (improvement of environmental quality, sustainable management of natural resources, reduction of GHG emissions and achievement of climate neutrality)	tourism, culture, sports and leisure activities and creative industries in the Jiu Valley) 4. Accessibility, mobility and connectivity (sustainable development of multi-modal urban mobility in a unitary way, facilitating accessibility in all areas of the micro-region by strengthening the connectivity between the component cities/ municipalities and the immediately

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		specific SOE for the conversion of coal regions, the NRRP proposes several measures and investments that will contribute to the transition of these regions towards a more sustainable and resilient economy.					neighbouring areas).
9	Proposed concrete projects that are	Support scheme for the implementa-	Creating new industrial areas/parks	The proposed projects are complementary to NRRP and NECP, as well as other national and regional plans	The document provides the general framework for	The strategic development vision for Hunedoara County proposes a	Similar to the vision of the County and the West region, eligible projects are

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	eligible for JTF support[5]	tion of mini-mum 2,580 MW RES with storage in Romania through the purchase, in-stallation, and commissioning of a national electricity stor-age facility in-frastructure with a total en-ergy capacity of 1,750 MWh. The installa-tions will be strategically distributed in a	with a focus on green, high-tech industries that create sustainable jobs and guarantee high wages.	and strategies. The Operational Plan was elaborated for alleviation of the socio-economic impact of the green transition; hence all proposals are eligible for JTF support.	conception of projects eligible for JTF support. Considering the close alignment with EU and national strategies and plans regarding Just Transition, sustainable development and socio-economic recovery, all projects that fit into the seven pillars of the Regional	set of initiatives that are aligned with the Just Transition principles, as follows: - professional training dedicated to smart specialisation and sectors with potential of sustainable development - support for adapting to change, targeted at workers, companies and entrepreneurs - investments in educational mobility	designed based on the four pillars of the Jiu Valley Strategy. As part of the strategy are specific objectives such as: - creating diversified work opportunities at a performing level to reduce unemployment - optimisation of medical services and development of social services as a support for vulnerable categories

[5] Eligible projects are ones aligned with JT objectives (see row 4). JTF will be used to alleviate the socio-economic impacts of the green transition in the regions most affected, by for example supporting the re-skilling of workers, helping SMEs to create new economic opportunities, and overall diversifying economic activity, investing in the future of the most affected regions.

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		uniform manner across Romania, located close to the renewable generation capacities installed and to be implemented soon. An important example is the Tesla Energy Hub project, which was announced in 2021 and foresees the installation of battery-based energy storage units in several locations in Romania. According to Tesla,			Strategy are subject to eligibility analysis for JTF support.	- increase in the quality of educational facilities in the rural areas - extension, increasing quality and accessibility of health services - reduction of internal and external migration of young people by increasing attractiveness of localities in Hunedoara County - economic development of the county by capitalisation of local mineral resources, using innovation and new technologies, and	- modernisation of educational facilities, improved access to education and investments in competencies - identification of alternative energy production options - increased energy efficiency for buildings and households - creation of an ecosystem favourable to investments for a sustainable and competitive local economy - support for companies in developing a high

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		these units could be used to support the increased integration of renewable energy into the electricity grid and provide network stability and safety services. Another important project is that of E-Distributie Muntenia, which launched a pilot program for installing energy storage batteries in its distribution network.				capitalisation of the local industrial potential - development and support for local business environment through infrastructure development, supporting implementation of R&D results, development of entrepreneurship and supporting operations of new companies.	added value for their goods and services offer - development and consolidation of tourism through extension of tourism activities all year long and support for family, culture and educational tourism - rehabilitation of road and rail infrastructure - development of efficient, sustainable and smart public transport system - development of utilities, telecommunication

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		These projects could include the installation of energy storage systems in existing wind and solar farms or the development of new renewable energy projects with storage in rural areas or coal regions.					s and street lighting networks
10	Outlined investment opportunities of projects beyond the JT mechanism	The plan envisages funding opportunities from the EU Structural Funds, the European Investment Bank, the	There are other sources of public funding available at national level for the	Other funding possibilities are sustainable development regional programs (PODD), Program Education and Employment (POEO),	Through the Partnership Agreement for 2021-2027 period, 10 operational and INTERREG	Information not available	Another funding option, in addition to the JTF, is the loans from the European Investment Bank for investments in the

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		European Bank for Reconstruction, the World Bank, the Innovation Fund, and the Modernisation Fund. There are also several private investors who are interested in investing in renewable energy projects in Romania. These investors can be banks, investment funds, energy companies or other organisations interested in	implementation of sustainable development measures, such as: 1.National Regional Development Fund (NFRD): This fund is financed by the EU and national funds and is intended for regional development by financing projects that contribute to increasing	Inclusion and Social Dignity Program (POIDS) and Growth Program Intelligence, Digitization and Financial Instruments (POCIDIF). POEO measures are convergent with TJTP (i.e., modernisation of labour market institutions, improvement tools and mechanisms for monitoring the labour market and for the active integration of the disadvantaged categories). TJTP differs from POCIDIF by its social and territorial dimension operations supported and by the type of funding granted.	programs were established for complementarity and synergies between all available financial instruments. Along with Just Transition Operational Program (POTJ), other investment opportunities are: - Operational Program 'Growth Intelligence and Digitization' (POCIDIF), - Sustainable (PODD),		energy sector and infrastructure. Financing mechanisms targeting industry sectors with high energy consumption and power sector are: - The Innovation Fund, for investments in low-carbon technologies and industrial processes - The Modernization Fund, for investments in the generation and use of energy from renewable sources; energetic efficiency; energy storage;

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		developing renewable energy projects with high profitability potential. Another option is to finance through stock exchanges, such as the Romanian Stock Exchange (BVB). The Romanian Stock Exchange recently launched a specialised segment for companies active in the field of renewable energy, called	economic competitiveness, improving infrastructure and protecting the environment. 2.Large Infrastructure Operational Programme (POIM): this programme is financed by the EU and national funds and aims to finance major infrastructure projects, such as transport	The Operational Plan investments will be additional to those of POIDS to support rural communities without access or with reduced access to social services, employment and health, combating school dropout, social inclusion, training / development skills in the areas of smart specialisation, entrepreneurship, industrial transition, etc. The Operational Plan foresees investments in in small-scale renewable energy generation and storage capacity, including grids of related transport, for the supply of renewable energy necessary for	Development Operational Program - Transport Operational Program (POT), - Operational Program Education and Occupation (POEO), - Inclusion and Social Dignity Operational Program (POIDS), - Health Operational Program (POS), - Technical Assistance		modernization of energy networks, including district heating, pipelines and networks; just transition in carbon-dependent regions: labour redistribution, reskilling and upskilling of workers, education, job-seeking initiatives and start-ups. - Next Generation EU, a temporary recovery instrument for the mobilization of investments and the relaunch of the European economy

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		"Green Market". This segment encourages investment in renewable energy projects by providing transparent and detailed information about listed companies. There are several investment opportunities in renewable energy projects in Romania, which are available both through the Just Transition	and energy networks, which are essential for Romania's sustainable development. 3.Human Capital Operational Programme (POCU): This programme is funded by the EU and national funds and aims to improve the capacity and qualification of	essential public services held in schools, hospitals, nursing homes, nurseries, social centers, professional training centers.	Operational Program (POAT), - Regional Operational Programs, - Aquaculture and Fishing Operational Program (PAP) - Interrgeg VI Romania-Hungary, - Interreg IPA III Romania-Serbia, - Danube Transnational Program 2, - Interreg Europe, - URBACT IV, - Interact IV,		- National investment programs (already detailed in the previous documents: POTJ, PODD, POT, POCIDIF, POS, POEO, POIDS, POR West, including the Integrated Territorial Investment Mechanism).

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		Fund (JTF) mechanism and through other government or regional support programmes, through private investors or through stock exchanges.	the Romanian workforce by financing vocational training and skills development projects. 4.Environmental Fund: it is financed by pollution taxes and aims to finance projects to protect the environment, such as improving air and water quality or		- ESPON.		

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
			waste man-agement. 5.National public funding, ERDF, EFF, CF, EAFRD, EMFF, international funding institutions, funds from natural and legal persons, NGOs, etc.				
11	Available measures for dealing with vulnerable groups (e.g., energy poor	There is a se-ries of measures aimed at ad-dressing vul-nerable groups in Romania. Measures are	Information not available	To promote equality, inclusiveness and non-discrimination, the criteria for funding grants will include aspects as the following:	The proposed measures are grouped under the umbrella of the fourth pillar "Education, Health, and	Proposed initiatives aimed at vulnerable groups are the following: - supporting workforce transition through mediation	The Strategy provides limited initiatives dedicated solely to vulnerable groups, as the whole Jiu Valley deals with major

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
	households) and gender-related issues. For example, is there information on the gender balance in involvemen t in decision-making?	designed to help reduce so-cio-economic disparities and promote social inclusion. a. Investment in education, including the modernization of school infra-structure and the develop-ment of teacher train-ing and train-ing pro-grammes. b. Develop-ment of social assistance pro-grams for vul-nerable groups, such as people		- infrastructure and equipment investments will include measures to ensure accessibility for people with disabilities and facilities that support gender equality. - employment initiatives include disadvantaged workers (including those close to retirement age, Roma people) and those exposed to high poverty rates and with disabilities - social, health and education infrastructure will focus on areas with higher disparities. For Hunedoara County, gender perspective integration initiatives have a targeted budget of 446.8 million EURO	Performant Social Systems", with the following priorities: Priority 1. Equal access to o modern education, connected to the labour market trends Priority 2. Inclusive access to efficient and innovative, patient-oriented medical services Priority 3. Ensuring some equitable social services,	and occupational counselling of the individuals directly affected by the transition to green economy (unemployed because of the transition) - support for social economy - increasing social inclusion rate of vulnerable categories.	economic and social problems. Nonetheless, prominent initiatives for vulnerable groups are: - rehabilitation of streets and pedestrian areas to improves accessibility for disabled persons - tackling poverty in marginalized neighbourhoods based on specialized social services.

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		with disabilities, the elderly and low-income families. c. Investments in health infrastructure. d. Employment support measures, including those for young people and people from vulnerable groups. These programmes include vocational training, traineeships, and other support measures to help them access jobs.			limiting social exclusion and the risk of poverty Priority 4. Increasing employment and ensuring inclusion on labour market		

		NRRP (MIPE, 2021)	SNDD (SGG, 2018)	Operational Just Transition Plan (TJTP) for Dolj, Gorj, Hunedoara, Mureș, Prahova and Galați counties 2021-2027 (MIPE, 2022)	Regional Development Plan for West Region 2021-2027 (ADR Vest, 2021)	Hunedoara County Development Strategy for the 2021-2023 period (INCE, 2022)	Economic, Social and Environmental Development Strategy for Jiu Valley
		e. Investments in rural development, including the modernization of rural infrastructure and the development of support programmes for farmers and other people from rural backgrounds.					

Summary of just transition policy documents affecting the transition of the Asturias Region

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
1.	Responsible agency/authority for the development of the document	Presidency of the Government of Spain. An Inter-Ministry Commission for Recovery, Transition and Resilience will be created, chaired by the President of the Government and with the participation of the Ministers whose competences are most closely linked to the implementation of Next Generation EU. This Commission will be linked to the Government's Delegate Commission for Economic Affairs, in order to foster synergies and coherence between the formulation of economic policy and the implementation of	The Spanish Government and in particular the Ministry for the Ecological Transition and the Demographic Challenge	The Spanish Government and in particular the Ministry for the Ecological Transition and the Demographic Challenge, along with the Institute for Just Transition	On 28 April 2019, the Spanish government approved the National Strategy against Energy Poverty 2019-2024 (NSEP 2019-2024) (Ministry of Ecological Transition, 2019). The strategy fulfils the mandate of Royal Decree-Law 15/2018. It builds on the UN Sustainable Development Goals, as well as European Directive 2009/72/EC of the European Parliament and of the Council of the EU, the Winter Package and the European Pillar of Social Rights. It also contributes to the objective of fighting energy poverty set out in	The Government of the Principality of Asturias represented by the Regional Minister for Industry, Employment and Economic Promotion, stated by the General Directorate of Energy, Mining and After-coal Development and the Asturian Energy Agency (FAEN).

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
		the Plan. Likewise, to facilitate the effectiveness of this governance tool, a Technical Committee will be created. It will provide technical and legal support to the Ministerial Commission, gathering all the intelligence and capabilities available in the Government Administration at the service of recovery, transition and resilience			the National Strategy to Prevent and Combat Poverty and Social Exclusion 2019-2023, the New Spanish Urban Agenda (2019) and the Strategy for Energy Renovation in the Building Sector in Spain (Ministry of Development, 2017).	
2.	Stakeholders consulted in the development of the document	The government used different fora for consulting each stakeholder type – from conferences to specific meetings. Consultations held with public institutions and political groups, as well as social agents and the business fabric.		This plan and operative Programme have been drawn up in very close cooperation between the six affected Autonomous Communities (Asturias, Galicia, Castilla y León, Aragón, Andalusia	It has been submitted to public consultation and the final document, which incorporates the contributions of civil society, was approved by the Council of Ministers on April 5, 2019. The Institute for Energy Diversification and	A regional committee was formed to initiate the elaboration of the Asturias Energy and Just Transition Strategy. It included representatives of the Government of the Principality of Asturias represented by the Regional Ministry for Industry, Employment

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
		Social Dialogue: CEOE, CEPYME, UGT and CC.OO. Autonomous Regions: 17 Autonomous Regions, 2 autonomous cities and FEMP. Local Entities: Spanish Federation of Municipalities and Provinces (FEMP). Public consultations.		and the Balearic Islands) and the Just Transition Institute. Territorial (Asturias): In October 2019, the Mixed Commission was established to assess the Impact of the Energy Transition in Asturias, made up of the Government, social and economic agents, the University, technology centers and associations.	Saving (IDAE), a public business entity attached to the Secretary of State for Energy, is designated as the monitoring body.	and Economic Promotion, Regional Ministry for Autonomous Administration, Environment and Climate Change, Regional Ministry for Rural Affairs and Territorial Cohesion, Regional Ministry for Finance, along with the following stakeholders: Social Agents: CCOO, SOMA-FITA-UGT, UGT Asturian Federation of Entrepreneurs (FADE) Industry: ArcelorMittal, Glencore, Energy sector: EDP, ENAGAS, R&D: INCAR-CSIC, University of Oviedo Coordinated by the Asturias Energy Agency (FAEN) and

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
						supported by the Secretariat Technical Assistance to Regions in Transition (START).
3.	Outlined developments in coal demand and supply, including coal phase-out date	This plan (by means of action number 10) aims to support the Just Transition Strategy and allocates budget to support the pathway and the phase-out process.	Spain energy mix 2030 will be free of coal and carbon.	TJTP refers to the National Energy and Climate Plan (PNIEC), where the closure of all coal-fired electricity generation by 2030 is stated.	Not applicable.	Closure of thermal coal power station by 2030 and coal mines by 2023. Several measures are directly related to coal demand and supply and coal power plants: M1.2.1. Evaluate the effects of the energy transition on the regional electrical system and proposal for improvements. M1.3.1 Promote alternatives for the maintenance of regional production facilities that are

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
						ending their regulatory life M1.3.3 Promote the enhancement of just transition nodes M4.13.1. Value the singularities of the regional transition in Asturias (closure of mines, thermal plants, decarbonization of industry, logistics)
4.	Alignment with the Just Transition's objectives: decentralizing energy production, improving energy efficiency and reducing dependence on energy imports, reducing emissions, and stimulating	Full Alignment, In fact, the NRRP plan is attached to the TJTP by the third structural reform lever [III – A just and inclusive energy transition] and specifically by the tenth project or component which is the Just Transition Strategy [https://www.miteco.gob.es/images/es/estrategiatransicionjusta-	NECP includes as measure, (Measure 1.15) the Just Transition Strategy. Apart from those other measures mention explicitly the focus on just transition: M1.1; M1.11; M1.14; M1.17; M2.6; M2.7; M2.15; M5.10	Full alignment	The NSEP 2019-2024 takes up a double challenge: a) to provide a comprehensive response to energy poverty, including the protection of vulnerable consumers and an efficient housing environment; and b) to develop awareness of the need for energy efficiency in Spanish society, at the current	Full alignment with Just Transition's objectives [2023]: SO1. Decarbonize the regional energy model based on energy efficiency and technological diversification and ensuring that it continues to facilitate competitiveness in the regional economy.

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
	employment and growth	def_tcm30-514300.PDF] A specific Just Transition component (component 10) has been incorporated into the Recovery, Transition and Resilience Plan of the Government of Spain, endowed with 300 million euros for the areas affected by the closures.			time of transition to a clean energy system.	• O1. New energy supply model based on renewable energies and technological diversification 26% reduction in primary energy consumption. (28.5%, 2025) 72% renewable energy in electricity generation, (55%, 2025) • O2. New energy consumption model based on energy efficiency and electrification 9.1 % of savings in the final use of energy, compared to 2017 12.6% of renewables on the final use of energy (11.6%, 2025)

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
						SO2. Strengthen the competitiveness of regional capacities. • O3. A Just Energy Transition that strengthens the regional industry, provides an economic boost to other sectors, improves competitiveness, promotes an ecosystem for generating knowledge and promotes economic activity in all territories. 6,500 M€ cumulative investment (1,900 M€, 2025) • O4. A Just Energy transition focused on the citizen, which generates employment, reduces inequalities

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
						and supports the people most affected by the transition of the energy sector. 6,300 new jobs (net generation of employment) in the region (3.600, 2025) *63 Measures distributed among 15 actions lines*
5.	Does the plan meet the goals of the energy transition and the transition schedule at the national level? Targets for 2020s/short-term, 2030/mid-term, 2050/long-term	Aligned to the NECP (2021-2030) 2030: RES 74% (power) & 42% (final demand) 2050: 100% RES 2030, GHG 23% (1990)) 2023: max. 5,000 MW coal-fired power plant [from 9,683 MW]	Make Spain carbon neutral by 2050. 2023: 23% reduction in greenhouse gas (GHG) emissions compared to 19901; 42% share of renewables in energy end-use; 39.5% improvement in energy efficiency;	Based on the Spanish NECP.	Looking at the 2018 data from the EU Statistics on Income and Living Conditions, we see that: 9.1% of people in Spain live in a household which is unable to keep its home adequately warm (EU-28 average: 7.6%), 7.2% in a household unable to pay utility bills on time (heating, electricity, gas, water…) (EU-28: 6.8%).	NECP (PNIEC): • 23% reduction in greenhouse gas emissions compared to 1990, • 42% of renewables on the final use of energy, • 39.5% improvement in energy efficiency,

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			74% share of renewable energy in electricity generation. 2050: 90% in total gross greenhouse gas (GHG) emissions by 2050 compared to 1990. 100% renewable electricity system		However, Spain suffers from low levels of energy efficiency, especially in the homes of the most vulnerable people. The objective is to reduce four energy poverty indicators by at least 25% or, if possible, 50% between 2017 and 2025, namely: excessive household spending on energy (from 17.3% down to maximum 12.9% and, if possible, 8.6%), hidden energy poverty (11.5%/8.6%/5.7%), inadequate housing temperature (8%/6%/4%), and late payment of bills (7.4%/5.5%/3.7%).	• 74% renewable energy in electricity generation. Asturias Energy & Just Transition Strategy: • 26% reduction in primary energy consumption. (28,5%, 2025) • 72% renewable energy in electricity generation, (55%, 2025) • 9.1 % of savings in the final use of energy, compared to 2017 • 12.6% of renewables on the final use of energy, (11,6%, 2025)

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
6.	Available clear evidence of a transition process	In the period 2020-2030, RES share in gross final energy consumption will grow up to 40%. 2050 RES share will be 100%.	The total investments to achieve the objectives of the Plan will amount to EUR 241,412 billion between 2021 and 2030. Of this amount, EUR 196 billion are additional investments compared to the Baseline Scenario (without additional policies). The total investments are distributed between: • Saving and efficiency: 35% (€83,540 bn) • Renewable energy: 38% (€91,765 bn) • Networks and electri-fication: 24% (€58,579 bn) • Other measures: 3% (€7,528 bn) Apart from that and more coal specific: In the case of the Balearic Islands, the existing coal-fired power	TJTP plans are based upon the Just Transition Strategy and its "Urgent Action Plan" stated in February 2019, when the Spanish Government approved the Strategic Framework for Energy and Climate which includes the draft bill on Climate Change, the draft of the National Integrated Energy and Climate Plan (PNIEC), and the Just Transition Strategy (ETJ).	The NSEP 2019-2024 is moving towards a new sustainable energy model and to guarantee the effective right of access to energy for all citizens, with particular reference to vulnerable and excluded groups.	The Strategy will be evaluated during 2023. First release by the end of 2024.

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			station will close two of its four generator sets by 2020, leaving the remaining two as a reserve until the effective integration of the Balearic electricity system into the mainland system			
7.	Specified concrete impacts at territorial level by 2030 or before, such as job losses/gains, re-skilling, health impacts, (energy) poverty,...?	3,300 people employed by coal plants in exploitation and maintenance activities, and 10,000 indirect jobs in the surrounding areas will be affected by the closure of coal-fired TPPs.	Section 4 includes the main results obtained in the evaluation of the economic, employment, social and public health impact of the measures and actions envisaged in this Plan. The effect of the INECP is an economic opportunity with significant economic, employment, social and public health benefits. Below are some conclusions with the	Thanks to the aid from the Just Transition Fund, it is expected to contribute to the creation of 6,000 jobs in these territories, and support more than 1,900 companies, mostly SMEs.		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			main figures that support this conclusion: • The INECP will mobilise EUR 241 billion of investment in Spain between 2021 and 2030, which will generate a significant expansionary effect on the economy. • The Gross Domestic Product (GDP) will increase by between EUR 16.5 and 25.7 billion between 2021 and 2030, an increase of 1.8% in 2030 with respect to the Baseline, both because of the investments planned and because of the greater energy savings and efficiency and the lower importation of fossil fuels. • The measures to be implemented will			

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			generate between 253,000 and 348,000 new jobs between 2021 and 2030 (non-cumulative annual employment), an increase of 1.7% in 2030 over the Baseline Scenario. Investments in renewables alone will generate between 107,000 and 135,000 jobs over the decade, benefiting manufacturing, construction, and services associated with the renewable sector. • The INECP will allow savings of EUR 67 billion up to 2030 compared to the Baseline Scenario, due to the reduction in demand for imported fossil fuels, which will also improve energy security as this source is			

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			replaced by indigenous energies. • The INECP will favour lower income households and vulnerable groups, which will see their income and consumption increase by a greater proportion than other households. • Finally, the measures will have a very positive impact in terms of health. The improvement in air quality with the measures foreseen in the Plan will prevent the premature death of around 2,400 people in Spain in 2030, a reduction of 27% compared to the Baseline Scenario.			

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
8.	Outlined concrete activities/measures for regions and people to address the social, economic and environmental impacts of the transition. For example: what could be done with the industry buildings and land after mining? Or does the document outline concrete infrastructural projects?	Mentioned by TJTP and JT strategy. Structural reform: C10.R1: Implementation of just transition agreements in coal transition zones. • Minimizing the social and economic impact. • Create employment and activity in the short term, • Promote "levers" of change with actions that had not been carried out until now and that will allow preparing actions from the Just Transition mechanism. • Stimulate and promote the economic development of these areas.	In general, as showed in the previous bullet, any measure is aimed to obtain a social, economic and environmental associated impact. Perhaps, the following measures could be considered to a more direct SEE impact: M1.15 : the Just Transition Strategy. M1.11: Specific programmes for the use of biomass M1.13: Local energy communities M1.14: Promoting the proactive role of citizens in decarbonisation M1.17: Training professionals in the renewable energy sector	In accordance with the second subparagraph of Article 5(1) of Regulation (EU) 2021/1060, the JTF shall contribute to the single specific objective of enabling regions and people to address the social, employment, economic and environmental impacts of the transition towards the Union's 2030 targets for energy and climate and a climate-neutral economy of the Union by 2050, based on the Paris Agreement. The TJTP planes address projects and concrete activities		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			M1.19: Generating knowledge, outreach, awareness and training M1.26. Taxation M2.6: Energy efficiency in existing buildings in the residential sector M2.7: Renewal of residential equipment M2.15: Communication and information concerning energy efficiency M4.11: Combating energy poverty M5.8: Social innovation for the climate	and measures aligned to any of the following 6 priorities, identified as common needs of development: AST 1. Ecological transition of industry, sustainable mobility, circular economy and energy efficiency. AST 2. Promotion of the value chain of renewable energies, self-consumption, energy storage and renewable hydrogen. AST 3. Promotion of SMEs and driving business projects for the economic diversification of the territories. AST 4. Promotion of research, development and		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
				innovation (R+D+I), the integration of ICT and digital transition. AST 5. Environmental rehabilitation, conservation of nature, biodiversity and ecosystems, promotion of historical and cultural heritage related to mining and industry, and promotion of sustainable tourism. AST 6. Promotion of social infrastructures, the social economy and training and qualification initiatives All of them are addressing a social, economic and		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
				environmental impact.		
9.	Proposed concrete projects that are eligible for JTF support	Mentioned by TJTP and JT strategy. In particular linked to action line (project) 10: entitled as Just Transition Strategy, which include: Structural reform: C10.R1: Implementation of just transition agreements in coal transition zones. • Reduction of TPP installed capacity from 9,683 MW to 5,000MW by 2023, • balanced by in-creasing the Renew-able energy sources sharing and	There are no specific projects in the plan, only goals and measures to reach these goals	Eligible projects will be those aligned to any of the following 6 priorities identified as common needs of development: AST 1. Ecological transition of industry, sustainable mobility, circular economy and energy efficiency. AST 2. Promotion of the value chain of renewable energies, self-consumption, energy storage and renewable hydrogen. AST 3. Promotion of SMEs and driving business projects for the economic		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
		• minimizing the social and economic impact. Investments: C10.I1 – Just transition investment. 300 M€ • create employment and activity in the short term, • promote "levers" of change with actions that had not been carried out until now and that will allow preparing actions from the Just Transition mechanism • stimulate and promote the economic development of these areas apart from the previous action line, other relevant projects mentioned at the NRRP		diversification of the territories. AST 4. Promotion of research, development and innovation (R+D+I), the integration of ICT and digital transition. AST 5. Environmental rehabilitation, conservation of nature, biodiversity and ecosystems, promotion of historical and cultural heritage related to mining and industry, and promotion of sustainable tourism. AST 6. Promotion of social infrastructures, the		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
		instrument aligned to JT mechanism are: • [Action Line 1] Plan for sustainable, safe and connected mobility in urban and metropolitan environments • [Action Line 2] Housing renovation and urban regeneration plan • [Action Line 7] Deployment and integration of renewable energy systems • [Action Line 8] Electrical infrastructures, promotion of smart grids and deployment of flexibility and storage • [Action Line 9] Roadmap green hydrogen and sectoral integration		social economy and training and qualification initiatives. A more detailed information will be found in section 2.4 of the TJTP of Asturias.		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
10.	Outlined investment opportunities of projects beyond the JT mechanism	30 projects (components or lines of action) structured by 10 structural reform levers.	The plan considers financing opportunities from the EU structural funds, the European Investment Bank, the European Bank for Reconstruction, The World Bank, the Innovation Fund and the Modernization Fund. More in specific, The National Energy Efficiency Fund constitutes the main instrument to support national initiatives on energy efficiency during the application of the current INECP	The JT mechanism is coherent and will need to be coordinated with the Recovery and Resilience Facility (RRF). However, to achieve the necessary impact in the selected territories, additional sources of EU funding may be necessary, among others: • LIFE Programme, • Research Fund for Coal and Steal, • Innovation Funds, • The New Euro-pean Innovation Agenda • Digital Europe		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
				• New European Bauhaus		
11.	Available measures for dealing with vulnerable groups (e.g. energy poor households) and gender-related issues. For example, is there information on the gender balance in involvement in decision-making?	Mention to specific training for gender equality on JT areas.	M1.15: the Just Transition Strategy. M1.11: Specific programmes for the use of biomass M1.13: Local energy communities M1.14: Promoting the proactive role of citizens in decarbonisation M1.17: Training professionals in the renewable energy sector M1.19: Generating knowledge, outreach, awareness and training M1.26. Taxation M2.6: Energy efficiency in existing buildings in the residential sector M2.7: Renewal of residential equipment M2.15: Communication and information	The transition of the economy will demand new professional profiles, which implies the need for requalification and/or training of the people most affected by the closures and especially young people, over 55 years of age and women. It seeks to promote socially necessary and environmentally acceptable jobs. Youth employment and socioeconomic integration of young people through programs aimed at		

		NRRP (Government of Spain, 2023)	PNIEC (Government of Spain, 2020)	TJTP (Government of Spain, 2021)	National Strategy Against Energy Poverty (Government of Spain, 2019)	Asturias Energy and Just Transition Strategy (ETJA, 2021)
			concerning energy efficiency M4.11: Combating energy poverty M5.8: Social innovation for the climate	promoting job creation through aids to companies to hire young people in sectors/territories directly related to the Transition. Training in the field of entities immersed in ecological transition or digitization, in upskilling and reskilling and actions aimed at the acquisition of soft skills.		