GREEN-PATHS: European Knowledge Hub on Just Transition Pathways

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Introduction

Executive Summary

This document presents a comprehensive summary report on the results of the case studies analysed in Work Package 3 (WP3) of the project. This report aims to assess the social costs and benefits of green transitions in different regions and countries of Europe and the Global South. Derived from Tasks 3.1, 3.2, and 3.3, this deliverable D3.3 synthesises the findings and insights gained from the case studies, providing an overview of the methodologies, outcomes, and implications for future research and practice.

This report was produced by UC with significant input and revisions from our consortium partners: TNI, UNIGIEßEN, CES, UVA, IPE, INTERMON, IUC, RISTECO, PNG, Zajednicko, PolicyLab, and FOEE. The collaborative effort ensures that the report reflects a diverse range of perspectives and expertise, enhancing the robustness and relevance of the findings.

The document aims to facilitate a clear understanding among all project partners and stakeholders of the key results and their potential impact. It also outlines the next steps for disseminating and applying these findings within the broader context of the project. This summary report will be a valuable resource for guiding future activities and ensuring that the project's objectives are met effectively.

Keywords

Case studies; Summary; WP3; Research methods; Findings.

Intended audience

This summary report is potentially of interest to a broad audience, including researchers (both within and outside the consortium), policymakers, representatives of civil society organisations, and other stakeholders interested in the findings of the case studies analysed in Work Package 3 (WP3). It provides a concise overview of the methodologies and results, making it a valuable resource for anyone seeking to understand the implications of these studies for future research, policy development, and practical applications in the context of sustainable and collaborative initiatives.

Reading recommendations

To fully understand the context and findings presented in this summary report (D3.3), it is recommended to review the preceding tasks and deliverables within Work Package 3 (WP3), specifically Deliverables D3.1 and D3.2. These documents provide detailed insights into the methodologies and initial analyses that underpin the case studies summarized here. Additionally, for a broader understanding of the project's analytical framework, reading D2.4 is advised, as it outlines the foundational concepts and processes of social impact integrated into the case study analyses. This comprehensive approach ensures that readers can appreciate the depth and implications of the research findings presented in D3.3.

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Scope

The scope of Deliverable 3.3 (D3.3) is to provide a comprehensive summary report on the results of the case studies conducted between July 2024 and July 2025 and analysed as part of Work Package 3 (WP3) of the GreenPaths project between August and October 2025. This deliverable synthesises findings from Tasks 3.1, 3.2, and 3.3, offering a detailed overview of the methodologies, outcomes and implications derived from the case studies.

D3.3 aims to assess the social costs and benefits of green transitions in various regions and countries across Europe and the Global South. It presents the key insights and data collected, highlighting the social and economic impacts of green transition policies across these geographic regions. The report serves as a critical resource for understanding how these policies affect different communities and environments, providing valuable information for researchers, policymakers, and other stakeholders.

By summarizing the results of the case studies, D3.3 facilitates a high-level understanding of the interdependencies between climate action, environmental sustainability, and social well-being. This summary report is intended to guide future research, inform policy development, and support the implementation of effective and equitable green transition strategies.

Approach

Previous GreenPaths deliverables have sought to systematically map, then shortlist potential indicators, methodological tools, policy mechanisms, analytical frameworks and conceptual approaches for appraising green transition policy impact, coherence and effectiveness (see D2.1, D2.2, D2.3, D2.4). Whilst our 15 case studies are interdisciplinary in nature and methodologically diverse, our GreenPaths analytical framework (D2.4) and conceptual and methodological matrix (D3.1) provided a consistent, overarching approach and consolidated indicators and methodological tools for identifying, evidencing and enriching the broader, cross-sectoral concepts and processes of social impact that underpin green transition policy. Standardised reporting templates were designed as part of D3.1 in June 2024 and updated in July 2025 to draw out costs and benefits and (applying feedback from external reviews at the GreenPaths periodic review in June 2025) emphasise narrative dimensions of the cases.

Overall, the case studies employed mixed-methods, consisting of: literature reviews; media, legal and policy content and critical discourse analysis; quantitative data analysis and modelling; primary qualitative data from interviews, focus groups, ethnography, participant observation, public and online events, seminars, webinars, conferences, consultations and debates with policy and legal experts, researchers, government officials, trade unionists, activists and local residents. The case studies are interdisciplinary, drawing from fields including environmental law, philosophy, social sciences, political ecology, economics and development studies, among others.

Examples of methodological tools used include: degrowth frameworks to understand alternate pathways for sustainable transition of agriculture (4) and tourism (13); critical discourse analysis (CDA) to unpack the messaging behind key policies (1, 4); Lebdioui and Anzolin's (2021) framework for analysing interconnected dimensions of green industrial policy (5); the Green Transition Vulnerability Index to analyse the distributional effects of EU climate investment (9); the OECD's Climate Actions and Policies Measurement Framework (CAPMF) and its Environmental Policy Stringency Index to investigate whether environmental policy exacerbate income inequality at home and shifts emissions abroad (10).

Examples of indicators and data used included: land use, farm structure, subsidy flows, and rural employment, alongside data on subsidy allocation patterns and institutional transparency in land governance (Eurostat, TNI, 2015; Fairbairn, 2020) (case study 4); renewable energy generation,

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renewable supply chains, formal employment in green sectors, water consumption per unit of mineral extraction, community consultation processes, technology transfer agreements, and regional trade patterns (World Bank, World Resources Institute, 2024; U.S. International Trade Administration, 2024) (6); European Quality of Government Index (EQI) indicators and GDP per capita (9); World Inequality Database and the EORA global supply chain database (10); World Bank, Eurostat, IRENA, IEA, and World Economic Forum economic performance and green tech investment data (11); percentage of the population unable to keep their homes adequately warm, risk of poverty or social exclusion in rural areas and percentage of the population working in agriculture (EU-SILC/JRC, EuroStat, ILO) (2).

The key policies linked to the green transition that were investigated by GreenPaths case studies range (at scale and transnationally) from the core EU policy fields of: Agriculture; Economic, social and territorial cohesion; Employment and social affairs; Energy; Environment; Justice and fundamental rights; Monetary policy for the Eurozone countries; Public health; Tourism and Transport. They include: the European Green Deal (EGD) and Fit for 55 decarbonisation and renewable energy targets; the Critical Raw Materials Act (CRMA); EU Battery Directive; EU Hydrogen Strategy; Common Agricultural Policy; Just Transition Mechanisms (agreements and funds) including the European Green Deal Investment Plan (EGDIP); European Agenda for Tourism 2030 and the Transition Pathway for Tourism; EU Renovation Wave for Europe Strategy; the EU Directive on the Energy Performance of Buildings (EPBD); and a range of national Energy and Climate Plans.

In the *Discussion and Conclusions* section, CES coded and analysed the costs and benefits of green transition policy as identified by partners in their cases, their keywords and themes, using MAXQDA, with coding informed by GreenPaths analytical framework. A summary analysis highlights socio-enviro-economic costs and benefits keywords, identifies some overarching metanarratives around the winners and losers of green transition policy, providing conceptual and theoretical analysis of key concepts and process of social impact underpinning our cases. We draw out some generalised responses to GreenPaths' research questions: How are green transition policies impacting environmental sustainability and social wellbeing? How are these impacts measured or assessed so far? *Who are the key actors and how are they responding (e.g. institutional/policy; local/community; external actors) in Europe and the Global South? What are the anticipated social and economic costs and benefits?* We focus in particular on this last question, the main focus of Task 3.3 and this deliverable. We also reflect on the key preliminary findings of the case studies and, by implication, what they tell us about hopeful developments and good policy initiatives towards decarbonisation and green technology targets, whilst highlighting critical and understudied examples from our data that evidence negative consequences, blind spots and inequalities in policy design and implementation.

Our main approach to this report is to focus on the stories our GreenPaths case studies tell us overall, as informed by the varied concepts, geographical focus, population and policy choice of study. Some cases focus on specific national projects, discussing the often unseen and under-researched social impacts occurring in the name of the green transition. Other cases provide a quantitative appraisal of the specific economic impacts of green trade policy and finance and, by extension, the social impacts they anticipate and incur. Some cases take a regional overview, providing a broader geographical look green transition policy, before zooming in on the socio-enviro-economic impacts of country-specific policy initiatives in select countries in the geographical Global South. Other cases investigate innovations in policy that offer potential for wider rollout and scale-up, highlight possible pathways for improving social wellbeing, inclusivity and sustainability.

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1 Case study results

1.1 Overview of case studies

Brief overview of each case study, including its key concepts, social impacts, and overall findings.

Table 1. Summary of the case studies and their focus

Case study	Concepts	Social impacts	Findings (Environment)	Findings (Social)
1. Lithium mining in Barroso, Portugal.	Decarbonisation ; Renewables; Green-grabbing.	Injustice/ Inequality; Loss and Damage.	Costs: Soil, air, and water pollution and contamination. Deforestation. Potential loss of biodiversity and protected species. Undermining of environmental protection policy. Green-grabbing of lands, including communal lands ('baldios'). Benefits: Long-term promises of reduced carbon emissions. Reduction in imports of lithium from outside the EU.	Costs: Risks to traditional husbandry, ancestral water management techniques, small-scale farming, agriculture, food security and new (ecotourism) livelihoods. Degradation of public participation in consultation and approval of mining licenses. Fears of erasure of unique historical-agricultural-cultural practices. Benefits: Short-term promises of economic prosperity and job creation. Geopolitical significance for the Portuguese government.
2. Europe's Yellowstone? An analysis of the social impacts of forest conservation in Romania	Decarbonisation ; Eco-social State/Public Services; Green-grabbing	Inequality /injustice; Recovery/resilience/restoration; Loss and damage	Costs: Green-grabbing of privately owned and communal forests. (Unintended) consequences of rewilding: increasing human-wildlife interactions, e.g. bear attacks. Over-regulation, litigiousness, punitive measures and new restrictions in access to and use of the forests. Benefits: Protection of forests and biodiversity. Rewilding and increased protection for endangered species	Costs: Increased (energy) poverty due to criminalisation of small-scale logging, forestry and loss of income. Pressure, coercion, accusations of corruption in Foundation Conservation Carpathia's (FCC's) land acquisition and management: creating new models of forest feudalism. Devaluing and threat of erasure of local knowledges of nature, symbiotic living in favour of the commodification of nature. Benefits: Long-term promises of increased socioeconomic benefits of ecotourism. Promises of reduction in large scale criminal logging operations.
3.Coal mine closures in the region of Bierzo-Laciana (Spain)	Decarbonisation ; Fossil fuel phase-out	Labour; Mitigation/ adaptation; Governance/ policies	Costs: Focus on economic development instead of environmental protection. Reliance on public funds for restoration. Risk of bad practices in new 'green' industries Benefits: Restoration of open-pit mines. Reduction of CO_2 emissions. Potential for green economic diversification.	Costs: Scarce and precarious job creation Inequality in the distribution of impacts. Population exodus and deterioration of services Benefits: Public participation and co-governance. Training and updating of skills.
4.Assessing the impact of Common Agricultural Policy in land use.	Land concentration as structural inequality and exclusion;	Marginalisation of smallholder farmers and entry denial for young farmers.	Costs: Biodiversity loss, soil degradation, and ineffective greening measures. Benefits: Partial stabilisation of agricultural land,	Costs: Increasing land concentration, exclusion of small farms, rural exodus.

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	Political ecology of land under CAP; Degrowth and just transitions in rural Europe.	Rural depopulation and socio-economic inequalities exacerbated by CAP. Elite capture and institutional fragmentation in land governance.	introduction of eco-schemes.	Benefits: Support for large farms sustaining some rural economies, rural development funding (uneven impact).
5.'Green' and 'fair' industrial policy in Latin America.	Resource sovereignty; Developmental state; South-South cooperation; Strategic sectors; Structural transformation.	Distributional justice. Elite capture. Democratic participation. Labour conditions Regional integration.	Costs: Critical minerals mining for the green transition intensifies water stress, soil degradation, and displacement of indigenous communities. Export-oriented extractivism reproduces colonial patterns despite green rhetoric. Benefits: State-led renewable energy programmes (Costa Rica, Uruguay) demonstrate high decarbonisation potential. Public investment in agro-ecological processing. Relatively successful local content policies in wind/solar sectors create domestic value chains. Increasing (but still limited) regional cooperation on climate adaptation.	Costs: Resource nationalism often benefits politically-connected elites over workers and communities. Precarious employment in 'green' sectors. Technology transfer remains limited. Insufficient just transition support for fossil fuel workers. Benefits: Expanded state capacity for strategic planning and sectoral coordination. Public banks financing productive transformation. Relatively successful industrial policies supporting social development. Regional initiatives re-creating policy space. Selective technology sovereignty advances. Social protection expansion in some countries linked to increased resource revenues.
6.'Green' and 'fair' industrial policy in Southeast Asia.	Developmental state; Strategic upgrading; Technology sovereignty; Industrial commons; Export-led industrialisation.	Structural transformation. Labour standards Inequality. Capability building. Democratic governance.	Costs: Rapid industrialisation increases energy demand and pollution. Benefits: Massive renewable energy deployment. State-coordinated infrastructure development reducing emissions. Successful public transport investments. Circular economy initiatives. Technology adaptation for tropical contexts.	Costs: Export assembly work remains precarious despite 'green' label. Anti-union practices in special economic zones. Uneven regional development. Displacement caused by large mining and industrial projects. Benefits: Strong developmental state achievements. Successful industrial upgrading through strategic policies. Effective technology transfer requirements. Robust public education and training systems. State enterprises capturing higher value-added activities. Coordinated wage growth policies. Significant poverty reduction through industrialisation. Social protection expansion Regional knowledge networks (ASEAN cooperation). Domestic technological capabilities in

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				renewable energy. Digital infrastructure. Proactive industrial policy creating middle-income prosperity despite remaining social challenges.
7.'Green' and 'fair' industrial policy in Southern Africa.	Beneficiation; Resource sovereignty; Developmental state capacity; Just transition; Industrial diversification.	Procedural justice. Democratic ownership. Employment quality. Community participation. Inequality reduction.	Costs: Platinum and cobalt mining for green technologies causes land degradation and water contamination. Inadequate environmental restoration. Green hydrogen projects threaten water security in water-scarce regions. Limited biodiversity protection. Benefits: Coal phase-out reduces pollution. Renewable energy programmes and expanding access. Potential for (re)industrialisation through mineral beneficiation. Community-based conservation models. Ecological restoration employment programmes.	Costs: Mining-dependent communities face job losses without adequate transition support. Foreign corporations dominate green hydrogen value. Minimal local content despite policies. Persistent inequality. Limited democratic participation in transition planning. Benefits: State enterprises maintaining strategic control in key sectors. Public renewable programmes creating employment. Innovative just transition frameworks with social dialogue (South Africa's Presidential Climate Commission). State procurement driving local manufacturing. Expanded social protection pilots; regional cooperation initiatives (SADC, African Continental Free Trade Area). Industrial policy revival creating institutional capacity. Public investment in skills development. Potential for transformative beneficiation strategies linking mining to manufacturing.
8.'Green' and 'fair' industrial policy in North Africa	Green colonialism; Export-oriented development.	Neo-extractivism. Energy access. Democratic deficit. Unequal exchange. Labour rights.	Costs: Large-scale solar/wind projects primarily serving European energy demand. Desalination for green hydrogen exacerbates water stress. Concentrated solar power disrupts desert ecosystems. Limited environmental justice considerations. Benefits: Significant renewable capacity expansion (Morocco's solar programme). Reduced fossil fuel imports improving energy security. Regional grid interconnection potential. Technology adaptation for arid climates. Domestic manufacturing capacity for the green energy transition.	Costs: Green energy export agreements reproduce asymmetric North-South relations. Limited community consultation. Employment mainly temporary and low-skilled. Authoritarian governance captures transition revenues. Limited and restricted labour organising. Benefits: State-led industrialisation strategies building institutional capacity. Public investment in energy infrastructure expanding domestic access. Technical training programmes developing workforce capabilities. Potential for South-South technology cooperation. Strategic positioning in global green value chains. Formal job creation in renewable energy.

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				Emerging industrial policy frameworks challenging pure export orientation. Potential for regional integration strengthening collective bargaining power.
9.Sustainable finance	Inequality in green finance distribution; Left-behind regions.	Beneficiaries: cities and their commuting areas.	Costs: Uneven distribution of climate finance where cities and their commuting areas receive greater climate finance proportionally than other, potentially left-behind, areas. Benefits: Climate lending particularly to urban projects that support environmental sustainability.	Costs: Vulnerable regions receive proportionally less climate finance. Existing territorial inequalities may likely increase further, exacerbating the issue of 'left-behind places'. Benefits: Regions with institutional capacity, particularly urban areas, benefit more from climate finance and reduce pollution.
10.Effects of green transition policy interventions on environmental sustainability and social wellbeing in Europe countries and in 24 selected countries in the Global South.	Decarbonisation ; Distributional impacts; Carbon leakage.	Rising inequality from stricter climate policies. Welfare transfers cushion low-income groups.	Costs: Emission offshoring to Global South due to increase in imports of carbon-intensive goods rise Benefits: Lower EU territorial emissions.	Costs: Low-income groups bear higher transition costs. Benefits: Social transfers offset inequality effects.
11.Social and economic impacts of the Hydrogen Economy in Europe.	Sustainable growth; Decarbonisation ; Renewables; Fossil fuel phase out; Hydrogen; New extractivism Green/ landgrabbing.	Injustice. Inequalities.	Costs: Green hydrogen can exacerbate inaccessibility of renewable energy, water stress and water pollution. Hydrogen requires large amount of renewable energy and investments. Benefits: Reduces emissions from industrial processes and hard-to-abate sectors. Green hydrogen is superior to 'blue hydrogen' in terms of sustainability.	Costs: Distribution of costs and benefits skewed towards private enterprises. Public participation, due process and transparency are insufficiently guaranteed. Hydrogen projects may harm local populace through misrecognition of (indigenous and labour) rights Benefits: Green hydrogen can encourage regional development and green industrialisation. Green hydrogen can help global knowledge transfer on renewable technologies.
12.Mining Lithium in Serbia	Decarbonisation ; Renewables.	Loss and Damage.	Costs: Contamination of groundwater and soil Destruction of biodiversity and habitat loss. Deforestation and alteration of hydrological systems. Benefits: Contribution to global decarbonisation. Potential to develop cleaner energy systems.	Costs: Displacement and loss of livelihoods. Social fragmentation and conflict. Benefits: Potential job creation. Positioning Serbia as EU's strategic partner.
13.Green transformation of tourism industry - Case of Croatian Urban Tourist Destinations.	Decarbonisation , Eco-social state/public services, Fossil fuel phase out	Loss and Damage.	Costs: pollution, resource consumption intensity, waste generation, land grabbing, high carbon footprint. Benefits: potential for decarbonisation, potential for	Costs: gentrification, lack of affordable housing, increase of real estate prices, social conflict, poorer public infrastructure, lower quality of life. Benefits: job creation, better integration into the EU market.

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			sustainable local community development.	
14.Energy poverty in residential buildings in Central and South-Eastern Europe – Case of Croatia.	Eco-social state/ public services; State-aid; Green finance and Renewables; Housing.	Injustice and inequality. Governance and policies.	Costs: Vulnerable groups remain reliant on fossil fuels and cheaper energy sources due to the lack of targeted policies. Twofold territorial bias: favouring urban over rural areas, and affluent neighbourhoods over disadvantaged neighbourhoods. Benefits: Reduction of household energy consumption and greenhouse gas emissions. Improved building performance that supports long-term climate resilience.	Costs: Exclusion of vulnerable groups from funding schemes (because of legal, financial or procedural barriers). Rising rents and potential displacement following renovations ('renoviction'). Benefits: Potential long-term reduction in energy spendings and improved housing quality. Strengthening of civil society engagement and awareness in energy justice debates.
15.Public food procurement as a lever to foster the just and green transition - Dordogne, France.	Sustainable public procurement; Healthy school meals; Farm-To-Fork Strategy (F2F).	Fairer remuneration for local farmers. Healthier diets for children. More affordable meals than national average.	Benefits: decreased emissions linked to transportation and use of pesticides. Costs: higher energy/resource use for small-scale and frequent logistics.	Benefits: Increased income and stability for local farmers. Costs: resistance of local suppliers doing conventional farming.

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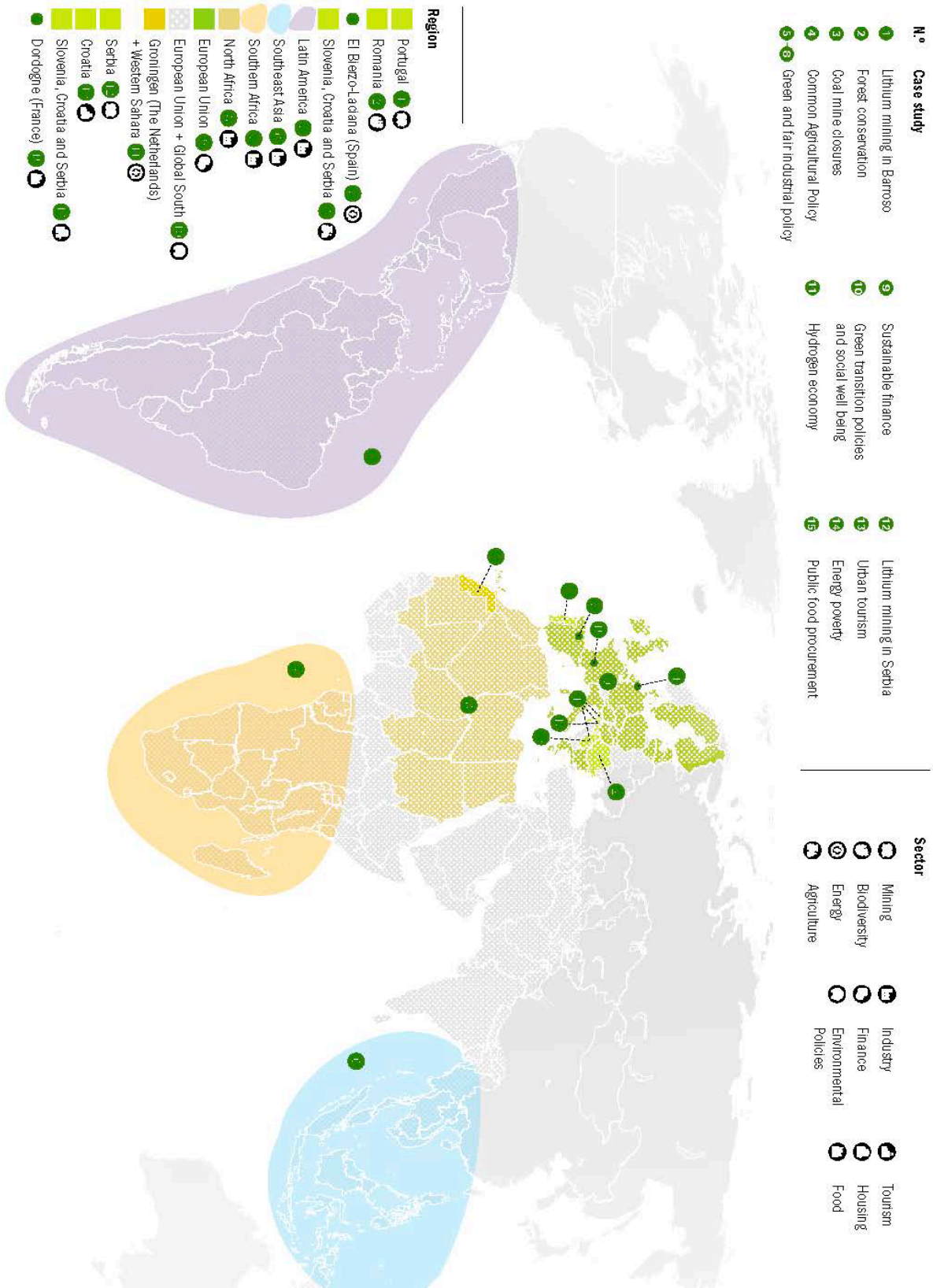
Figure 1. Visualisation of the GreenPaths case studies by place and sector



1.2 Detailed results

The following 15 sections provide deep dives into WP3 case studies and their preliminary findings, which were researched and written by different coalitions of GreenPaths consortium and aim to identify the costs and benefits of green transition policy in their given contexts.

1.2.1 Case study 1: Lithium mining in Barroso, Portugal

Summary

Table 2. Summary of case study 1

Lithium mining in Barroso, Portugal
EXECUTIVE SUMMARY OF THE CASE. The 'Mina do Barroso' case has become emblematic of the struggle between the push for decarbonisation and 'green mining'—driven by international and national policies on critical mineral extraction—and the need for social, cultural, and environmental protections. This case study mobilises the concept of Green Sacrifice Zones (GSZs) to unpack the sacrificial logics present in key enabling policies, pro-lithium discourses, and processes of loss, damage and injustices experienced or anticipated by local communities impacted by the granting, public consultation and prospecting processes of Mina do Barroso. Through Critical Discourse Analysis (CDA) and content/keyword analysis of primary and secondary data, the case study reveals gaps in the socioeconomic benefits promised by advocates of 'green mining'. It also exposes a minimisation of environmental protection policies and an exacerbation of processes of rural marginalisation and peripheralisation. This poses a risk of erasing a unique and sustainable historical, agricultural, cultural, and social system.
SUMMARY OF THE MAIN FINDINGS. The primary finding is that key EU and Portuguese green transition policies deploy a logic of urgency and geopolitical competitiveness to fast-track projects, sidestepping substantive public consultation and dismissing ecological costs as temporary. A second finding identifies a logic which frames rural areas as moribund, arguing 'green' mining represents a resurrection and win-all benefit, thereby erasing local communities' perceived sacrifice of their unique agricultural heritage and local livelihoods. A third finding is the use of technocratic 'restoration' promises to create a 'no net harm' discourse, strategically circumventing biodiversity protections. Based on the erasure of costs, a fourth and final logic considers any kind of opposition irrational, sacrificing a community's right to decide, neutralising dissent and creating a new layer of intangible, psychosocial costs, especially for women. While the socio-ecological costs (ongoing and anticipated) emerge from the analysis of these logics, benefits proclaimed by lithium proponents appear as vague and strategic promises. Their core argument hinges on a regional economic boom trickling down to the local community through 'direct' and 'induced' jobs, financial benefits and repopulation. However, identifiable indicators, such as renewable energy jobs, socioeconomic inequality and lithium production, suggest these potential economic benefits are long-term. With Mina do Barroso planning to start operations in 2027 and the next census due in Portugal in 2031, it is unclear when any social benefits might manifest. Overall, this case contributes to the broader literature on green sacrifice zones by demonstrating how green, developmentist and life-saving rhetorics are particularly effective discursive tools for justifying extraction, erasing loss, injustices, and silencing dissent under the guise of climate action and, more recently, EU military defence.

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ENVIRONMENTAL COSTS OF THE GREEN TRANSITION

- Mining-related pollution, noise, deforestation, water contamination and shortages, potential disasters, changes in soil conditions, loss of biodiversity and protected species.
- Undermining of environmental protection policy in favour of pro-lithium extraction policy.
- Green-grabbing and expropriation of lands, including communal lands ('baldios').

ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Long-term promises of reduced carbon emissions and reduced reliance on fossil-fuels.
- Reduction in imports of lithium from outside the EU.

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Fears of erasure of unique historical-agricultural-cultural practices: risks to traditional husbandry, ancestral water management techniques, small-scale farming, agriculture, food security and new (ecotourism) livelihoods.
- Degradation of public participation in consultation and approval of mining licenses.
- Emotional and psychological stress, social and political pressure.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Short-term promises of economic prosperity and job creation.
- Geopolitical significance for the Portuguese government.

BACKGROUND

This case study focuses on the proposed Mina do Barroso lithium project in Northern Portugal, specifically on the socio-environmental impacts of the policies that facilitate it. The case is emblematic of the struggle between the push for decarbonisation–driven by international and national policies on critical mineral extraction–and the need for social, cultural and environmental protections. The EU's acceleration of 'green extractivism', particularly through the Critical Raw Materials Act (CRMA), which lists Barroso as a Strategic Project, and Portugal's concomitant National Energy and Climate Plan (PNEC), has brought this struggle into sharp relief.

The Barroso region is an agricultural, mountainous area designated a Globally Important Agricultural Heritage System (GIAHS). A Natura 2000 biodiversity site is also located in the region (Montalegre) where the Mina do Romano project is underway (Pusceddu, 2024). The region is particularly rich in minerals, including lithium (Gomes and Ramos, 2018). Tying into EGD targets to move production of electric vehicles to the EU – with batteries requiring 40% of local materials (EU Regulation 2023/1542) – Portugal created a Working Group on Lithium in 2016, encouraging applications for exploration and prospection licencing. By 2025, 22 lithium mining concession and prospecting contracts were approved, 10 of which in the Barroso region, including Mina do Barroso, owned by Savannah Lithium Lda.

The process has been marked by legal and community disputes (Dunlap and Riquito, 2023; Silva and Sareen, 2023). Savannah has faced sustained local opposition since 2018. In 2019, the Municipal Assembly of Boticas passed a motion against lithium mining in the municipality. A 2021 complaint accused Portuguese agencies of violating the UNECE Aarhus Convention on public consultation in environmental projects (the Aarhus Committee ruled they had in August 2025). A UN Special Rapporteur accused the project of threatening human rights and damaging the ecosystem, pointing to 'growing global problem of sacrifice zones' (Boyd, A/HRC/52/33/Add.1, 2023). Despite these concerns, the Portuguese Environment Agency (APA) issued a positive Environmental Impact Statement (DIA) in 2023. In February 2024, the Portuguese Public Prosecutor issued an opinion on the proceeding, recommending that

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Savannah's DIA should be annulled due to several legal infringements. Despite these controversies, the European Commission classified Mina do Barroso as a Strategic Project under the CRMA in March 2025.

While Mina do Barroso is among the most documented lithium projects in Europe, few studies offer qualitative data on its social and economic impacts (Dunlap and Riquito, 2023; Silva and Sareen, 2023; Saleth and Varov, 2023). Additionally, more research is needed to analyse recent EU and Portuguese green transition policies and their socio-environmental impacts in Barroso. This study addresses these gaps using Environmental Justice and Political Ecology literature, applying the concept of GSZs to describe new frontiers of green extraction and the sacrifice of places and populations affected by low-carbon transitions and related projects (Zografos and Robbins, 2020). It investigates the contested 'sacrificial logics' (Reinert, 2018) preceding project implementation, detectable in planning documents, policies, discourses, and decision-making processes. Drawing on the GreenPaths analytical framework, this approach analyses key actors, their responses, enabling policies and projected costs and benefits. Its aim is to determine whether the socio-environmental impacts in Barroso manifest a sacrificial dynamic—one that exacerbates existing, or creates new, inequalities, injustices, and power relations—which the green transition should remedy, not intensify.

METHODOLOGY

This qualitative study employs a mixed-method approach using multiple data sources: academic and grey literature including the Environmental Impact Assessment and Public Consultation Report for Mina do Barroso; policy documents such as the EU CRMA and Portugal's PNEC; promotional material from Savannah Resources Lda; and primary data from a doctoral research project. The primary data comprises 18 semi-structured interviews with residents of Covas do Barroso (aged 27-100 years, including farmers, retirees, and care or social workers), as well as fieldnotes, conducted between April 2023 and April 2024. It also includes two public CES events that engaged discussion of the case between social movements, local residents, NGOs and researchers: a March 2025 webinar *How the Lithium Rush is Producing Sacrifices Zones in Europe and Beyond* and an April 2025 seminar *What are the challenges and paths for the energy transition in Portugal?* [see GreenPaths Knowledge Hub: https://tinyurl.com/r28c7z73 / https://tinyurl.com/yxrjbzz2].

The analysis was conducted using MAXQDA software. The CRMA and PNEC were analysed using Critical Discourse Analysis (CDA) (Van Dyke, 1993; Cummings et al., 2020), while the remaining primary and secondary data were examined through thematic coding, keyword and content analysis. CDA served to identify dominant discourses and language used to justify green extraction. While keywords and content analysis enabled to highlight the main sacrificial logics in the making of the Barroso mine and the (socio-economic-environmental) costs and benefits informed by such logics and perceived by different stakeholders, including Savannah, residents, local authorities, activists, and researchers.

The case adopts concepts of decarbonisation, renewables, new extractivism, and green-grabbing, and the theoretical lens of GSZs to understand key processes of social impact (injustice/inequality and Loss and Damage) related to lithium mining in Barroso—both ongoing and anticipated impacts. It answers the following research question: How do the proposed lithium mining projects impact the social and ecological well-being of the Barroso region?

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FINDINGS

The following analysis of the sacrificial logics at play in the Barroso lithium mine is contextualized by key regional indicators that highlight the tension between its green energy potential and its socioeconomic reality. Portugal's share of renewable energy consumption stands at 34.7% (World Bank, 2022), and it hosts Europe's largest lithium reserve (Direct Industry, 2022), which policymakers frame as a strategic asset. Conversely, 22.0% of the Northern region's population is at risk of poverty or social exclusion (EAPN, 2024). It is crucial to note that data remains limited; these are merely benchmarks, as any definitive socioeconomic impacts are longitudinal. Significant information gaps—including a lack of detailed household surveys, disaggregated data, and metrics for intangible loss—persist, with the Barroso mine set to commence in 2027 and the next national census not due until 2031.

Against this backdrop, the study identifies the following primary sacrificial logics:

- Urgency and international standing. The CRMA (2024) and Portugal's PNEC (2024) function as complementary instruments that deploy convergent discursive strategies to fast-track 'renewable' resources – including lithium extraction, often at the expense of democratic integrity and environmental protection. Both policies construct a narrative of inevitability around the green transition. However, while climate goals were expected to be the primary justification for legitimising extraction, we observed that it is now just one rationale among others, including military defence and geopolitical competitiveness. This manufactured urgency, explicit in the CRMA's expedited approval processes and echoed in the PNEC's nationalist call for Portugal to be a 'frontrunner' in the energy transition, sidelines substantive public consultation and dismisses profound ecological and social costs as mere short-term inconveniences on the path to a greater good (procedural injustice). What is emphasised, especially in PNEC, is the intrinsic tie between green mining and economic growth as the panacea for social and environmental good, economic development and job creation. Both documents employ deliberately ambiguous language to greenwash extraction and evade accountability. The CRMA offers investors a blueprint of positivist language and policy framing with hollow references to human rights and environmental mitigation, insinuating significant legal wiggle room. Similarly, PNEC's vague promises of a Just Transition and socio-economic prosperity end up neutralising opposition and legitimising the very injustices it claims to avoid. Affected communities are omitted from the PNEC's Just Transition agenda (recognitional injustice), and the guiding frameworks cross-referenced are unrooted in binding legal instruments and recourse for communities.

- Where there is no life, there can't be a sacrifice (or the sacrifice of rural life): Proponents of green mining present this as a unique opportunity for economic growth. The rhetoric insists on the alleged economic decline of Barroso's rural area to justify the project's benefits (Carballo-Cruz and Cerejeira, 2020; Savannah 2024). If the rural is framed as moribund and in need of salvation, then any action upon it can only be an improvement, a 'revitalisation'- a win-all benefit, never a sacrifice. Benefits such as promised job creation and the region's development (Chaves et al., 2021)—including financial incentives for 'baldios' commoners, Covas do Barroso residents, and a flat donation to local volunteer firefighters (Savannah, 2024)—are framed as offering a new life. Local opposition rejects the narrative of a dying rurality in need of 'development', contending that their livelihoods are being sacrificed in the name of green progress. Environmental activists, NGOs and affected communities in Barroso identify intertwined social, economic and cultural costs, including risks to traditional husbandry, water management, small-scale farming, agriculture, food security and ecotourism. Potential costs articulate fear of the erasure of unique historical-agricultural-cultural practices and intangible,

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values that characterise small-scale farmers' 'way of life', threatening residents' strong attachment to place (Riquito, webinar, March 2025).

- 'There will have been no environmental harm': the sacrificial use of restoration. Opponents highlight environmental costs like pollution, noise, deforestation, water contamination and shortages, potential disasters, changes in soil conditions, and the loss of biodiversity and protected species. A prominent counter-argument from lithium proponents suggests that ecological 'restoration' can neutralise these damages, creating a 'no net harm' discourse (Reinert, 2018). In this 'no loss, no damage' logic, there is no lasting sacrifice to mourn, only a temporary imbalance to be technically managed. International environmental protection frameworks, such as GIAHS, are used by communities as tools of resistance but are also circumvented by official policies through the strategic promise of technocratic restoration. In recognising Mina do Barroso as a Strategic Project, the European Commission sent a clear message: globally recognised biodiversity, ecological, cultural and agro-historical practices are less important than lithium.

- If there are no costs, any opposition is irrational. The Barroso case reveals serious concerns about public information, participation, consultation procedures, and the approval of mining licenses. Since no socio-environmental costs are acknowledged, opposition is dismissed as irrational and contrary to the common good. Savannah launched a comprehensive public relations campaign to counter 'misunderstandings' in the resistance narrative, depicting the 'opposition' as few radicals, conflating all critique as irrational (Velicu, 2018), whilst highlighting regional economic benefits of the project: essentially damage control, then reframing. Community participation and contestation are sacrificed by a predetermined notion that the mine is inevitable, opposed by locals defending their 'right to say no' (Boyd, 2023). 'Social technologies of pacification' are therefore deployed to neutralise conflict (Dunlap and Riquito, 2023), whilst green grabbing processes and land expropriation are progressively enabled by administrative easements. The sum of these procedural, recognitional and prospective injustices produces intangible ongoing costs in the form of psychological, affective and emotional stress. The latter, particularly impactful for women who are on the frontline of community resistance, is described as one of extractivism's 'most profound impacts, even before any material extraction' (Riquito, webinar, March 2025).

Indicators: Data remains limited. We foreground the case with the following indicators: Portugal's share of renewable energy in total final energy consumption is: 34.7% (World Bank, 2022); the country has the largest reserve of lithium in Europe (Direct Industry, 2022); 22.0% of people at risk of poverty or social exclusion in Northern Portugal (EAPN, 2024). But these are merely benchmarks, any socioeconomic impacts are longitudinal—with the Barroso mine set to commence operations in 2027 and the next census in Portugal not due until 2031. Information gaps include a lack of detailed regional household surveys, disaggregated sociodemographic data, and indicators of intangible loss and damage.

DISCUSSION

The making of green sacrifice zones is a major concern for scholars working on the impacts of the green transition and green extractivism. This case study has highlighted the main sacrificial logics characterising the Mina do Barroso project: they manifest through ongoing and anticipatory processes of (procedural, recognitional, and prospective) injustice, inequalities (especially rural/urban and gendered), and socio-environmental-economic-psychological (tangible and intangible) losses and damages. While closely resonating with those characterising 'conventional' sacrifice zones, the sacrificial dynamics at play in Barroso show that the 'climate urgency', 'life-saving' and 'restoration' discourses are even more effective strategies to erase losses and harms

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inflicted upon local communities and the environment and to justify green mining as a benefits-only practice. Dismantling such discursive tools and, ultimately, the green mining enterprise is even more challenging because opposition is easily dismissible as irrational or NIMBYist.

Overall, the case reveals a profound dissonance between the benefits promised by green transition advocates and the realities experienced by local communities. Despite having been denied the 'right to say no', residents, environmental activists, and NGOs play a crucial role in pointing to green mining as just another frontier of capitalist extraction, where the State, mining companies and private investors—not vulnerable communities—are the primary beneficiaries. Policies play a central role in the making of Barroso' GSZ. Their impacts - costs and benefits – are channelled to the local population through downstream integration of common green targets, incentivised by promises of economic empowerment, (geo)political relevance and saving the planet. The collective support, Just Transition strategies, and socio-ecological benefits insinuated by CRMA and PNEC are neither clearly articulated nor readily quantifiable. Moreover, 'lithium for renewables' has recently been paired with 'lithium for war' rhetoric, as the Green Deal policy drive is being supplanted by calls for EU defence and remilitarisation.

Imagining policies that facilitate a truly Just and Green transition should centre on community participation and self-determination regarding their socioeconomic development, land and resource use, on the protection of incommensurable (often non-monetisable and irreplaceable) place-based and life-making values as well as on the acknowledgement of all forms of loss and damage. The Barroso case emphasises the need for open and transparent community-led discursive spaces to debate alternatives to monolithic narratives of green extractivism when faced with fait accompli top-down policy implementation.

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1.2.2 Case study 2: Europe's Yellowstone? An analysis of the social impacts of forest conservation in Romania

Summary

Table 3. Summary of case study 2

Europe's Yellowstone? An analysis of the social impacts of forest conservation in Romania
EXECUTIVE SUMMARY OF THE CASE. This case study examines the social impacts of large-scale conservation in Romania's Carpathian Mountains, focusing on the Foundation Conservation Carpathia's (FCC) 'Europe's Yellowstone' project. It addresses a critical research gap in understanding how green transition policies around forest conservation, under the EGD and Biodiversity Strategy, affect rural communities. Through mixed methods—including policy analysis, media review, and stakeholder interviews—the study investigates whether ostensibly progressive conservation agendas perpetuate green-grabbing and sacrifice zones. Findings reveal significant socio-environmental trade-offs: increased biodiversity protection and rewilding coincide with dispossession, criminalisation, cultural erosion, and economic marginalisation of local communities. The research contributes to broader literature on environmental justice by applying a 'green sacrifice zone' framework to non-extractive contexts, demonstrating how fortress conservation exacerbates inequalities. It concludes that convivial conservation can help prevent the risk of EU-backed transition policies replicating colonial patterns under a green guise.
SUMMARY OF THE MAIN FINDINGS. A stark disparity between conservation benefits and local costs was found. Environmentally, the FCC project enhances protection, rewilding and species reintroduction, supported by EU funding and media acclaim. Socially, however, it triggers dispossession, cultural loss, economic exclusion, and political disempowerment. Local communities – especially farmers, forest-dependent households, and Roma communities–lose access to forests, face restrictive regulations, and endure criminalisation, intimidation and legal threats. Winners include international investors, conservation elites and external actors benefiting from commodified nature and green legitimacy; losers are residents whose livelihoods, local knowledge, and traditions are eroded. The case illustrates a new form of green sacrifice zone: not extractive, but conservation-driven, yet equally detrimental to vulnerable communities. This aligns with broader literature on green grabbing in the Carpathians (Iordachescu, 2021) and environmental justice, showing how 'fortress conservation' prioritises myths of pure wilderness over human wellbeing. The FCC's actions, supported by EU policies, echo historical colonial patterns that sideline local voices and perpetuate power imbalances. In response, this study advocates for convivial conservation frameworks (Buscher and Fletcher, 2020; Iordăchescu, 2023) as inclusive alternatives that policymakers must integrate to prevent the replication of these green sacrifice zones.

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ENVIRONMENTAL COSTS OF THE GREEN TRANSITION

- Green-grabbing of privately owned and communal forests.
- (Unintended) consequences of rewilding: increasing human-wildlife interactions, e.g. bear attacks.
- Over-regulation, litigiousness, punitive measures and new restrictions in access to and use of the forests.

ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Protection of forests and biodiversity.
- Rewilding and increased protection for endangered species.

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Increased (energy) poverty due to criminalisation of small-scale logging, forestry and loss of income.
- Pressure, coercion, accusations of corruption in FCC's land acquisition and management: creating new models of forest feudalism.
- Devaluing and threat of erasure of local knowledges of nature, symbiotic living in favour of the commodification of nature.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Long-term promises of increased socioeconomic benefits of ecotourism.
- Promises of reduction in large scale criminal logging operations.

BACKGROUND

The case investigates the social impacts of EU and national conservation policies in Romania, focusing on controversial forest land purchases by the Foundation Conservation Carpathia (FCC). The FCC is developing a 200,000-hectare private wilderness reserve in the Carpathian Mountains - marketed as 'Europe's Yellowstone'. Considering the Yellowstone case as a lens to investigate how changes in forest management impacts communities' dependency on the forests, the research explores issues of vulnerability, power dynamics and socioeconomic impacts on small-scale agriculture, forestry, husbandry, and common lands ('composesorates' and 'obști'), alongside criminalisation of local logging as well as threats to cultural practices and the rural social fabric.

The FCC's role must be understood within the context of Romania's contentious forest restitution process and, more recently, the launch of the EGD. Romania's post-socialist property reform, governed by Law 1/2000, transferred one million hectares of forest from the state back to local communities triggering complex institutional reorganisation along with enduring social and legal conflicts (Voicu and Vasile, 2022). Weaknesses in formalising collective land rights left these areas vulnerable to appropriation by private and state actors with allegations that loopholes in the restitution process were used to illegitimately transfer land to the FCC. EU policy is a key driver for conservation. The EGD and its Biodiversity Strategy 2030 set ambitious targets for protecting old-growth forests. The EU Carbon Removals and Carbon Farming Certification (CRCF) also establishes a certification for carbon removal and capture, which includes afforestation and sustainable forest management. These directives directly inform Romanian policy, such as the Integrated National Energy and Climate Plan (INECP, 2024) and the National Strategy for Forests 2030, which aligns with the EGD to expand protected forests and combat illegal logging under the New Forestry Code (2024). These new policies have legitimised the strict protection model invoked by the FCC in the Carpathians, which implements the EGD by restoring 'degraded' ecosystems, rewilding Carpathian forests, promoting ecotourism, and launching pioneering projects like the Carpathia Carbon Finance Project to compete in the carbon credit market.

This case asks: How do forest conservation policies impact rural communities in Romania? Existing analysis looks at the balance between meeting renewal energy targets, environmental protection and local communities' interests, needs and heritages. It draws on the work of

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Iordăchescu, who shed light on the role of the FCC in green-grabbing and 'fortress conservation' (2018), erasing transhumance and traditional forestry (2021a), and of Vasile (2023) who analysed the conflicts and contradictions of forestry policy and punitive legislation on illegal logging in the Carpathian Mountains. This study offers new empirical contributions by cross-analysing media, legal, and policy documents alongside numerous local stakeholder interviews. Theoretically, it puts Environmental Justice studies on 'green sacrifice zones' (GSZs) (Zografos and Robbins, 2020) into dialogue with existing literature and new findings.

We foreground the case with key statistics: 12.5% of Romanians cannot heat their homes adequately (EU-SILC/JRC, 2023); rural poverty risk is 41.7% (Eurostat, 2024); 18% of the population work in agriculture (ILO, 2023).

METHODOLOGY

This mixed-method study combines a literature review, media analysis and a legal and policy review with primary data. The latter was gathered during three distinct fieldwork trips (2019, 2023 and 2025) and includes 14 interviews with local residents (farmers/foresters, tourism business manager, current and former forestry employees and former FCC employee), leaders of a forest commons (civic leadership role) and local officials (civic leadership roles) in the vicinity of FCC-owned forest areas in the Carpathian Mountains. This is supplemented by testimony from FCC at public events in Romania and a GreenPaths online webinar. Data was manually coded in Excel and MAXQDA. Content analysis focused on identifying the socioeconomic and environmental costs and benefits of key policies. Drawing from the GreenPaths analytical framework, the case investigates social impacts including injustice and inequality, Loss and Damage, governance/policies and labour. The core concepts of the case include Sustainable Growth and green-grabbing. The case study relies on the empirical research of Romana Puiulet and the conceptual framing of Iordachescu (2025), who argues that the depiction of virgin forests and research sanctuaries in the Carpathian Mountains is built on mythologies of nature purification and erasure of the historical footprint of the local population.

Theoretically, the case introduces an Environmental Justice perspective on GZSs to the existing literature on the case. It identifies dimensions of socioenvironmental justice most commonly referenced in association with a green or just transition (distributional, procedural and recognitional) and those less developed (restorative and cosmopolitan). The GSZs lens is deployed here to assess whether current conservation policies, while claiming to protect the forests from 'humans', are in fact perpetuating the sacrifice, marginalisation, and dispossession of rural communities whose subsistence directly depends on that very environment.

FINDINGS

The FCC's proposed Ecopark is supported by international organisations (WWF, Greenpeace, Natura 2000) and promoted in international media for its environmental benefits, including forest and biodiversity protection, rewilding, enhanced prospects for endangered species, alongside socioeconomic gains from ecotourism and prospected carbon credit revenue. The FCC recently completed Romania's largest EU-funded LIFE project, 'Creating a Wild Nature Zone in the Southern Carpathians' (2019–2025), worth €27.6 million. Western media (The Guardian, NYT, National Geographic) praise the initiative as visionary, often highlighting species reintroduction, and protection. Romanian outlets (Digi24 and Libertatea) also laud its conservation efforts, though some (such as Adevărul) question sovereignty, access and intentions. Critical reports, such as Antena 3's 'Premeditated Robbery' allege FCC acquired forests via fraudulent restitutions. Local outlets emphasise community opposition, accusing FCC of privatising forests with foreign capital, restricting local rights, and bypassing consultation.

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Interviews reveal a lack of participation and fair inclusion of local communities in decisions regarding forest conservation and livelihoods (Iordachescu, 2025). Residents, forestry workers and officials report being marginalised from consultations, contradicting the FCC's claims of collaborative partnership. Communities feel ignored, with many describing public consultations as mere formalities between officials and the FCC rather than genuine public engagement. One local official stated that 70% of the community opposes the FCC's national park project, criticising its top-down approach. Residents call for more inclusive policymaking and management plans that reflect local needs and improve infrastructure. This alienation is intensified by the perception that economic benefits primarily favour foreign investors whereas locals lose land, resources and development opportunities. The arbitrary designation of protected areas—such as Natura 2000 sites—was also criticised, with examples of illogical boundaries and strict regulations that prevent basic repairs without approval.

Residents and officials repeatedly accuse the FCC of corruption, manipulation and deception. One official claimed the foundation uses proxy organisations to advance its goals, leveraging financial resources and a long-term strategy that targets younger generations as older residents pass away. A former forestry inspector alleged that some FCC-owned lands were illegally restituted. Others criticised conservation policies for perpetuating systemic injustice and political corruption, citing unfulfilled promises of local development, disregard for local law, and a lack of tangible benefits for communities, whilst the State fails to protect the community.

Residents involved in community resistance report bullying, intimidation and legal threats, alongside pacification tactics like the funding of youth and education programs aimed at gaining community acceptance. They have leveraged legal and historical knowledge to reclaim forest commons, viewed as core to local identity. The historical role of the obște - a traditional institution responsible for safeguarding community forests - is emphasised, with one resident stating, 'The forest is our life, our tradition'. Although one group won a court ruling for restitution, they allege local authorities are blocking enforcement.

These testimonies align with literature and media coverage of the FCC's green-grabbing of private and communal forests. As noted by Iordachescu (2025), large-scale conservation land acquisitions have concentrated grazing and transhumance areas into private hands, sparking social unrest. A local official highlighted how restrictive silvicultural laws disproportionately affect small owners and communities, since most local forests are (or were) communally owned. Another official called the project 'the biggest real estate scam in Romania in 35 years', contrasting it with the U.S. Yellowstone, which is federally owned, whereas the Romanian state owns only 5% of the land here. One resident described FCC's dominance as a 'state within a state'.

At the heart of the FCC's project lies the commodification of nature—consolidating forest ownership as privately owned assets. This shift to 'neoliberal conservation' (Vesalon and Anghel, 2024) led to significant local conflict, characterised by heightened regulation and restricted access to forest resources. Residents report tangible (income, property, access to forest resources) and intangible losses (connection to land, nature, community, heritage). These forests were historically managed as commons, rooted in trust and collective use rather than private ownership or external control. The impacts are deeply felt: shepherds can no longer graze livestock in traditional areas, Roma communities face fines from berry gathering and many must now buy firewood, exacerbating energy poverty. Critics accuse the FCC of promoting sustainable development while delivering no local benefits, instead acting as land barons. As livelihoods disintegrate, emigration increases, forcing some to sell ancestral land. Moreover, the FCC's potential pursuit of carbon credits suggests another layer of commodification of nature besides eco-tourism.

The FCC's reintroduction of species (bison, beavers, trout) and monitoring and protection of endangered species (bears, lynx, wolves) have increased dangerous human-wildlife interactions, particularly bear attacks. A former forestry inspector described communities as 'overrun' by bears

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protected by the FCC. Residents report destroyed property, killed livestock, and heightened fear of leaving home. While the FCC compensates for livestock losses it is also accused of supporting legislation that banned hunting, leading to an unsustainable tripling of the bear population. Although the FCC claims to manage conflict, community distrust remains high.

These dynamics intersect with broader policy impacts, including Romania's New Forest Codes, which intensified anti-logging enforcement and criminalisation of forest activities. Additionally, Law 1/2000, which restored half of Romania's forests to private and communal ownership, is now overshadowed by allegations of corruption and a shift toward concentrated ownership under the FCC, displacing traditional household timber economies.

The analysis of key actors and civil society reveals a deeply fractured landscape. The primary winners are transnational actors: the FCC, which consolidates managerial power and access to new revenue streams like carbon markets; its international donors; and global tourists. The clear losers are the local communities, who lose autonomy, resources, and cultural identity, facing criminalisation of traditional practices and heightened vulnerability from increased human-wildlife conflicts.

DISCUSSION

The study showed how large-scale conservation projects are experienced by the Carpathian communities less as sustainable development and more as green grabbing. The benefits of Europe's Yellowstone are not reaching residents reliant on forestry and farming, especially more vulnerable groups such as the Romas, nor their civic representatives. Residents' concerns span political participation, material and intangible losses, land-based identity, and eroded social trust. Through an Environmental Justice lens, they typify distributional, procedural and recognitional injustices, whilst restorative and cosmopolitan injustices are interwoven in top-down policy and regulation.

By analysing FCC ecotourism park, the case sheds light on an under-researched aspect of EU green transition: GSZs that manifest not through resources extraction but through environmental conservation and restoration, rewilding, and the expansion of strictly protected areas. Justified and legitimised as a way 'to repair the harm done by humans (i.e. former owners) by giving the land back to nature (i.e. wilderness)', the Carpathia Project represents 'a new frontier of land control' based on the cheapening and commodification of nature (Iordăchescu, 2021b, p.196), and on the sacrifice (dispossession, privatisation, criminalisation) of communal and subsistence-based forms of human and more-than-human relationships represented by local livelihoods.

As highlighted by Iordăchescu (2025), the EU and FCC 'resource sanctuary' model legitimises restrictive policies and erases historical human presence through myths of pure wilderness, overlooking the need to also protect people—a tension evident in residents' experiences of over-regulation, litigiousness, punitive measures and new restrictions in access to and use of the forests.

While environmental protection itself is not under critique, legitimate concerns persist regarding greenwashing and 'philanthro-capitalism'. Central are questions about whose 'nature' is being prioritised, and who benefits from these projects. The park's establishment is marred by allegations of corruption and injustice, while local highlight extensive tangible and intangible losses linked to the enclosure of green sanctuaries. The ambiguity between 'good' and 'bad' land-grabbing reveals conflicts involving power dynamics, discursive strategies, and legitimising narratives.

In crafting large-scale transformative policies, risk assessment and public consultation are often sidelined in the name of progress. As Almeida et al. (2023) note, the EGD's transformative ambitions echo historical colonial and neo-colonial patterns. Similarly, Nacu and Jercan (2023) frame the EGD and SDGs as part of an 'environmental economy' shaped by Western Euro-centric

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positivism. The myth of purifying nature in Romania exemplifies this approach. Ultimately, policies that enable nature's commodification give rise to a new, conservation-based form of GSZ, transforming post-communist Carpathian forest restitution into a modern system of forest feudalism. In response, the study advocates for convivial conservation (Buscher and Fletcher, 2020; Iordăchescu, 2023) as an alternative to protectionist models of conservation which offers more inclusive, communal pathways of biodiversity conservation that must be recognised and integrated by EU and national policymakers to avoid replicating patterns of green sacrifice.

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1.2.3 Case study 3: Coal mine closures in the region of Bierzo-Laciana (Spain)

Table 4. Summary of case study 3

Just Transition Agreements – Coal mine closures in the region of El Bierzo-Laciana
EXECUTIVE SUMMARY OF THE CASE. This case study examines the social impact of the Just Transition Agreements (JTAs), the main instrument developed to implement the Spanish Just Transition Strategy in territories affected by the closure of coal mines and thermal and nuclear power plants. The study evaluates how just transition policies affect the social well-being of communities impacted by the closure of thermal power plants and mining operations in the Spanish regions of El Bierzo and Laciana (León). It identifies key achievements, advantages, challenges, and insights relevant for other JTAs and policymaking processes in Europe. The main target group is the population at risk due to decarbonisation policies, addressing aspects such as employment quality, adaptability to new processes, perceptions compared to other regions, training and skill updates, and the impact on the productive and social fabric of affected areas. The stakeholders interviewed highlight the late and insufficient intervention to address the economic impacts resulting from the closure of mining facilities and power plants.
SUMMARY OF THE MAIN FINDINGS. 'Neither transition nor just'. The closure of mines and thermal power plants was abrupt and traumatic, rather than gradual and planned with sufficient time. As a result, the affected areas were unable to prepare for the transition or to generate economic alternatives. This sudden change imposed high costs on the local population, many of whom were forced to move far away in search of work or essential services. Meanwhile, various entities and individuals have taken advantage of available funding without ensuring a stable and long-term contribution to the productive fabric of these regions.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Focus on economic development instead of environmental protection. • Reliance on public funds for restoration. • Risk of bad practices in new 'green' industries. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Restoration of open-pit mines. • Reduction of CO_2 emissions. • Potential for green economic diversification. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Scarce and precarious job creation. • Inequality in the distribution of impacts. • Population exodus and deterioration of services. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Public participation and co-governance. • Training and updating of skills.

BACKGROUND

The Just Transition Agreements (JTAs) are a co-governance tool designed to ensure the commitment, coordination, and support of public administrations in Spain's Just Transition process. Their primary objective is to maintain and create economic activity and employment in territories affected by the energy transition, stabilize the population in rural or closure-threatened areas, and promote new and diverse economic activities. Public participation with various stakeholders is key to identifying and proposing projects that can foster a new productive fabric in these regions. Submitted proposals are analysed for their economic, social, and environmental

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viability, and the most suitable receive technical support to secure appropriate financing. While there are up to 15 JTAs across Spain, this case study focuses on the agreement for El Bierzo and Laciana in León (northern Spain). The research question guiding this study is: 'How do Just Transition Agreements impact the social well-being of communities affected by the closure of thermal power plants and mining operations in the Spanish region of Bierzo-Laciana?'. The study examines the quality and conditions of new jobs created by the JTAs, their impact on the productive and social fabric, community adaptation, perceptions of training and skill updates, prospects for new generations, and the distribution of policy impacts among different groups. The main target group is the population at risk due to just transition policies. Beyond simply counting jobs lost or created, and the brown-green job dichotomy, this study raises questions about the quality of expected employment and the type of economy to be developed in the new context.

METHODOLOGY

Socioeconomic and employment-related data, population (de)growth rates, and indicators concerning attitudes towards climate policies contribute to the contextual understanding of the phenomenon. However, this study aims to understand perceptions of the adequacy and fairness of the policies, the concerns and prospects of the local population, and the issues arising from the implementation of these plans. For this reason, a qualitative methodological approach was chosen. A total of 15 interviews and 2 focus groups were conducted. The interviews were divided into two categories: 'expert voices' and 'community members'. The focus groups consisted of young people and women, respectively. Local and regional authorities, just transition institute officials, trade unions, former workers, scholars and residents of the affected communities were consulted. In line with the project's conceptual and methodological framework, the case study primarily addresses the category of 'labour' but also considers others such as 'mitigation/adaptation' and 'governance/policies'. The concept of 'decarbonisation' is present throughout, and the sectoral/case study concepts of 'fossil fuel phase-out' were fundamental research tools. To evaluate costs and benefits, different stakeholders were consulted to identify inconsistencies and agreements regarding the pros and cons of the decarbonisation process in this specific region. The analysis collected insights related to seven major categories: 'employment', 'local development and social/productive fabric', 'adaptability', 'training', 'inequalities and comparisons', 'other impacts' and 'solutions, suggestions, and proposals'. Reviewing the interviews and focus groups allowed for the identification of common discourses as well as differences between groups (defined by features such as former jobs, area, age and gender).

FINDINGS

Regarding the labour conditions of the new employment opportunities generated by the JTAs, the study reveals that job creation has been both scarce and precarious. Most new jobs are found in small, family-run businesses that offer limited positions, primarily in the service sector, with low wages and unstable contracts—quite different from previous industrial employment patterns. Although green projects are mentioned, there is widespread scepticism about their actual implementation and the number of jobs they will create.

The reality on the ground is not reflected in public policies, making it difficult to perceive any positive impact of the JTAs on the productive and social fabric of the affected areas. Many projects remain unfinished or fail to take root, and while diversifying into other sectors is seen as a possible solution, most respondents emphasize the importance of industry as the key sector. The introduction of new economic projects also faces bureaucratic hurdles, especially in smaller locations that lack the resources to submit proposals and struggle with project continuity and timing.

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The general mood among the population is pessimistic. In terms of community adaptation, the exodus from the area is driven not only by the need for income but also by the lack of services in depopulating locations. Social protection plans are viewed as insufficient and unequal, leading to serious social consequences and a decline in the region's quality of life and services.

Educational strategies also need improvement: there is a mismatch between training and employment, as training courses are offered but there are no local jobs requiring those skills. Many suggest promoting Vocational Training (VT) over university education and highlight the need for training in the service and tourism sectors, where programs are currently lacking.

There is also an uneven distribution of policy impacts. The JTAs have a negative impact mainly for adult men (30–40 years old) who were not eligible for early retirement, while women are encouraged to enter the labour market in female-dominated, precarious sectors. Young people face worsened future prospects, and inequalities in compensation are reported, especially between workers in parent and subcontracted companies. Differences are also observed between the two regions studied, with Laciana in a worse situation due to its location and infrastructure. The affected villages are widely dispersed, with varying sizes, resources, and opportunities.

An unexpected benefit is the restoration of open-pit mines, which could enhance both the environmental and economic value of the area, though stakeholders regret that this was funded with public money. A notable research gap is the difficulty in tracking individuals who migrated elsewhere for better opportunities. Furthermore, it is too early to fully assess the quality of jobs created by these policies, as more time is needed for their impacts to become visible.

In summary, the main issue identified is the timing and planning of the transition: 'Neither transition nor just' is the most frequent description of the process. These experiences highlight the continued importance of the physical place in a so-called 'digital economy', which clashes with the mobility of capital. The energy and mining sectors remain tied to the specific locations where they generate jobs and wealth. However, energy transition in a globalized world is very different from the industrial revolutions of the past. In coal-intensive regions, the benefits of the 'just transition' are not perceived, and communities feel abandoned. This has led to a lack of trust in political authorities and companies regarding their responsibility to create jobs and stimulate the local and regional economy.

DISCUSSION

The findings reveal an unbalanced relationship between the costs and benefits of green transition policies. The JTAs appear to continue the restructuring policies of the 1990s already experienced in this region: while the definitive closure of mines was anticipated, the process was far more abrupt and traumatic than expected, rather than being gradual and structured.

The 'green vs brown jobs' dichotomy is not reflected in local discourse. Although there is recognition of the need to reduce CO_2 emissions, the main priority for the population remains securing a source of income. The lack of economic alternatives—due to poor communication, low initiative, competitive disadvantages, or industrial monoculture—demands an ambitious, long-term, and cross-cutting approach. While public funding is crucial, it is not sufficient on its own. Public actions must consider the specific characteristics of each affected area and the network of actors involved, including demographic factors, educational needs, economic resources and opportunities, public services, and inequality risks.

The prevailing sense of 'abandonment' increases the risk of eroding mutual trust, which can lead not only to the rejection of just transition policies but also to a broader disengagement from political institutions and social agreements that underpin a healthy democracy. The pessimistic outlook creates a vicious cycle: negative perspectives fuel population exodus, which in turn accelerates the decline of these areas. Further risks may emerge when just transition policies end

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and temporary jobs or investments are withdrawn, potentially triggering a second crisis for these communities.

In terms of 'winners' and 'losers', the situation is complex. Companies are often the most privileged, benefiting from public funding to create new economic opportunities or leaving the region without assuming significant social or environmental responsibilities. Their advantage lies in reduced risk, thanks to public support, and in using the workforce as a bargaining tool. Among the 'losers', there are varying degrees of disadvantage: locals who remain face a lack of opportunities and declining living conditions, while those who leave do so in search of jobs, better healthcare, or educational opportunities for their children. Those excluded from compensation schemes are the most negatively affected. Early retirement plans provide economic support for some, but do not help retain population or develop a productive local economy.

Several solutions and demands have emerged from the case study, including: stronger institutional support and public engagement (with increased but better-targeted funding); broader coverage of social plans (through comprehensive stakeholder mapping); greater efficiency in interventions, based on better knowledge of the affected areas and their real potential; support for an ecosystem of SMEs; promotion of flagship projects to drive regional development; and the design of projects with a cross-sectoral, transregional, and long-term perspective. The lessons learned here can be illustrative other green transition scenarios, such as the closure of nuclear facilities or other decarbonisation plans in Spain, the EU, and beyond. They can also help prevent poor practices in the implementation of new 'green' energy sources (e.g., hydrogen) or in the expansion of mining for the digital and green economies (e.g., copper, lithium).

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1.2.4 Case study 4: Common Agricultural Policy (CAP) on land use in Slovenia

Summary

Table 5. Summary of case study 4

Assessing the Impact of Common Agricultural Policy in Land Use
EXECUTIVE SUMMARY OF THE CASE. This case study examines the socio-environmental impacts of the EU's Common Agricultural Policy (CAP) on land use and rural livelihoods in Slovenia, Croatia, and Serbia, three countries shaped by a post-socialist 'triple transition' of agrarian reform, market liberalisation, and EU integration. Despite CAP's stated aims of sustainability and rural renewal, its area-based direct payments reinforce land concentration, marginalize smallholders, and fuel rural depopulation. The research addresses a gap in studies of the CAP's distributive effects in Southeast Europe by asking: How does CAP shape land use and access in these countries, and what does this reveal about the social justice dimensions of the EU's green transition? Findings show that large agribusinesses (e.g., Perutnina Ptuj, Panvita, Agrokor/Fortenova, Al Dahra) capture subsidies and land, while small farmers—especially women and youth—face systemic exclusion. Conceptually, the study contributes to critical agrarian, political ecology, and degrowth literature, highlighting how CAP's green transition policies reproduce structural inequalities.
SUMMARY OF THE MAIN FINDINGS. This case study shows that the CAP's subsidy architecture entrenches land concentration in Slovenia, Croatia, and Serbia by rewarding land area rather than need. In Slovenia, large agribusinesses such as Perutnina Ptuj and Panvita capture disproportionate subsidies through the Farmland and Forest Fund's leasing practices. In Croatia, EU accession and state land leasing laws facilitated consolidation by Agrokor/Fortenova, while in Serbia the Law on Agricultural Land (2006, amended 2015) enabled oligarchic and foreign control, epitomized by the 2018 sale of PKB's 17,000 hectares to Al Dahra. Smallholders and young farmers face exclusion due to land price inflation, opaque leasing, and complex CAP compliance. Environmentally, greening measures (Ecological Focus Areas, crop diversification, grassland protection) have delivered little, with biodiversity loss, soil degradation, and rural abandonment persisting (Pe'er et al., 2019; Erjavec & Erjavec, 2015). Winners are agribusiness corporations and foreign investors; losers are small farmers, rural communities, and ecosystems. These findings align with critical literature (Burja et al., 2020; Van der Ploeg et al., 2015; FIAN, 2013; Kay et al., 2015).

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ENVIRONMENTAL COSTS OF THE GREEN TRANSITION

- Accelerated biodiversity loss and soil degradation due to monocultures and intensive farming
- Limited effectiveness of CAP greening programs (less than 5% of land under greening has shown meaningful change)
- Land abandonment and afforestation processes masking socio-ecological exclusion

ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Partial stabilisation of agricultural land in Slovenia and some forest recovery
- Introduction of eco-schemes and cross-compliance conditions promoting sustainable practices
- Rural development funding supporting infrastructure and some environmental measures

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Increased farmland concentration and marginalisation of smallholders
- Rural depopulation and decline of agricultural employment
- Complex bureaucracy and unequal subsidy access favouring larger operators and elites

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Support to large and medium-scale farms sustaining some rural economies
- Rural development funds targeting infrastructure and environmental projects (though unevenly distributed)
- Emergence of community and cooperative farming alternatives, though limited in scale.

BACKGROUND

This case study addresses the socio-environmental impacts of the CAP on land use and rural livelihoods in Slovenia, Croatia, and Serbia. Situated within the broader GreenPaths research agenda, it highlights land concentration as a central dimension of green transition policies and their structural inequalities. While the Green Deal and Farm to Fork strategy claim to foster sustainability, biodiversity, and climate resilience, CAP remains dominated by area-based payments that reproduce existing inequalities (Pe'er et al., 2019; Guy et al., 2017; Collantes, 2020; Guyomard et al., 2023). This contradiction is central to current debates: whether CAP enables a just transition or locks in a productivist, capital-intensive model of agriculture (Giuliani & Baron, 2023; Peeters et al., 2021, Erjavec & Erjavec, 2015). The Balkans' post-socialist 'triple transition' context—socialist agrarian regimes, neoliberal land market liberalisation, and EU integration—frames the analysis of how CAP mechanisms affect farm structure, subsidy distribution, and rural socio-ecological systems (Burja et al., 2020; Medarov, 2013; Bilewicz et al., 2022; Kušić, 2019; Swinnen, 2009; FIAN, 2019). Despite CAP's professed goals of sustainability and rural renewal, its area-based payment system reproduces historical land inequalities, marginalizing smallholders, and reinforcing land commodification (Calo et al., 2021; Franco & Borras, 2013). The study reveals how CAP mechanisms interact with post-socialist legacies to marginalize smallholders and accelerate rural depopulation (Burja et al., 2020; Medarov, 2013; FIAN, 2019). Our guiding research question is: How does CAP shape land use and access in Slovenia, Croatia, and Serbia, and what does this reveal about the social justice dimensions of the EU's green transition? This study thus contributes by building on, going further than existing studies on just and equitable green transitions in the European periphery. By combining empirical insights from Slovenia, Croatia, and Serbia with critical debates also on political ecology and degrowth, the case contributes to understanding how EU agricultural policy structures both opportunities and constraints for socially just green transitions.

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METHODOLOGY

The study employs a comparative tri-national interdisciplinary approach, combining political ecology and degrowth frameworks (Kallis, 2018; D'Alisa et al., 2014; Liegey & Nelson, 2020; Latouche, 2009; Hickel 2021; Barlow, 2022; Kay et al., 2015) to analyze CAP's impacts across Slovenia (EU member since 2004), Croatia (EU member since 2013), and Serbia (EU candidate).

EU and national policy documents, CAP strategic plans, and legal frameworks: EU and national policy/legal documents: Regulations: CAP Regulations 1307/2013 and 2021/2115. European Parliament Resolution on Farmland Concentration (2017). Strategic Plans: Slovenia's Strategic Plan of the CAP 2023–2027, Croatia's Strateški plan ZPP 2023–2027, Serbia's IPARD II Programme 2014–2020. Land laws: Slovenian Farmland and Forest Fund Act (ZSKZ), Croatia's Law on Agricultural Land (2018), Serbia's Law on Agricultural Land (2006, amended 2015).

Statistical datasets on land use, farm structure, subsidy flows, and rural employment: Eurostat Farm Structure Survey (2003–2020) for farm size and structural change, Eurostat agri-environmental indicators (land use, biodiversity, soil), Eurostat Economic Accounts for Agriculture (subsidy distribution, rural employment).

Qualitative interviews: In Slovenia, four semi-structured interviews were conducted with: Official from the Ministry of Agriculture, Forestry and Food, Representative of the Ministry of Natural Resources and Spatial Planning, Dora Matejak (Faculty of Social Sciences, University of Ljubljana) researches agrarian political economy and food systems in Slovenia, offering insights into how CAP instruments and land governance affect smallholders and rural communities. Katarina Kušić (Marie Skłodowska-Curie Actions fellow, University of Vienna) studies land, sovereignty, and Europeanisation in post-socialist contexts, providing a political ecology perspective on CAP's impacts in the Balkans.

Academic and civil society literature reviewing agrarian political economy, land governance, and green transition critiques: The study draws on a wide body of academic research on agrarian political economy, land governance, and critical green transition debates. This includes analyses of land concentration and CAP distributional effects in CEE (Burja et al., 2020; Medarov, 2013; Bunkus & Theesfeld, 2018; Bilewicz et al., 2022), political ecology approaches to land and sovereignty (Borras, 2015; Fairbairn, 2020; Kušić, 2019, Kušić & Eberle, 2025), and degrowth frameworks highlighting alternative agrarian futures (Liegey & Nelson, 2020; Barlow, 2022). For the Slovenian context, historical and policy studies provide national depth, including Centrih & Sitar (2022) on integrated peasant economies in socialist Slovenia, Čepič (2024) on early socialist agrarian policies, and Rednak et al. (1997) on Slovenian agriculture and EU integration. This is complemented by civil society literature and reports, particularly those produced by farmer movements and advocacy organisations, such as FIAN (2019) on land concentration, the Transnational Institute (TNI, 2015) on land grabbing in Europe, and European Coordination Via Campesina (ECVC, 2021) and La Via Campesina (2018) on the rights of peasants, food sovereignty, and the challenges of CAP reform. Together, these sources provide both empirical evidence and critical conceptual frameworks that inform the justice-oriented evaluation of CAP's socio-environmental impacts in the Balkans.

The analysis focuses on indicators such as land distribution by farm size (Eurostat, 2023; Burja et al., 2020), subsidy allocation patterns (ECVC, 2021; FIAN, 2019), tenure regimes (Medarov, 2013; Kušić & Eberle, 2025, Srećković, 2013), and institutional transparency in land governance (TNI, 2015; Fairbairn, 2020). Qualitative data provide insights into policy implementation, barriers to smallholder access, and socio-ecological impacts. The approach critically evaluates costs and benefits through a justice-oriented lens, reflecting on policy gaps and data limitations.

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FINDINGS

CAP's area-based direct payments reinforce farmland concentration by disproportionately benefiting large holdings, while small and young farmers are marginalized by market pressures, land price increases, and administrative complexity (Van der Ploeg et al., 2015; Kay et al., 2015). In Slovenia, a smallholder-dominated landscape conceals ongoing consolidation through subsidy capture and leasing practices favouring agribusiness (Udovč, 2003; Bojnec & Latruffe, 2005). In Croatia, EU accession triggered rapid restructuring: small farms disappeared while elites captured subsidies through opaque leasing and ownership of state land (Josipović, 2021). In Serbia, pre-accession liberalisation facilitated foreign investment and oligarchic land control, intensifying exclusion and speculation: with the 2018 privatisation of PKB transferring more than 17,000 hectares to Al Dahra (Srećković, 2013; Gluščević & Katić, 2019; Kušić & Eberle, 2025). Environmentally, CAP's greening measures—Ecological Focus Areas, crop diversification, and grassland protection—had limited effect: monocultures, soil exhaustion, and biodiversity loss persist (Pe'er et al., 2019; European Commission, 2020; Guyomard et al., 2023). Land abandonment further complicates outcomes; in Croatia it contributes to wildfires and conflicts with large carnivores, while afforestation masks rural decline and exclusion. Socially, CAP exacerbates rural depopulation, generational renewal crises, and inequalities. Gendered disparities are notable, as women—overrepresented in small-scale and agroecological farming—have weaker land access and benefit less from area-based payments (Burandt & Mölders, 2017; ECVC, 2021). Unexpected findings include 'internal land grabbing' via leasing and the weak institutionalisation of agroecological alternatives. Persistent data gaps—notably on public land leasing, informal tenure, and subsidy beneficiaries—limit full assessment but reveal major governance challenges (European Parliament, 2017).

DISCUSSION

This case study situates its findings within wider literature critiquing the distributive injustices and environmental contradictions of the Common Agricultural Policy (CAP). It contributes new evidence from Southeast Europe, showing how subsidy logic and post-socialist legacies reinforce land concentration, marginalize smallholders, and constrain socially just transitions (Burja et al., 2020; Bunkus & Theesfeld, 2018; FIAN, 2019).

In Slovenia, farmland consolidation has been more moderate, buffered by the Farmland and Forest Fund, yet CAP funds disproportionately benefit large agribusinesses such as Perutnina Ptuj and Panvita, reinforcing inequalities in access to land and subsidies (Udovč, 2003; Agency for Agricultural Markets, 2016). In Croatia, post-war privatisation and EU accession reforms encouraged agribusiness expansion and rural financialisation; the Agrokor crisis revealed how corporate governance failures can destabilise entire rural economies and undermine food sovereignty (Tomašević et al., 2018). In Serbia, land liberalisation without safeguards enabled oligarchic and foreign investor control, with the 2018 privatisation of PKB transferring over 17,000 hectares to the Emirati company Al Dahra, a striking example of speculative land dispossession (Srećković, 2013; Gluščević & Katić, 2019; Kušić & Eberle, 2025).

The case reveals policy incoherence between CAP's environmental ambitions and its regressive subsidy design. It shows how post-socialist legacies and fragmented institutions mediate CAP's uneven impacts. The study reflects on paradoxical winners (large agribusiness, foreign investors) and losers (smallholders, ecosystems), emphasizing the importance of participatory governance and redistribution for just transitions. It identifies data and knowledge gaps, calling for intersectional, territorially grounded indicators and community-based monitoring to better capture justice outcomes. Political ecology exposed how land concentration reflects power asymmetries and institutional fragmentation, while degrowth perspectives highlighted the limits of productivist, growth-oriented models and pointed to alternative pathways (Kallis, 2018; Liegey & Nelson, 2020; Barlow, 2022; Hickel, 2021). These perspectives highlight justice-oriented

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criteria—redistribution, participation, and ecological resilience—that can guide future research and policy evaluation.

Overall, while CAP has potential to support rural development and environmental schemes, its weaknesses—subsidy inequality, weak enforcement, and failure to halt land concentration—remain dominant. Redirecting CAP toward redistributive reforms, transparent land governance, and cooperative and agroecological farming is essential for a just transition.

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1.2.5 Case study 5: 'Green' and 'fair' industrial policy in Latin America

Summary

Table 6. Summary of case study 5

'Green' and 'fair' industrial policy in Latin America
EXECUTIVE SUMMARY OF THE CASE. This case study examines the challenges and opportunities for green industrial policy in Latin America, focusing on how countries in the Global South balance the demands of mineral extraction for global green technologies, development needs, and climate action. While Costa Rica and Uruguay have successfully implemented state-led renewable energy programmes, the 'lithium triangle' (comprising Argentina, Bolivia, and Chile) faces increased extractivism that benefits elites and transnational corporations rather than local communities. Resource nationalism often perpetuates dependency patterns, characterised by limited technology transfer. The study highlights that the success of green industrial policies largely depends on state capacity, democratic participation mechanisms, and regional cooperation frameworks, rather than resource endowments alone, challenging both neoliberal and deterministic pessimistic narratives.
SUMMARY OF THE MAIN FINDINGS. Latin America's green transition generates contradictions between climate imperatives and local socio-ecological justice. Lithium extraction in the Atacama Desert and the Andean highlands intensifies water stress in arid ecosystems, displaces indigenous communities, and degrades fragile *salares* (salt flats), with costs concentrated in areas serving distant consumption (Sanchez-Lopez, 2023). Water consumption for lithium processing reaches 500,000 litres per tonne of lithium carbonate, severely impacting water-scarce regions (World Economic Forum, 2023). Indigenous Andean peoples report contamination of traditional water sources and disruption of ancestral land use. However, renewable energy deployment shows genuine environmental benefits when prioritised. Costa Rica generates over 98% of its electricity from renewables – mainly hydroelectric, geothermal, and wind – replacing fossil fuel generation (Climate Action Tracker, 2024). Uruguay shifted its energy mix from 35% fossil fuels in 2007 to 98% renewables in 2024 through coordinated public-private investments, which lowered energy costs and enhanced security (U.S. International Trade Administration, 2024; Earth.org, 2025). The analysis of social impacts reveals clear winners and losers. State development banks (notably Brazil's BNDES), renewable energy firms benefiting from public procurement, and middle-class urban consumers accessing cheaper clean energy emerge as winners. Conversely, communities affected by mining face displacement without adequate compensation, precarious workers in green export processing lack stable jobs, and countries with weak capacity struggle to negotiate favourable terms with transnational corporations. Resource revenues exhibit varied capture: Chile's copper wealth partially funds education through sovereign wealth mechanisms, whereas Bolivia's lithium nationalisation generated minimal processing capacity despite ambitions for state control (Carrasco, 2024). Primary winners include state institutions maintaining planning capacity (Chile's CORFO, Costa Rica's ICE), domestic renewable firms where local content policies succeed, and social sectors benefiting from expanded energy access. Losers comprise rural and indigenous communities, precarious export workers, small-scale farmers affected by large renewable projects, and countries lacking bargaining power to impose technology transfer requirements. This aligns with resource curse and neo-extractivism literature (Svampa, 2019; Gudynas, 2016), yet challenges deterministic narratives by documenting successful state-led transitions in Costa Rica and Uruguay, suggesting institutional capacity and democratic governance matter more than resource endowments (Carrasco, 2024).
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Lithium extraction creates new 'sacrifice zones'. • Contamination of water sources in arid ecosystems. • Degradation of fragile salt flats ('salares').

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ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Costa Rica's energy transition: 98% renewable electricity (hydroelectric, geothermal, wind).
- Uruguay' 'renewables revolution': 98% renewables by 2024, reduced fossil fuel dependence.
- Significant emissions reductions in power sector.

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Community displacement without adequate compensation.
- Precarious employment in green export processing (fewer than 5,000 lithium jobs).
- Limited technology transfer and local content.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Uruguay: $500 million annual savings in energy imports.
- Expanded energy access for middle-class urban consumers.
- State capacity building (BNDES, CORFO, ICE, UTE).

BACKGROUND

Latin America occupies a contradictory position in global green transitions. The region holds 56% of the world's lithium reserves, concentrated in Argentina, Bolivia, and Chile's 'lithium triangle', along with significant copper reserves essential for electrical infrastructure, while possessing exceptional renewable energy potential through solar, wind, hydroelectric, and geothermal resources (Sanchez-Lopez, 2023). Yet resource wealth has historically created dependency rather than development, with export-oriented extractivism serving foreign industrial centres while limiting domestic value addition.

Following neoliberal structural adjustment (1980s-1990s), which dismantled planning institutions and development banks, 'pink tide' governments (2000s) aimed to rebuild state capacity for strategic coordination. Countries including Brazil, Argentina, Venezuela, Bolivia, Ecuador, and Uruguay adopted neo-developmental policies that combined resource nationalism, expanded social protection, regional integration, and targeted industrial upgrading. These initiatives faced challenges from commodity price volatility, capital flight, trade agreement commitments, and continued primary commodity export dependence (Carrasco, 2024).

Recent scholarship emphasises that the region faces a 'dual trap' of specialising in low-productivity sectors with high carbon emissions (Ahumada & Sossdorf, 2025). The global race for critical minerals risks locking copper, lithium, and rare earth-rich countries into rigid trade agreements and extractive investments with weak local linkages. This peripheral insertion persists within longstanding structural weaknesses: premature deindustrialisation, low productive complexity, deep productivity and income gaps, contributing to volatile, stagnant long-term growth.

Research question: How do Latin American states handle extractive dependencies while pursuing productive transformation goals within the context of green industrialisation, and what conditions encourage emancipatory outcomes?

METHODOLOGY

This case study adopts a qualitative approach that incorporates a systematic literature review alongside an analysis of recent policy developments and empirical research. The study also involves in-depth discussions with Latin American researchers, government officials, trade unionists, and environmental activists. These include seminars and conferences organised by TNI in collaboration with the Trade Unions for Energy Democracy (TUED) in Mexico City in February 2025, with the Latin American Council of Social Sciences (CLACSO) in Bogota in June

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2025, and with the Uruguayan Government and the United Nations Industrial Development Organisation (UNIDO) in Montevideo in October 2025.

The study draws on a comprehensive analysis of recent academic publications (2020-2025) on Latin American industrial policy, extractivism, renewable energy transitions, and developmental states, alongside policy documents from national governments, regional organisations, and civil society organisations. Key theoretical frameworks include political ecology, ecological economics, and development economics.

Recent research offers empirical foundations, including Carrasco's (2024) analysis of state capacity in the lithium triangle, Sanchez-Lopez's (2023) examination of lithium value chain geopolitics, Lebdioui and Anzolin's (2021) framework on three dimensions of green industrial policy, Nem Singh's (2024) analysis of state-owned enterprises in resource governance, and United Nations ECLAC's (2023) studies on critical minerals and industrialisation opportunities. Government energy policy documents from Costa Rica's Generation Expansion Plan 2022-2040 and Uruguay's Ministry of Industry, Energy and Mining present official perspectives.

The study employs a multi-dimensional framework that goes beyond narrow economic metrics. Environmental costs include ecosystem degradation, water stress, land appropriation, and the impacts of climate change; benefits include renewable energy deployment, emissions reductions, and decreased dependence on fossil fuels. Social costs cover insecure employment, community displacement, democratic deficits, and gender inequalities; benefits include formal job creation, expanded social protection, increased state capacity, and strengthened regional cooperation. This framework explicitly rejects methodologies that monetise all values, recognising incommensurable losses, especially for rural and indigenous communities.

The analysis is based on a variety of indicators including renewable energy as a percentage of total generation (World Resources Institute, 2024; U.S. International Trade Administration, 2024), domestic content within renewable supply chains, formal employment in green sectors, resource rents captured by states, water consumption per unit of mineral extraction, community consultation processes, technology transfer agreements, and regional trade patterns.

Data availability varies widely across countries. Some have strong statistical systems, while others lack detailed information on employment quality, environmental effects, and distributional outcomes. The rapidly changing policy environment means that recent efforts lack sufficient evidence of implementation. Gender-disaggregated data remains very limited in all countries.

FINDINGS

Latin America's green transition exposes stark environmental contradictions. Lithium extraction creates ‘sacrifice zones’ where environmental and social costs concentrate to meet distant consumption demands. Chile's Atacama Desert lithium operations consume up to 65% of water in certain areas, risking fragile wetland ecosystems and indigenous water sources (World Economic Forum, 2023). Bolivia's Uyuni operations face similar difficulties despite being state-owned. Argentina's federal system allows provincial governments to negotiate directly with corporations, leading to fragmented governance that weakens national beneficiation strategies (Carrasco, 2024).

Extraction scale reflects global demand forecasts. IEA predicts a 40-fold increase in lithium demand by 2040, driven by electric vehicles and energy storage, with Latin America emerging as the main supplier (IEA, 2022). However, current practices show limited domestic value addition: the region supplies raw or minimally processed lithium carbonate, while Asian manufacturers (mainly Chinese, Japanese, and South Korean firms) dominate battery production, capturing most of the value chain profits (Sanchez-Lopez, 2023).

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Considering the historical trajectory and potential future roles of public enterprises such as Brazil's Petrobras and Chile's Codelco, researchers argue that state-owned companies can promote technological innovation and industrial policy when supported by effective governance reforms (Nem Singh, 2024). However, most Latin American mineral-rich countries have yet to realise their full potential. State ownership alone does not ensure developmental outcomes; institutional capacity, governance systems, and political coalitions are crucial.

Conversely, the deployment of renewable energy offers significant environmental advantages when properly prioritised. Costa Rica's renewable electricity system—76% hydroelectric, 11% wind, 11% geothermal, with growing solar—has dramatically reduced power sector emissions while maintaining energy security (Low Carbon Power, 2025). Recent droughts impacting hydroelectric generation temporarily increased fossil fuel use to 10-25%, revealing climate vulnerabilities, but the Generation Expansion Plan 2022-2040 aims to add 2,125 MW of renewable capacity through diverse sources, including 1,100 MW solar and 502 MW wind (Climate Action Tracker, 2024).

Uruguay's energy transition is arguably Latin America's most successful green shift. The country increased renewable generation from 65% (2007) to 98% (2024) through coordinated state-led public-private investments, with wind and biomass capacity expanding significantly alongside existing hydroelectric resources (U.S. International Trade Administration, 2024). National state utility UTE maintained strategic control, though researchers warn about renewable generation privatisation (Robbins et al., 2024). The transition reduced energy import costs by over $500 million annually, enhanced energy security, and positioned Uruguay as an electricity exporter to Argentina and Brazil (World Economic Forum, 2023; Earth.org, 2025).

Understanding divergent outcomes requires a sophisticated analytical framework. Lebdioui and Anzolin (2021) propose that green industrial policy operates across three interconnected dimensions: (1) *Consumption-centred dimension*: policies targeting consumer behaviour through regulations, taxation, and incentives promoting green consumption; (2) *Firm-level sustainability dimension*: initiatives greening existing production processes through cleaner technologies, circular economy principles, and environmental management systems; (3) *Productionist, innovation-driven dimension*: strategies emphasising the creation of new green industries, technological capabilities, and export competitiveness through coordinated industrial policy.

This analytical framework highlights successful cases (Costa Rica, Uruguay) that adopted holistic approaches integrating all three dimensions. Lithium triangle countries mainly focused on the production aspect without adequately considering consumption patterns or firm-level sustainability. Greener consumption is vital but difficult to achieve without industrial policies promoting green manufacturing and low-carbon innovation. Latin American experiences show that concentrating narrowly on resource extraction for global green value chains, without developing domestic renewable systems or sustainable consumption patterns, perpetuates historical peripheral dependency patterns (Anzolin & Lebdioui, 2021).

Employment outcomes reveal tensions between decarbonisation imperatives and livelihood dependencies. Lithium extraction employs fewer than 5,000 workers across the triangle despite massive investment, most positions temporary and low-skilled (Sanchez-Lopez, 2023). Labour scholars document systematic anti-union practices in special economic zones, including precarious contracts and chemical exposure health impacts. Gender analysis reveals particular disadvantages for women, concentrated in the lowest-paid positions with minimal opportunities for advancement.

Resource revenues show significant variability in how they are captured and distributed. Chile's copper income, partly allocated through sovereign wealth funds, supports education and innovation programmes, though neoliberal fiscal rules limit broader use (Carrasco, 2024). Bolivia's lithium nationalisation under Morales aimed to channel revenues into domestic processing and social initiatives but faced technical difficulties, corruption, and limited success

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in developing processing capabilities. Argentina's federal system creates conflicts between extraction provinces and the national government, highlighting governance complexities (Carrasco, 2024).

State capacity development offers significant long-term benefits when industrial policies succeed. Brazil's BNDES pioneered sectoral financing methodologies that combine patient capital with support for technological upgrading, though subsequent political changes shifted priorities. Chile's CORFO maintained strategic planning capabilities through neoliberal periods, enabling rapid scaling of renewables when political opportunities arose. Costa Rica's ICE preserved technical expertise and coordinated planning that is absent in privatised systems elsewhere (Climate Action Tracker, 2024). Uruguay's state utility UTE demonstrated effective project management and long-term energy planning (U.S. International Trade Administration, 2024).

Technology transfer still faces notable limitations. Foreign renewable companies usually import equipment with minimal local content beyond construction labour. Brazil's wind sector reached 25-60% local content by implementing proactive requirements, ultimately fostering the domestic manufacturing of towers, mounting structures, and balance of plant components, although high-value turbines and panels remain imported (Carrasco, 2024). Most countries lack the market size or political influence to enforce meaningful technology transfer.

Latin America's largely unsuccessful history of regional integration reveals an intention to safeguard policy space against international pressures, alongside significant implementation challenges. ALBA's currency clearing mechanism reduced member countries' reliance on the dollar. UNASUR's industrial development council encouraged knowledge sharing, although political changes diminished these frameworks. ECLAC continues to provide technical support and policy advice, emphasising the importance of coordinated regional strategies to enhance collective bargaining power (ECLAC, 2023).

Recent scholarship proposes a 'progressive industrial policy agenda' for the Global South that extends beyond traditional frameworks (Ahumada & Sossdorf, 2025). Five strategic dimensions offer pathways: (1) establishing new FDI deals by leveraging the region's market power in critical minerals and renewable energy to negotiate frameworks that include technology transfer requirements, local content provisions, high environmental standards, and genuine public-private partnerships; (2) strengthening regional production networks through increased intra-regional trade and investment, fostering productive autonomy and reducing carbon footprints; (3) aligning productive regionalism with financial regionalism by coordinating national development banks with multilateral institutions; (4) ensuring digital sovereignty through legal frameworks that secure sovereign control over digital data flows; (5) redefining institutional architecture beyond merely correcting 'market failures' toward comprehensive frameworks that reset rules, redefine market boundaries, and direct accumulation toward collective objectives.

Discussion

This case advances understanding of green industrial policy in countries of the Global South. First, successful green transitions require moving beyond either/or framings of extraction versus preservation. Costa Rica and Uruguay demonstrate that renewable energy transitions are viable and achievable, while lithium triangle countries reveal that extraction without domestic value addition perpetuates dependency. The crucial variable is the state's capacity to negotiate favourable terms, impose social and environmental conditions, capture resource rents, and redirect revenues towards productive transformation (Carrasco, 2024).

Second, *green* does not automatically mean *just*. Environmental improvements can occur alongside social decline when transitions lack democratic participation, adequate compensation, and alternative livelihoods. Conversely, extractive sectors can fund expanded social protection and infrastructure when political coalitions link resource revenues to welfare, though

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sustainability remains debated (Sanchez-Lopez, 2023). This builds on research (Lebdioui & Anzolin, 2021) highlighting that holistic approaches across all three green industrial policy dimensions—consumption, firm-level sustainability, and production innovation—are necessary for coherent developmental transitions.

Third, regional cooperation frameworks create policy space that would otherwise be unavailable to individual countries. ALBA members successfully resisted constraints from investment treaties, especially the US-led Free Trade Area of the Americas (FTAA), which would have prohibited resource nationalisations across the Western Hemisphere. Regional institutions facilitate technology sharing and coordinated industrial development that are absent in purely national strategies. A progressive industrial policy agenda means Latin America's position in critical mineral value chains offers potential leverage, if used collectively through regional coordination, to reshape the terms of global green transition engagement.

Fourth, analysing state-owned enterprises provides important nuance to debates on resource sovereignty and state capitalism. Nem Singh's (2024) comparative study demonstrates that state ownership can foster technological innovation and support industrial policy objectives when accompanied by effective governance reforms. Nonetheless, many nationalisation efforts have failed due to weak institutional capacity, political meddling, and a lack of strategic vision beyond revenue collection. This challenges both neoliberal beliefs that state enterprises inevitably fail and leftist ideas that nationalisation automatically achieves developmental objectives.

Priorities for progressive green industrial policy include: strengthening state planning capacity and public development banks, as market mechanisms alone cannot coordinate complex transformations or ensure equitable distribution; properly designed and enforced local content requirements that build domestic technological capabilities, though these require sufficient market scale and political leverage; implementing progressive taxation, transparent contracting, beneficial ownership registries, and dedicated sovereign wealth funds with democratic governance for resource rent capture; engaging in assertive negotiations, utilising compulsory licensing provisions, establishing public research institutes, and fostering South-South cooperation networks for technology transfer; conducting comprehensive worker retraining, providing income support during transitions, developing public employment programmes in ecological restoration, and establishing strong social dialogue mechanisms for just transitions.

Coherent policy mixes must simultaneously address consumption patterns, firm-level sustainability, and productionist innovation. Countries focusing narrowly on one aspect while neglecting others risk replicating existing inequalities or generating new contradictions. Future research should examine long-term employment quality in renewable sectors through longitudinal studies tracking career paths, wage trends, and skill development; focus on gender dynamics due to persistent data gaps; develop alternative indicators to GDP growth that better reflect wellbeing, ecological sustainability, and distributional effects; explore the complexities of the relationship between state capacity and democratic participation; investigate optimal governance structures for state-owned companies in extractive sectors during the green transition; and understand conditions that enable durable regional cooperation despite political volatility.

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1.2.6 Case study 6: 'Green' and 'fair' industrial policy in Southeast Asia

Summary

Table 7. Summary of case study 6

'Green' and 'fair' industrial policy in Southeast Asia
EXECUTIVE SUMMARY OF THE CASE. This case study examines green industrial policy in Southeast Asia, exploring how developmental states with established industrial upgrading abilities handle green transitions while maintaining competitive positions in global value chains. The research question asks: Can Southeast Asian developmental state models achieve ecological sustainability without compromising economic dynamism and poverty alleviation? Findings reveal that, although countries like Vietnam, Thailand, and Malaysia have quickly implemented relatively successful national policies through effective state coordination, export-oriented industrialisation patterns often reproduce precarious labour conditions and environmental pollution despite 'green' labelling. The study shows that Southeast Asia's developmental states have strong institutional capacities for coordinated green transitions that exceed market-led approaches; however, democratising these processes remains essential for truly fair outcomes.
SUMMARY OF THE MAIN FINDINGS. Southeast Asia's green industrial policy arises from unique development paths that blend strong state coordination with export-driven manufacturing integration into global value chains (Nem Singh, Ngamarunchot, & Somsiriwong, 2025). Following Japan's post-war model, Southeast Asian nations adopted 'late development' strategies emphasising manufacturing capacity building, technology absorption, and productivity improvement (Amsden, 1992; Wade, 1990). Thailand's automotive industry exemplifies this approach: state coordination of foreign direct investment, local content requirements, and export promotion transformed the country into Southeast Asia's 'Detroit.' Vietnam's recent integration demonstrates the continued relevance of developmental state approaches, including the development of local champions such as Vinfast (Nem Singh et al., 2025). However, these successes have generated significant environmental costs, with Southeast Asia adding over 50 GW of coal capacity in the 2010s. Can Southeast Asian developmental states utilise proven coordination capabilities to achieve ecological sustainability and social justice, or do global competitive pressures obstruct transformative green transitions? This case study fills gaps in the literature by exploring whether coordination capacities used to develop manufacturing sectors can be redirected towards sustainability, and how to assess trade-offs between economic growth and environmental sustainability.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Over 50 GW coal capacity added in 2010s. • Pollution from export-oriented manufacturing despite 'green' labeling. • Environmental degradation from resource extraction. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Vietnam: Solar capacity increased from 86 MW (2018) to 16.5-17.6 GW (2020). • Thailand: Reduced coal reliance while maintaining competitiveness. • Singapore: Low emissions from extensive public transport network. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Precarious labour conditions in green manufacturing sectors. • Exploitative working conditions in electronics and solar panel production. • High-tech sectors generate fewer jobs, risking greater inequality. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Manufacturing employment in solar panels, electronics, and EVs. • Poverty reduction through export-driven growth.

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- Enhanced state coordination capacity (Vietnam's Ministry of Planning, Thailand's Board of Investment).

BACKGROUND

Vietnam experienced one of the world's fastest solar energy transitions, with installed solar capacity increasing from 86 MW in 2018 to approximately 16.5-17.6 GW by the end of 2020, supported by aggressive feed-in tariffs of US$93.5/MWh (Do & Sharma, 2020; ASEAN Centre for Energy, 2021). This achievement made Vietnam the world's third-largest solar market in 2020, with around 101,000 rooftop solar installations (ASEAN Centre for Energy, 2021). By the end of 2020, Vietnam's installed wind power capacity reached 600 MW (Vietnam Briefing, 2023).

In Thailand, the national Alternative Energy Development Plan (2015-2036) guides the expansion of solar, wind, and biomass energy, aiming for 30% renewable energy in final energy consumption by 2036. The state utility EGAT retains strategic control while collaborating with private developers (Ministry of Energy Thailand, n.d.; Asian Development Bank, n.d.). Thailand has successfully reduced its reliance on coal while maintaining industrial competitiveness.

Singapore's Green Plan 2030 aims to reach net-zero emissions by 2050, with 60% of electricity produced from low-carbon sources by 2035, including solar energy, regional power imports, and emerging technologies (Nem Singh et al., 2025). An extensive public transport network covers 99% of households within a 10-minute walk of stations, resulting in low private vehicle ownership and emissions.

An international seminar organised by TNI, the GreenPaths project and partner organisations in Asia, highlighted the profound evolution in industrial policy across several policy dimensions (Nem Singh et al., 2025):

• Objectives: The old industrial policy concentrated on economic growth and GVC integration. The new industrial policy broadens to include technological sovereignty, targeted redistribution for SMEs, the promotion of 'good jobs', and the fundamental incorporation of 'green' as a necessary condition.

• Global Context: The old paradigm operated within the 'flying geese model' of sequential industrialisation in Asia. The contemporary landscape is characterised by 'fragmented globalisation' and the shift to 'the Dragon and the Eagle', highlighting increased US-China competition.

• Domestic Politics: Traditional approaches relied on developmental bureaucratic states with 'embedded autonomy'. The new paradigm shifts towards developmental network states, emphasising 'state-extended Society' models that include MNCs, universities, and civic organisations.

• Policy Instruments: While retaining traditional tools such as conditional subsidies, new instruments include Just Transition Funds, National Reskilling Platforms, venture capital for start-ups, and competition law as market-shaping mechanisms.

Employment in manufacturing underscores Southeast Asia's continued integration into global value chains under 'green' narratives. Vietnam has become a major producer of solar panels, Malaysia's electronics industry supplies components for renewable energy systems, and Thailand positions itself as a regional hub for electric vehicles (Nem Singh et al., 2025).

State capacity for coordination is the most important institutional resource. Vietnam's Ministry of Planning and Investment maintains comprehensive sectoral strategies that integrate industrial development, infrastructure provision, and workforce training. Thailand's Board of Investment manages foreign direct investment in line with domestic development objectives through local content mandates.

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China dominates the midstream and downstream stages of the global rare earth supply chain, particularly in refining and fabrication, with over a 50% market share. It employs a 'push-and-pull' linkage strategy, where state-driven upstream development is guided by strong demand from advanced downstream industries.

South Korea's semiconductor sector faces challenges, including political delays, shortages of skilled talent, and overreliance on memory chips. Unlike global rivals, Korea depends more on tax incentives than direct subsidies, which restricts the speed and scale of intervention.

The Philippines remains vulnerable due to its limited export base, weak supply chain integration, and inadequate infrastructure. The shift away from industrial policy following the 1986 democratisation has created gaps in developing a coordinated green industrial strategy (Nem Singh et al., 2025).

Vietnam's green industrial strategy aims to attain net-zero emissions by 2050 and a 75% renewable energy target through the Green Growth Strategy, Power Development Plan 8, and the Just Energy Transition Partnership. Key pillars include economic restructuring, decarbonisation, a circular economy, climate resilience, and inclusive development; however, significant dilemmas remain in balancing the speed of transition with limited institutional capacity (Nem Singh et al., 2025).

Thailand sets ambitious targets, including net zero by 2065 and an EV roadmap, with strengths in sustainability standards, market diversification, and green innovation. However, it faces threats from U.S. tariffs that affect key export sectors (Nem Singh et al., 2025).

Regional cooperation: ASEAN's response remains fragmented, with limited collaboration on standards for emerging green sectors like EVs and batteries. Green industrial policies risk exacerbating inequality as high-tech sectors generate fewer jobs, making social justice and just transition frameworks essential (Nem Singh et al., 2025).

Beyond the subregion, India has introduced the Production-Linked Incentive schemes and the Green Hydrogen Mission to establish itself as a global hub for green manufacturing, strategically utilising the China Plus One strategy and Quad Clean Energy Supply Chains partnerships. However, challenges include balancing sustainability with growth and overcoming fragmented institutional coordination.

METHODOLOGY

This case study employs a qualitative methodology that combines a systematic literature review with regional stakeholder consultations. Besides desktop research, the case study draws on the proceedings of an international seminar that brought together academic researchers, civil society activists and government officials from across East, South, and Southeast Asia. On May 21-23, 2025, the Science, Technology and Innovation Policy Institute (STIPI) at King Mongkut's University of Technology Thonburi, in collaboration with the Transnational Institute (TNI), the GreenPaths project, the ERC-funded GRIP-ARM project, and the University of Sussex, co-organised an international workshop in Bangkok examining green industrial policy in Asia Pacific (Nem Singh et al., 2025). The workshop included participants with expertise spanning China, India, Indonesia, the Philippines, Singapore, South Korea, Thailand, and Vietnam, providing crucial insights into implementation challenges and political obstacles.

The study employs a multidimensional framework, recognising that Southeast Asia's starting point differs from that of other Global South regions. Environmental costs include pollution, deforestation, and climate impacts; benefits include renewable energy deployment and improved urban environmental quality. Social costs encompass precarious employment and displacement; benefits include poverty reduction and enhanced state capacity.

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FINDINGS

The resurgence of industrial policy takes place within multiple crisis contexts, with green industrial policy in Southeast Asia seen as a new response to emerging challenges, while maintaining continuities with past efforts of structural transformation (Juhász, Lane, & Rodrik, 2024; Nem Singh, 2023).

First, state coordination remains crucial for the swift deployment of renewable energy. Vietnam's solar expansion and Thailand's integrated renewable planning show effective government intervention, contradicting neoliberal frameworks that favour private initiative.

Second, 'green' labelling offers no assurance of social justice. Electronics manufacturing and solar panel production can display exploitative labour conditions similar to those in traditional sectors. Without robust labour protections, democratic participation, and fair distribution mechanisms, green industrialisation risks perpetuating exploitation beneath a sustainable facade.

Third, developmental state models necessitate democratisation for truly transformative results. While authoritarian steering facilitated rapid industrialisation, it did so at the expense of labour rights and environmental health. Thailand's move towards democracy strengthened labour advocacy despite subsequent military interventions. Vietnam's authoritarian system achieved swift growth but limited civil society participation, which is vital for equitable transitions.

Fourth, assertive state policies enable opportunities for technology transfer and industrial upgrading. Local content requirements, performance conditions on foreign investment, and support for domestic research institutes have fostered indigenous capabilities despite neoliberal predictions of failure.

DISCUSSION

Priorities for a progressive green industrial policy in Southeast Asia include: strengthening labour protections and enabling genuine collective bargaining; expanding mechanisms for democratic participation beyond elite consultations; increasing technology transfer requirements with compulsory licensing and public research investment; enhancing environmental governance enforcement; and creating ASEAN frameworks for joint technology development, coordinated labour standards, and environmental protection to prevent a race to the bottom.

Regional cooperation could enhance collective bargaining power against transnational corporations and trade partners in the Global North. South-South technology collaboration, especially with China, India, and Latin America, provides alternatives to Northern-led intellectual property regimes.

The long-term sustainability of developmental state models under green transition pressures requires ongoing monitoring. Gender considerations demand targeted research, given the concentration of women in the worst positions and existing data gaps. The connection between authoritarianism and developmental success needs careful analysis. While authoritarian states have achieved rapid industrialisation, sustainability transitions might require democratic participation that is unfeasible under repressive governance.

Alternative development indicators beyond GDP growth could more accurately reflect wellbeing, ecological health, and distributional outcomes. Developing context-specific indicators that recognise Southeast Asian achievements while critically evaluating ongoing injustices is vital for policy progress.

Southeast Asia's developmental state legacies offer essential institutional foundations for green transitions that many regions in the Global South lack. However, attaining truly just and sustainable outcomes requires democratising these capacities, enhancing labour and environmental protections, and challenging both domestic and international power structures that hinder transformative change.

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1.2.7 Case study 7: 'Green' and 'fair' industrial policy in the Global South (3)

Summary

Table 8. Summary of the study 7

'Green' and 'fair' industrial policy in Southern Africa
EXECUTIVE SUMMARY OF THE CASE. This case study examines the challenges of Southern Africa's green industrial policy at the intersection of critical mineral wealth, energy transition needs, and structural economic vulnerabilities. Although the region – in particular South Africa, Zimbabwe, Namibia, and Botswana- possesses significant resources for the global green transition (such as platinum, cobalt, lithium, and manganese), the shift toward sustainable industrialisation encounters tensions between export-driven extractivism and domestic beneficiation strategies. South Africa's Just Energy Transition Investment Plan and Presidential Climate Commission framework propose innovative governance strategies that aim to balance decarbonisation efforts with job preservation. However, communities dependent on mining face job losses without sufficient support for the transition, foreign firms predominantly control the emerging green hydrogen sector, and local content policies encounter implementation challenges. To ensure a successful and genuine 'green' transition, it is crucial to strengthen the state's capacity, encourage democratic participation, and establish regional cooperation frameworks to avoid repeating past patterns of resource extraction that fail to create added value.
SUMMARY OF THE MAIN FINDINGS- Southern Africa added 27 GW of energy capacity between 2012 and 2022, with renewables accounting for 28% of the electricity mix, yet coal still drives 34% of installed capacity (RES4Africa, 2025). Environmental costs are concentrated in the Mpumalanga province, where coal mining employs between 76,000 and 108,000 workers, with approximately 87% of them living in Mpumalanga, and 46,000 households depend on coal (Bhorat et al., 2024). Platinum and cobalt mining lead to land degradation and water contamination. Green hydrogen projects in water-scarce Namibia threaten water security. South Africa secured R218 billion (US$11.8 billion) through the Just Energy Transition Partnership for a coal-to-renewables shift (Xaba, 2024). Phasing out coal cuts pollution, while renewable programmes widen access and generate jobs. However, mining communities face job losses without enough reskilling, workers report a lack of consultation (Mohlakoana, 2024), and foreign firms dominate green hydrogen value chains with limited local content. South Africa's Presidential Climate Commission provides an innovative multi-stakeholder governance (Presidential Climate Commission, 2022), but the tangible outcomes are unclear. Winners (or rather potential winners) include state institutions developing strategic capacity, renewable developers, communities gaining access to expanded electricity, and technical workers in high-skilled roles. Losers include approximately 90,000 coal workers facing redundancy (Bhorat et al., 2024), displaced rural communities, insecure renewable manufacturing workers, and countries locked into disadvantageous green hydrogen export agreements.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Land degradation and water contamination from platinum and cobalt mining. • Green hydrogen projects threaten water security in water-scarce Namibia. • South Africa's coal mining environmental impacts concentrated in Mpumalanga. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Expansion of installed capacity in renewable power generation. • Reduced air pollution from coal phase-out. • Expanded clean energy access. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • 90,000 coal workers facing job losses without adequate reskilling.

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- Displacement of rural communities.
- Foreign firms dominate green hydrogen with limited local content.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Potential 29,000 jobs from R320 billion investments in Mpumalanga by 2030.
- R218 billion (US$11.8 billion) secured through Just Energy Transition Partnership.
- Multi-stakeholder governance through Presidential Climate Commission.

BACKGROUND

Southern Africa holds strategic resources: Africa's largest lithium reserves (located in Zimbabwe, among the top five worldwide), the second-largest platinum reserves globally (Zimbabwe after South Africa), and notable cobalt and manganese deposits (Ngundu, 2025). IRENA estimates that Southern Africa could become the world's leading exporter of green hydrogen by 2050 (RES4Africa, 2025).

Yet, resource wealth remains burdened by extractivist legacies. South Africa derives 74% of its electricity from coal (Xaba, 2024), creating tensions between pursuing decarbonisation and managing employment dependencies. Zimbabwe has established lithium export bans since 2022 while planning refineries and industrial parks, but implementation faces infrastructure deficits and Chinese firm dominance, which undermines beneficiation (Ngundu, 2025).

Research question*:* Can Southern African states utilise green transition demands to enhance productive capacity and attain structural transformation, or will green industrialisation replicate neo-colonial extraction patterns?

METHODOLOGY

The study relies on qualitative research, combining an in-depth review of the recently published academic and policy literature. Theoretical frameworks include political ecology, green extractivism, developmental state theory, and just transition approaches that centre on democratic participation. The methodology included interactions with local researchers, trade unionists, social activists, and government officials conducted through workshops and seminars organised by TNI and the GreenPaths project in collaboration with research units at the universities of Johannesburg, Cape Town, and Stellenbosch between November 2024 and March 2025.

Key indicators: coal employment concentration, renewable capacity additions, beneficiation rates, green hydrogen ownership structures, and just transition implementation metrics (Xaba, 2025). Data sources include government statistics, Presidential Climate Commission monitoring, and SADC databases. Limitations include variable data quality across countries, rapidly evolving policies, and limited gender-disaggregated data.

FINDINGS

Institutional innovations and governance. South Africa's Presidential Climate Commission (established in 2020, formalised in 2021) exemplifies institutional innovation with a cross-cutting mandate, a multi-stakeholder composition (government, business, labour, civil society, traditional leadership), and transparent operation (Presidential Climate Commission, 2022). The 2022 Framework for Just Transition sets out a shared vision and governance arrangements (The Presidency, 2022). However, coal workers in Mpumalanga reported a lack of consultation and insufficient reskilling information, with mine closures not leading to worker retraining or renewable job placements (Mohlakoana, 2024).

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Employment and Just Transition. The coal sector's concentration presents significant risks: 92,000 workers are employed in coal mining, with 83% of South Africa's 78 mines located in Mpumalanga's southwest, contributing to 80% of the country's production (Bhorat et al., 2024). Nine coal plants are scheduled to close by 2035, threatening jobs (Xaba, 2025). Most coal jobs are formal, with 81% being permanent, 80% contributing to pension schemes, and 68% offering medical aid; these figures exceed the average rate of formal employment in Mpumalanga (Bhorat et al., 2024). Workers prefer direct compensation over government spending, reskilling programmes, or infrastructure projects.

Renewable employment presents mixed prospects: cumulative Mpumalanga investment could reach R320 billion (USD 20.6 billion) by 2030, generating around 29,000 jobs (Koffer & Herz, 2022). However, these opportunities require higher skills and geographical relocation, with construction employment being temporary.

Regional Cooperation. SADC Sustainable Energy Week 2024 brought together over 800 delegates, with commitments including Botswana's target of 1.5 GW solar by 2030 and Zambia's plan for over 1,000 solar mini-grids (SACREEE, 2024). However, only 32% of rural areas in SADC have access to electricity (RES4Africa, 2025).

Beneficiation Challenges. Zimbabwe's lithium export ban (2022) and planned industrial parks challenge Chinese firm dominance, threatening operations and citing infrastructure difficulties, with the government adopting flexible strategies, which inadvertently worsen smuggling and corruption (Ngundu, 2025). Zimbabwe's Arcadia Lithium Project sale (USD 422 million to Zhejiang Huayou Cobalt) shows demand, yet raw ore exports fail to maximise value (Ngundu, 2025).

Namibia secured €50 million for green hydrogen investment, with Germany identifying Hyphen Hydrogen Energy's two million tonnes annual ammonia project as ‘strategic’ (RES4Africa, 2025); however, concerns have emerged about the EU-driven export orientation neglecting domestic needs.

Progressive Developments. South Africa’s Climate Change Act integrates climate change into government strategies (Xaba, 2024). State procurement promotes local renewable manufacturing. The SADC Renewable Energy Strategy offers collaborative policy frameworks (SACREEE, 2024).

DISCUSSION

This case enhances understanding of green industrial policy in resource-rich but vulnerable settings. Firstly, institutional innovation, such as South Africa's Presidential Climate Commission, marks a shift from standard practices. However, turning this into effective community implementation necessitates continuous democratic involvement, which is currently lacking (Mohlakoana, 2024).

Second, ‘green’ does not automatically mean ‘just’. Environmental improvements can occur alongside social deterioration when transitions lack sufficient compensation, consultation, and alternative livelihoods. Mpumalanga demonstrates how coal-dependent communities face threats despite the existence of sophisticated frameworks, highlighting implementation gaps (Bhorat et al., 2024; Xaba, 2025).

Third, SADC cooperation offers policy space unavailable to individual countries, but its effectiveness remains limited by insufficient funding and inadequate project preparation capacity (SACREEE, 2024). Strengthening regional institutions, particularly renewable project preparation facilities and harmonised regulations, becomes a priority (RES4Africa, 2025).

Fourth, critical minerals beneficiation demonstrates how resource-rich countries with clear policies struggle against the dominance of firms from China and the Global North, infrastructure

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deficiencies, and capacity limitations (Ngundu, 2025). Successful beneficiation requires coordinated infrastructure investment, skills development, and regional value chain integration.

Priorities for progressive green industrial policy include: strengthening state capacity for negotiating favourable terms with transnational corporations; extending democratic participation beyond elite consultations to genuine community engagement (Mohlakoana, 2024); providing comprehensive just transition packages, such as direct compensation, accessible reskilling, income support, and economic diversification (Koffer & Herz, 2022); enforcing technology transfer and local content requirements through South-South cooperation; prioritising regional coordination for shared infrastructure and collective bargaining power; and explicitly addressing gender dimensions, especially considering women's concentration in the lowest-paid positions.

The relationship between state capacity and democratic participation remains a complex one. Strong institutions enable coordinated transitions, yet without democratic accountability, there is a risk of authoritarian rent capture (Presidential Climate Commission, 2022). Southern Africa's experience indicates that both elements must be strengthened together: the capacity of a developmental state embedded within democratic governance that promotes popular participation.

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1.2.8 Case study 8: 'Green' and 'fair' industrial policy in Northern Africa

Summary

Table 9. Summary of case study 8

'Green' and 'fair' industrial policy in North Africa
EXECUTIVE SUMMARY OF THE CASE. This case study investigates green industrial policy in North Africa, highlighting the tension between bold renewable energy goals and neocolonial extraction practices. The research question asks: Can North Africa's green transition meet its domestic development needs, or does it mainly replicate historical patterns of resource extraction that serve European energy security? Results show that despite substantial renewable energy efforts – Morocco aiming for 52% renewables by 2030 and Tunisia 35% – export-focused green hydrogen projects, privatisation agendas driven by international financial institutions, and the ongoing Moroccan occupation in Western Sahara through 'green' infrastructure illustrate how the energy transition risks increasing dependency rather than promoting true sovereignty. The study adds to discussions on green colonialism by illustrating how the EU's hydrogen strategy and World Bank-IMF structural reforms influence North Africa's energy trajectories, prioritising European energy security over local needs and democratic engagement.
SUMMARY OF THE MAIN FINDINGS. North Africa's green transition exposes stark contradictions between climate goals and social justice. Morocco's large green hydrogen initiatives – including dedicating up to 300,000 hectares for renewable energy, with over 80% in occupied Western Sahara (Western Sahara Resource Watch [WSRW], 2023) – illustrate green colonialism, where European energy demands lead to land appropriation without significant community consultation. The Moroccan government intends to develop green hydrogen and ammonia projects on 553,435 hectares in Dakhla-Oued Eddahab alone, while all energy for phosphate extraction in Bou Craa is sourced from wind farms, reinforcing occupation through renewable infrastructure (WSRW, 2021). Large-scale solar and hydrogen projects utilise scarce water resources in arid areas. Desalination for green hydrogen production adds environmental pressures, while concentrated solar power plants like Ouarzazate require substantial water for cooling in semi-arid regions (Hamouchene, 2022). The unbundling of Tunisia's state electricity company ONEE, mandated by IMF Resilience and Sustainability Trust reforms, enables European investor entry but may also create 'sacrifice zones' as warned by previous research published by the Transnational Institute (TNI, 2024). North Africa leads the continent in utility-scale wind and solar deployment, hosting nearly half of Africa's installed wind capacity and a fifth of grid-based solar capacity (International Renewable Energy Agency [IRENA], 2023). Egypt's 10 GW Suez Wind Power Project will supply 11 million households and reduce 25.5 million tonnes of carbon emissions (BloombergNEF, 2024), while Morocco's renewable energy reached 45% of installed capacity by 2024 (IRENA, 2023). Green hydrogen projects prioritise temporary, low-skilled employment while displacing pastoral communities. French company TotalEnergies' project requires 170,000 hectares in Guelmim-Oued Noun, appropriating lands from agropastoralist communities without proper consent (TNI, 2024). Tunisia's energy privatisation, supported by World Bank reforms, has led to expensive buyback agreements that increase electricity prices, similar to Jordan's experience, while lacking labour protections to ensure local job creation (Arab Reform Initiative [ARI], 2024). In Western Sahara, Moroccan settlers occupy jobs in the energy sector, while Saharawi communities face displacement, arbitrary arrests, and systematic exclusion from benefits, generating nearly $1.95 billion annually for Morocco, even as renewable capacity reaches 792.2 MW wind and 455 MW solar (Saharawi Observatory for Natural Resources and Environmental Protection [SONREP], 2025). In theory, renewable energy investment would generate 2-5 times more jobs per pound than fossil fuels, providing opportunities for North Africa's large and educated workforce when supported by suitable labour market policies and technical training (IRENA, 2023). Public renewable programmes increase energy access, although Tunisia's 3% renewable share in 2023 highlights the gap between ambitious goals (35% by 2030) and the realisation of these plans (World Bank, 2024a).

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Winners of the green transition include: European energy importers securing green hydrogen supplies; multinational corporations (TotalEnergies, Siemens, ACWA Power, Masdar) capturing value chains; the Moroccan monarchy through Nareva's wind portfolio; international financial institutions expanding lending; Gulf capital (UAE invested $25 billion in Morocco, Saudi Arabia $2.8 billion 2016-2025); and authoritarian state elites maintaining control (TNI, 2024; WSRW, 2023).

Losers of the transition include: Local and pastoral communities displaced without proper compensation; precarious workers in export-focused sectors; Saharawi people barred from accessing their territory's renewable resources; Tunisian and Egyptian citizens paying for privatisation with higher energy costs and diminished public services; and civil society organisations facing limited participation in energy planning (ARI, 2024; SONREP, 2025).

This aligns with literature on green extractivism and energy colonialism, showing how neocolonial structures endure under renewable rhetoric (Hamouchene, 2022). The Arab Reform Initiative warns of 'green structural adjustment,' where loans and investments favour foreign markets over local needs, potentially turning Tunisia into a renewable exporter while its domestic energy security remains fragile (ARI, 2024).

ENVIRONMENTAL COSTS OF THE GREEN TRANSITION

- Water scarcity worsened by desalination for green hydrogen production in arid regions.
- Land appropriation (up to 300,000 hectares for renewables, 80% in occupied Western Sahara).
- Ecosystem disruption from large-scale solar and hydrogen projects.

ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Morocco: 45% renewable installed capacity by 2024.
- Egypt: 10 GW Suez Wind Project reducing 25.5 million tonnes CO2 emissions.
- North Africa hosts half of Africa's wind capacity and one-fifth of solar.

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Displacement of pastoral communities without proper consent (e.g., 170,000 hectares TotalEnergies project).
- Saharawi people systematically excluded from benefits despite $1.95 billion annual revenue from occupied territory.
- Higher energy prices from privatisation while profits accrue privately.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Investment in renewable could generate 2-5 times more jobs per unit than fossil fuels.
- Expanded energy access through public renewable programs.
- Foreign investment mobilisation.

BACKGROUND

North Africa – Algeria, Egypt, Libya, Morocco, Tunisia, and Sudan – constitutes Africa's largest energy market with relatively high socioeconomic development and nearly universal electricity access (except Sudan and Libya). The region has vast renewable energy potential beyond current deployment (IRENA, 2023). Over the past decade, it attracted significant financing for renewable assets, mainly supported by policies through auctions in Egypt and Morocco, with utility-scale wind and solar being the primary beneficiaries (BloombergNEF, 2024).

However, the transition to renewables takes place within significant asymmetries. North Africa auctioned 4.8 GW capacity from 2014 to 2023, far behind Latin America's 44 GW annual average or China's 45 GW, while electrification rates remain 100% in North Africa compared to 47% in Sub-Saharan Africa (BloombergNEF, 2024). The EU's 2020 Hydrogen Strategy aims to import 10 million tonnes of renewable hydrogen by 2030, with North Africa as the primary supplier via a planned 24 GW interconnector capacity requiring over $27.5 billion in investment (European Commission, 2020).

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Contemporary debates focus on whether North Africa can harness renewable resources for sovereign development or remains stuck in extractivist patterns. Saudi Arabia, UAE, Egypt, and Morocco account for over 90% of MENA's renewable growth, yet the region falls behind global counterparts despite having 22-26% of the world's solar radiation concentrated there (World Economic Forum, 2024).

METHODOLOGY

This case study employs qualitative methodology by combining systematic literature review, policy document analysis, and civil society reports. Primary sources include: government renewable energy strategies (Morocco Offer green hydrogen framework, Tunisia National Plan 2030, Egypt's National Low-Carbon Hydrogen Strategy 2023); World Bank Country Climate and Development Reports for Morocco (2022), Tunisia, and Egypt (World Bank, 2022, 2024a, 2024b); IMF Resilience and Sustainability Trust programme documents; Western Sahara Resource Watch monitoring reports (2021-2025); Saharawi Observatory for Natural Resources and Environmental Protection 2025 report (SONREP, 2025); Arab Reform Initiative roundtable proceedings on Tunisia's energy transition (ARI, 2024); and academic literature on green colonialism (Hamouchene, 2020, 2022), energy extractivism, and neo-colonial dynamics.

The analytical framework explores three dimensions: (1) Neo-extractivism: export orientation, resource sovereignty, unequal exchange; (2) Structural adjustment: IFI conditionalities, privatisation, PPP frameworks; (3) Democratic deficits: community participation, labour rights, indigenous exclusion. Environmental costs include water stress, land appropriation, ecosystem disruption; benefits encompass emissions reductions, renewable energy deployment, decreased fossil fuel imports. Social costs involve precarious employment, displacement, rising energy prices; benefits include formal job creation, expanded energy access, and strengthened state capacity.

Data sources include: IRENA renewable capacity statistics (IRENA, 2023), BloombergNEF Africa Power Transition Factbook 2024, IEA World Energy Investment 2024 (International Energy Agency [IEA], 2024); project announcements from energy ministries and developers; and WSRW calculations of occupied Western Sahara renewable capacity and revenue generation (WSRW, 2021, 2023). Data limitations include opacity around employment quality, gender-disaggregated impacts, actual versus announced project implementation, and deliberate information concealment by occupation authorities in Western Sahara.

FINDINGS

Export-Oriented Green Hydrogen: The New Extractivism

Morocco approved $32.5 billion in green hydrogen projects in March 2025, selecting five investors (ORNX consortium with US Ortus/Spain Acciona/Germany Nordex, UAE Taqa with Spain Cepsa, Morocco's Nareva, Saudi ACWA Power) for six projects with up to 30,000 hectares allocated per project (Morocco World News, 2025). Germany's 2020 partnership with Morocco pledged €300 million for green hydrogen development, with TotalEnergies aiming for 10 GW of clean electricity capacity in Guelmim-Oued Noun starting in 2027.

This hydrogen rush aims to enhance European, not North African, energy security. Rystad Energy forecasts that Europe could receive 24 GW of renewable power through North African interconnections, with the Xlinks Morocco-UK project alone providing 11.5 GW of generation and 5 GW/22.5 GWh of battery storage to supply 1.6% of Europe's power needs (Morison, 2024). The EU's REPowerEU plan has quadrupled hydrogen targets to 20 million tonnes by 2030, with half being imported mainly from North Africa, despite studies indicating that these targets are

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unrealistic from cost and energy perspectives and may lead to increased fossil fuel exploitation (TNI, 2024).

Morocco's $1.32 billion IMF RST loan includes 16 reforms across six pillars, with Pillar 2 requiring electricity market unbundling to enhance the legal and regulatory framework for EU market compatibility, effectively supporting Europe's energy transition while favouring foreign investors over Moroccan sovereignty (Bretton Woods Project, 2023). Water scarcity worsens injustices—desalination for electrolysis in arid regions heightens environmental stress while production supplies distant consumption (Hamouchene, 2022).

Western Sahara: Green Colonialism Under Occupation

More than 80% of Moroccan government land designated for renewable energy and green hydrogen projects is located in occupied Western Sahara, including 553,435 hectares for Dahamco's green hydrogen/ammonia facility in Dakhla-Oued Eddahab, 150,446 hectares for Falcon, and 145,333 hectares for the ORNX consortium in Boujdour (WSRW, 2023). By 2030, projections indicate that 47.20% of Morocco's total wind capacity and 32.64% of solar capacity will be produced in occupied territory, with 100% of OCP's Bou Craa phosphate mining energy supplied by 22 Siemens wind turbines at the 50 MW Foum el Oued farm (WSRW, 2021).

Morocco plans to double Western Sahara's green power capacity from 1.3 GW to 2.7 GW by 2027, with a $2.1 billion investment, ahead of the 2030 World Cup. This includes a 3 GW cable connecting renewable plants to central Morocco, with French funding announced in April 2024 (Morocco World News, 2024). France committed €10 billion in 2024, with the French Development Agency granting a €150 million loan specifically for infrastructure in occupied Western Sahara, which facilitates renewable energy development. Meanwhile, Climate Investment Funds provides $629.6 million with an expected co-financing of €10.97 billion.

The installed capacity generates about $1.95 billion each year for Morocco, integrated into the national grid and exported, while the Saharawi people see no benefits (SONREP, 2025). Foreign companies, including French, Spanish, German, US, Chinese, and Gulf firms, reap profits as Morocco engineers demographic shifts by relocating settlers into energy sector jobs. These projects fundamentally undermine UN peace efforts by increasing Morocco's dependence on occupied territory, while UNFCCC blindly accepts Morocco's reporting of Western Sahara projects as its own Paris Agreement commitments, which suggests international recognition for projects that violate international law (WSRW, 2021).

Privatisation and Financial Institution Dominance

Tunisia's transition, supported by the World Bank since 2018, aims for 35% renewables by 2030 and 100% by 2050, with two-thirds of the programme relying on public-private partnerships as the government attracts private investment through three regimes: concessions for large projects, authorisation for small and medium projects (up to 10 MW solar/30 MW wind), and self-generation for industrial customers (World Bank, 2024a). In January 2023, Tunisia launched tenders for 1,700 MW, including ten photovoltaic plants of 100-150 MW each and eight wind farms of 75 MW. The $932 million ELMED project links the Tunisia-Italy grids with $337 million in EU funding and $268.4 million from the World Bank (U.S. International Trade Administration, 2024).

Egypt's 2014 energy reforms, supported by a $3.15 billion World Bank development policy loan (2015-2017), transformed the sector through feed-in tariff policies, competitive bidding frameworks, and the phasing out of fuel subsidies, mobilising $2 billion private investment in Benban Solar Park with an IFC consortium of nine international banks and $210 million MIGA political risk insurance (World Bank, 2018). Egypt's 2024 Green Hydrogen Incentives Law and the National Council for Green Hydrogen aim to address barriers to private investment, with the World Bank CCDR (2022) guiding increased private-sector participation towards a 5% GDP contribution from green and sustainable projects (World Bank, 2024b).

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Algeria advances its wind energy programme with technical assistance from the World Bank, supporting bankable projects and a renewable energy strategy for various consumer types. However, installed solar capacity reached only 423 MW by the end of 2021, despite 15 GW targets for 2030 and 22 GW plans announced in 2011 (World Bank, 2024c). This highlights how liberalisation frameworks prioritise investor returns over energy sovereignty, with citizens bearing costs through higher tariffs and reduced subsidies while profits are privately accrued.

State Capacity Versus Democratic Participation

Authoritarian governance characterises North African energy transitions. Tunisia's energy sector governance deficits reflect regional patterns where centralised, non-transparent decision-making prioritises foreign investments over local development, with Algeria maintaining strict state control but bureaucratic opacity hindering renewable transition, and Egypt's Benban Solar Park revealing challenges in ensuring equitable benefit distribution despite successful international investment attraction (ARI, 2024).

Morocco's renewable energy expansion takes place without significant Saharawi consultation. Civil society organisations like MENAFem Movement raise concerns over RST's neo-colonial impact, viewing it as favouring foreign interests with green hydrogen projects influenced by EU Global Gateway that create sacrifice zones, while citizens shoulder the costs of de-risking climate projects for private profit through higher energy prices without public support (Bretton Woods Project, 2023).

DISCUSSION

North Africa's green transition shows how deploying renewable energy can reinforce, rather than challenge, neocolonial structures. First, export-focused hydrogen strategies prioritise European security over local energy needs, replicating historical extractivism under the guise of green rhetoric (Hamouchene, 2022). Initiatives like Xlinks, which supplies 6% of UK electricity demand, or Tunisia's ELMED bidirectional flow that enables European markets, demonstrate how North African renewable resources mainly benefit distant consumers rather than regional development.

Second, Western Sahara exposes the harshest form of green colonialism—occupation entrenched through renewable infrastructure, supported by international complicity via French, Spanish, and US backing, as well as corporate involvement (Siemens, Enel, TotalEnergies). The EU's failure to distinguish energy sources from occupied versus Moroccan territory, along with UNFCCC's acceptance of Morocco's reporting, grants international legitimacy to illegal occupation while Saharawi refugees displaced to climate-vulnerable desert regions are excluded from global climate governance (WSRW, 2021; SONREP, 2025).

Third, IFI-driven liberalisation prioritises private investor returns over public service. IMF RST reforms mandating ONEE unbundling, World Bank CCDRs focusing on EU investor entry, and PPP frameworks that socialise risks while privatising profits demonstrate how structural adjustment operates in renewable sectors, with citizens facing higher energy costs and reduced subsidies (Bretton Woods Project, 2023; World Bank, 2022, 2024a). Tunisia and Egypt's experiences parallel Jordan's expensive buyback agreements, confirming regional patterns.

Fourth, democratic deficits weaken the potential for a just transition. Authoritarian governance excludes civil society participation, criminalises community consultation (Western Sahara deportations), and suppresses labour organising (ARI, 2024). Without reforming governance structures to serve the public rather than private interests and establishing strong labour policies that ensure local employment, investments result in temporary foreign labour rather than long-term community benefits.

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Priorities for a Progressive Green Industrial Policy

Priorities for a progressive green industrial policy include: (1) Prioritising domestic renewable deployment over exports until 60-70% decarbonisation is achieved; (2) Asserting resource sovereignty through technology transfer requirements, local content mandates, and compulsory licensing rather than intellectual property monopolies; (3) Ending occupation in Western Sahara and recognising Polisario's representational authority; (4) Democratising energy planning through community participation, labour movement involvement, and civil society inclusion; (5) Rejecting IFI conditionalities that mandate privatisation and instead strengthening public utilities with transparent governance; (6) Demanding climate debt payments as grants rather than loans, technology transfers, and odious debt cancellation; (7) Building South-South cooperation frameworks to enhance collective bargaining power against Northern capital and IFIs.

Future Research Agenda

Future research should explore: long-term renewable employment quality through longitudinal studies; gender-disaggregated impacts considering ongoing data gaps; effectiveness of regional integration frameworks (Arab Maghreb Union, African Continental Free Trade Area) versus bilateral dependencies; alternative ownership models (community energy, municipal utilities, energy cooperatives) versus PPP dominance; and links between militarisation, authoritarianism, and energy transitions considering North Africa's role in global security industries.

North Africa's position—bridging Europe's energy demands, holding vast renewable resources, and facing severe climate risks—underlines the urgency of genuine energy sovereignty. Climate justice entails recognising European historical responsibilities, ending neocolonial extraction practices, democratising transitions, and empowering marginalised communities. Without a fundamental overhaul of power structures, renewable energy risks being a mere greenwash for ongoing exploitation.

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1.2.9 Case study 9: Sustainable finance

Summary

Table 10. Summary of case study 9

How 'just' is the 'just transition'? A regional analysis of climate finance in the European Union
EXECUTIVE SUMMARY OF THE CASE. This case study investigates the extent to which the European Investment Bank (EIB), as implementer of the European Green Deal Investment Plan (EGDIP), delivers on the promise (as a policy-taker of the EU) of a 'just transition' across EU regions. Despite political commitments to 'leave no one behind', concerns persist that climate finance may be disproportionately directed towards urban regions, which are both more responsible for climate change and better positioned to attract finance. The study addresses this gap by analysing the regional distribution of EIB climate finance between 2021 and 2023, using original data on 646 green projects. Two hypotheses are tested: whether urban regions attract more finance per capita, and whether vulnerable regions (as measured by the Green Transition Vulnerability Index, GTVI) receive more support. Findings confirm that cities and their commuting areas receive significantly more climate finance, while vulnerable regions do not. This challenges the equity of the transition and raises questions about the effectiveness of current policy tools.
SUMMARY OF THE MAIN FINDINGS. The analysis confirms a pattern whereby cities and their commuting areas are more likely to obtain climate finance, proportionally, than other, less urbanised regions. This supports Hypothesis 1 and refutes Hypothesis 2. The main 'winners' of the green transition are large metropolitan areas, which benefit from flagship infrastructure projects and greater capacity to manage climate policies. In contrast, 'losers' include rural, brown energy-dependent and economically stagnant regions, which face barriers to accessing finance. This reflects what the literature has described as a 'paradox', whereby cities—largely responsible for climate change—are also better positioned to attract climate finance that facilitates their transformation, while other regions may be under-served. Beyond a paradox, we claim this is an injustice. Unless carefully designed, climate finance could exacerbate pre-existing inequalities between locations.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Climate finance is unevenly distributed across regions. • Less urbanized (and already lagging-behind) regions may be left behind. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Lending to projects that support environmental sustainability. • Some regions increase resilience to climate change. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Vulnerable regions may receive less green finance. • Climate finance may increase territorial inequalities. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Regions with capacity may benefit more from climate finance. • Cities and commuting areas, which also pollute more, may obtain greater climate finance.

Background

The European Union (EU) has positioned itself at the forefront of global climate action through the European Green Deal (EGD), which aims to make the EU the world's first climate-neutral continent by 2050. The EGD is a multisectoral and complex set of policies, but its overarching

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objectives can b-e reduced to three: eliminate net emissions of greenhouse gases by 2050; decouple economic growth from resource use; and 'leave no-one behind' (the 'just transition') (EC, 2025a; EC, 2020).

To finance this ambition, the European Green Deal Investment Plan (EGDIP) promises to mobilise at least €1 trillion over a decade. The European Investment Bank (EIB) was nominated by the European Commission to implement the EGDIP. In preparation for this role, the EIB rebranded itself in 2019 as the world's first 'Climate Bank' and launched its Climate Bank Roadmap, committing to align its operations with the Paris Agreement and to increase climate and sustainability finance to over 50% of total lending by 2025.

At the core of the EGDIP is the Just Transition Mechanism, a set of tools and funds designed to ensure that 'no people, no places' are left behind (EC, 2025b). However, concerns persist that climate finance may reinforce rather than reduce territorial inequalities. Cities and urban areas, which are largely responsible for climate change, may be better positioned to attract climate finance than less urbanised regions (EIB, 2025a). This article investigates whether the distribution of EIB climate finance reflects the EU's commitment to a just transition.

METHODOLOGY

The study employs a mixed-methods approach, combining quantitative analysis of EIB green projects funded between 2021 and 2023 with five anonymised interviews with EIB officials. The authors manually tracked the location of 646 green projects (EIB, 2025b), representing over half of the total climate finance disbursed in that period. These projects were analysed to determine their regional distribution across the EU.

Climate finance is defined as the amount within each project dedicated to Climate Action and Environmental Sustainability, following EIB criteria. The dependent variable is climate finance per inhabitant by region. Two independent variables are used: (1) population living in functional urban areas, as defined by Eurostat, and (2) vulnerability to the green transition, measured by the Green Transition Vulnerability Index (GTVI) developed by Rodríguez-Pose and Bartalucci (2024).

Two control variables are also included: institutional quality, measured by the European Quality of Government Index (EQI), and GDP per capita. The econometric analysis isolates the effect of each variable to test two hypotheses: whether urbanisation and vulnerability predict climate finance allocation.

In line with the conceptual and methodological matrix of the project, the case study applies the concept of sustainable growth at the project level and green finance at the sectoral level. The processes of social impact analysed—recovery, resilience and restoration—are examined through the territorial distribution of climate finance and its alignment with the goals of a just transition.

FINDINGS

The analysis confirms that regions with large urban areas receive significantly more climate finance per inhabitant. Regions with over 1.5 million inhabitants in functional urban areas obtained, on average, 154 euros per inhabitant, while other regions received 82.7 euros. The econometric model shows that regions in the fourth quartile of urban population received +221.5% more climate finance than those in the first quartile. This supports Hypothesis 1.

In contrast, regions most vulnerable to the green transition, as measured by the GTVI, do not receive more climate finance. The correlation is negative and not statistically significant. On average, for each additional unit of GTVI, a region attracts -20.5% climate finance. This leads to the rejection of Hypothesis 2.

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The analysis also shows that institutional quality has a non-linear effect: regions in the third quartile of EQI received +94.7% more climate finance than those in the first quartile. GDP per capita is not statistically significant once urbanisation is controlled for. In short, population living in larger urban areas is the dominant factor explaining the distribution of climate finance.

DISCUSSION

The findings challenge the EU's claim that the green transition is just. While cities benefit from climate finance, vulnerable regions are proportionally under-served. This reflects concerns in the literature about territorial discontents and the emergence of 'green discontent'. The study shows that climate finance is not currently aligned with the goals of the just transition.

Large metropolitan areas received substantial funding for flagship infrastructure projects. For example, the Grand Paris Express – Ligne 15 Sud received €1 billion for a 33 km automated metro line, and Madrid's railway node expansion was allocated €518 million. These projects bring benefits to cities but may leave behind less urbanised regions.

Regions characterised by greater vulnerability—often rural, development-trapped, or brown energy-dependent—were correlated with less likelihood of obtaining climate finance. The econometric analysis confirms that vulnerability is not a significant predictor of finance allocation.

Policy recommendations include improving transparency in project location data and adjusting financial criteria to better support vulnerable regions: our research was only able to map around half of the total EIB climate finance - where does the other half go? If the EU wants to ensure that no one is left behind, climate finance must reach all regions—not just those best positioned to receive it.

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1.2.10 Case study 10: Effects of green transition policy interventions on environmental sustainability and social wellbeing in European countries and in 24 selected countries in the Global South

Summary

Table 11. Summary of case study 10

Who bears the cost of Europe's green transition? Distributional and transnational effects of European environmental policies
EXECUTIVE SUMMARY OF THE CASE. This case study examines the distributional and environmental impacts of the European Union's green transition, addressing the gap in research that jointly considers social inequality and emission offshoring. While much of the literature on carbon leakage focuses on the EU Emission Trading Scheme (ETS) with inconclusive results, we employ the OECD's Climate Actions and Policies Measurement Framework (CAPMF) and its Environmental Policy Stringency Index (EPSI), which captures over 100 policy variables, to analyse the broader effects of environmental policy. The central research question asks whether stricter climate policies in Europe simultaneously (a) exacerbate income inequality at home and (b) shift emissions abroad. The analysis relies on panel data from 1990–2022 for inequality, unemployment, social expenditures, and trade data from 2016–2023 to derive imported emissions. The results suggest that policy stringency raises pre-tax and post-tax inequality but not disposable inequality, highlighting the protective role of welfare states in the Just Transition. At the same time, stricter environmental policies increase imported emissions from the Global South to the EU. The case study provides a joint view on domestic and global dimensions of the Just Transition debate, revealing undesired side effects of the existing policies.
SUMMARY OF THE MAIN FINDINGS. The findings reveal a paradox at the heart of Europe's green transition. Stricter environmental policies increase pre-tax and post-tax inequality, showing that low-income groups bear disproportionate costs. The inequality in disposable incomes, however, remains stable due to redistributive transfers. Unemployment further worsens inequality, while social expenditure mitigates it, underlining the central role of welfare states. On the environmental side, stronger policy stringency within the Union is linked to higher imported emissions from nearly all Global South countries in the sample, pointing to carbon offshoring, which mitigates at least some of the efforts to reduce emissions within the Union.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Offshoring of emissions to the Global South, with Europe importing carbon-intensive goods. • Risk of 'carbon leakage,' undermining the global effectiveness of domestic decarbonisation in Europe. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Reduction of territorial emissions within Europe. • Increased climate protection. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Lower income groups are more adversely affected by climate policies in Europe. • Stricter environmental policies are linked to rising pre-tax and post-tax income inequality. • Uneven distribution of burdens between and within countries. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Tax revenues from emission taxation can be used to soften the economic burden on low-income households: • Welfare systems, especially direct cash transfers, protect disposable incomes. • Social expenditure reduces inequality across all measures of income inequality.

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BACKGROUND

In the efforts for the integrity of the earth's biosphere, Europe has implemented several measures to reduce its contribution to climate change. These are largely bundled within the European Green Deal (EGD), with a legally binding target of climate neutrality by 2050 and emission cuts of 55% by 2030 (European Commission, 2019). The EGD promises not only a transition towards ecological sustainability, but also one that is economically viable and socially fair. To support this Just Transition, the EU has allocated around €55 billion to ease socio-economic impacts in the regions most affected by the EGD. Yet the reality may differ, with studies suggesting that the transition adversely affects vulnerable groups (Baran et al., 2020; Chateau et al., 2018; Wang et al., 2016).

This study examines both the environmental and socio-economic impact of environmental policies in the EU. First, it considers how these policies affect income inequality within European countries, to assess whether the transition unfairly burdens lower-income groups. Second, it asks whether these policies, while reducing emissions in Europe (Eslahi, Creti, & Sanin, 2026; Ugrinov, 2025; Green, 2021; Ziemblińska et al., 2025), have simply shifted production emissions abroad through offshoring. Evidence of offshoring would suggest that Europe, while cutting its own emissions, imports products embodying these emissions from countries with weaker environmental and climate protection.

The central research question is whether stricter environmental policies in Europe simultaneously exacerbate income inequality at home and shift emissions abroad. Using the OECD's Climate Actions and Policies Measurement Framework (CAPMF) and its Environmental Policy Stringency Index (EPSI), the study assesses whether stricter environmental legislation is associated with greater inequality within Europe and higher imported emissions from the Global South. Together, the two dimensions highlight the paradox of Europe's Just Transition: while presented as fair and inclusive, such policies risk placing disproportionate burdens on economically vulnerable groups in Europe and climate protection efforts abroad.

METHODOLOGY

This case study uses a quantitative methodology for two analytical dimensions. The key explaining variable of these analyses, the Environmental Policy Stringency Index (EPSI), is an index within the range from 0–10 which covers 130 climate mitigation policy variables, including targets and market- and non-market-based instruments. It is the only validated database providing consistent, harmonised, long-term cross-country data on policy stringency (Nachtigall et al., 2022).

The first analysis examines the impact of environmental policy stringency on income inequality in Europe, using data from 1990–2022 and three inequality measures: Gini of the pre-tax national income (before taxes and transfers but after pensions), Gini of post-tax national income (including taxes, transfers, and in-kind services), and Gini of post-tax disposable income (including in-kind transfers). This allows us to assess both the effect of policy stringency on inequality and the extent to which redistributive mechanisms mitigate this effect. Three control variables are included: GDP, unemployment, and public social expenditure.

The second analysis tests the impact of the EPSI on emissions embodied in imports from 24 Global South countries across Africa, Asia, Latin America, and MENA. Using multi-regional input-output trade data from the EORA database for 2016–2023, we parametrize a gravity framework with a Poisson Pseudo-Maximum Likelihood (PPML) model to investigate whether stricter European policies increase imported embedded carbon emissions, thereby failing to reduce the footprint of European demand.

In line with the project's conceptual and methodological matrix, this case study investigates the effects of decarbonisation and other environmental policies at the national and global level. We

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analyse these dynamics within Europe through income inequality, and globally through the shifting of environmental burdens to the Global South.

The analysis relies on harmonised data from the World Inequality Database, the OECD's CAPMF, and the EORA database on input-output models. However, due to data gaps in the EORA, the second step of the analysis is based only on years 2016 – 2023, compared to the income inequality analysis based on data from 1990 to 2022.

FINDINGS

In terms of distributional outcomes, the analysis finds that stricter environmental policies are associated with higher inequality in Europe. Specifically, a 10 percent increase in environmental policy stringency raises the pre-tax Gini by about 0.5 percent and the post-tax Gini by 0.7 percent However, it has no statistically significant effect on the disposable Gini. These findings indicate that direct cash transfers, which are included in the calculation of disposable Gini, mitigate the regressive impact of climate policies. Unemployment is found to exacerbate both pre-tax and post-tax inequality, reflecting the vulnerability of low-income groups to structural job losses during the transition. By contrast, higher levels of social public expenditure consistently reduce inequality across all three measures of the Gini, underscoring the role of welfare systems in cushioning the social costs of decarbonisation.

In terms of environmental outcomes, the results of this analysis show that higher environmental policy stringency in Europe is strongly associated with higher levels of imported emissions from global south countries: If environmental policies become 10 percent more stringent, then emissions embodied in imports increase by 1.3 percent. results were disaggregated to the level of different exporters in the Global South country and suggest that emissions are imported increasingly from most Southern countries in our sample[1].

The results were confirmed by robustness checks in both analyses.

[1] For small number of countries, the emissions decrease with an increase in EPSI.

DISCUSSION

Our findings show that environmental policies have the potential to adversely affect the vulnerable and low-income population in Europe, with higher pre-tax and post-tax inequality associated with increase in policy stringency. This confirms concerns that climate policies disproportionately burden low-income groups (Baran et al., 2020; Chateau et al., 2018). However, the statistically insignificant results for inequality in the disposable income indicate the silver lining: the compensatory role of welfare states, particularly in the form of progressive taxes and direct cash transfers, has prevented the social costs of decarbonisation from falling too heavily on the most vulnerable households.

However, the environmental perspective suggests a different story. Previous studies on carbon leakage have focused primarily on the EU's Emission Trading Scheme (Branger & Quirion, 2014; Wang & Kuusi 2024; Dechezleprêtre et al., 2022; Verde, 2020; Juergens, Barreiro-Hurlé, & Vasa, 2013), with inconclusive results. Our study focuses on an environmental policy measure which considers more than 100 policy variables. It confirms suspicions of carbon leakage, with environmental policy stringency in Europe strongly linked to increased imported emissions from the Global South. This suggests that Europe's domestic emission reductions come at expense of higher emissions in global south countries. McWilliams, Tagliapietra, & Zettelmeyer (2025) also argue that Europe's decarbonisation strategy risks externalising the environmental burden by importing energy-intensive products from the Global South, which contradicts the reduction of global emissions. These findings align with Eurostat (2025) data showing that intermediate goods account for over 60% of extra-EU imports and mineral fuel imports still exceed €500 billion

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annually, highlighting how Europe's transition remains intertwined with carbon-intensive imports from the Global South.

Empirically, this study contributes by combining three measures of inequality with unemployment and social expenditure, revealing how policies interact with both labour market vulnerability and welfare systems. Conceptually, it unifies domestic inequality and global offshoring, showing that the losers of Europe's transition are not only low-income groups at home but also communities abroad exposed to the environmental burdens of European consumption.

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1.2.11 Case study 11: Social and economic impacts of the Hydrogen Economy in Europe

Summary

Table 12. Summary of case study 11

The European Hydrogen Economy: A Carrier for the Green and Just Transition?
EXECUTIVE SUMMARY OF THE CASE. This case study investigates the social impacts of the EU green hydrogen economy. It takes an energy justice perspective to enrich social impact analysis of hydrogen economies in two particular localities: Groningen in the north of the Netherlands and the Western Sahara a region recognized in international law as a non-self-governing territory, to which Morocco has territorial pretensions. Social impact assessments on (renewable) energy projects and systems, such as the EU-endorsed SLC-A, currently do not (sufficiently) assess the justice of green transitions (Fortier et al., 2019). This study builds on energy justice approaches to integrate additional indicators towards understanding the social impacts of green hydrogen and applies the resulting assessment framework to green hydrogen projects in Groningen and Western Sahara. This study shows how the introduction of green technologies and energy systems risks exacerbating distributional, procedural and recognition injustices where these concerns are not properly addressed in EU and national law and policy frameworks.
SUMMARY OF THE MAIN FINDINGS. The analysis shows that whereas there are environmental benefits to a transition to a green hydrogen economy, EU and national policies insufficiently address the (risk of) injustices that arise along the value chain. The risk of distributive injustice, where the benefits will largely flow to European based fossil energy companies instead of (energy poor) local communities, is present in both Groningen and the Western Sahara. Moreover, specific risks of land grabbing, water stress, and a lack of economic development and knowledge transfer are present in the case of Morocco (Müller et al., 2022; Tunn et al., 2024). Such risks are further exacerbated due to a lack of recognition and procedural justice, with Morocco scoring poorly on many of the indicators for transparency and due process and the Western Sahara where the protection of indigenous rights seem anything but secured and democratic processes insufficiently give voice to these actors (Müller et al., 2022). Meanwhile the Groningen case study too shows an inadequate consideration of these dimensions of justice, particularly through insufficient effective participation in hydrogen projects and a lack of recognition of past injustices incurred during the gas drilling in the region (Rodhouse et al., 2024). These risks appear insufficiently addressed in the overarching EU regulation and governance structures for green hydrogen projects, while in the concrete projects under examination we find little evidence of acknowledgement and mitigation measures. Taking both a case inside and outside the European Union allowed us to compare the two cases and see whether similar justice concerns arise in the green hydrogen economy. The findings are consistent with the literature particularly with the literature on green hydrogen production in the global south, where the justice risks have seen increased attention.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Green hydrogen can exacerbate inaccessibility of renewable energy, water stress and water pollution. • Green hydrogen requires large amount of renewable energy and investments that could be used in other ways. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Green hydrogen reduces emissions from industrial processes and hard-to-abate sectors. • Green hydrogen is superior to 'blue-hydrogen' in terms of sustainability. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • The distribution of costs and benefits is largely skewed towards private enterprises. • Public participation, due process and transparency are insufficiently guaranteed.

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- Projects may harm the local populace through a misrecognition of (indigenous and labour) rights.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Green hydrogen can encourage regional development and green industrialisation.
- Green hydrogen can help global knowledge transfer on renewable technologies.

BACKGROUND

At the centre of our case study is the following question: How does the introduction of a green hydrogen economy impact energy justice in Groningen and the Western Sahara?

Hydrogen has been hailed, particularly by the EU, as one of the key energy carriers for the green transition (EU Commission, 2021). The fact that hydrogen does not release CO2 when burned, and its possible application as a fuel in hard-to-abate sectors has made it popular among EU policy-makers. There has been a large lobby by fossil fuel actors to move the EU policy to hydrogen because the refinement of hydrogen is in many ways similar to the refinement of fossil fuels, with the majority of the current hydrogen supply being produced from fossil sources. Green hydrogen is made through electrolysis, where (green) electricity is used to extract hydrogen from water. The process currently requires large amounts of renewable electricity and clean water.

At the EU level the EU hydrogen strategy (EU Commission, 2021) introduced binding targets for hydrogen production and infrastructure. To meet these targets, the strategy contains many policies aimed at creating an EU market for clean hydrogen, among others through European hydrogen valleys and importing renewable hydrogen from abroad.

One of the countries that has decided to invest heavily in green hydrogen is The Netherlands. The country has a national hydrogen strategy ('Nationaal Waterstof Programma') and is making large investments to realise a green hydrogen economy. Because of the similarities and connections with natural gas, one of the first 'Hydrogen valleys' has been set up in the North of the Netherlands, the site of the former 'Groninger gasveld', or the largest natural gas basin in Europe. The region's gas infrastructure and skilled workers made it a good location for setting up the industrial environment for 'tomorrows oil' (Rodhouse et al., 2024).

Because of the large amounts of renewable energy required to produce green hydrogen, the EU has set its sights on places where renewable energy is easily realized and inexpensive. Because of their considerable solar potential, MENA nations have seen large interest from European countries that want to invest in hydrogen (Lindner, 2023). Morocco is one of the main beneficiaries of these investments. The country also has a national strategy for hydrogen and is making large investments to accommodate European hydrogen projects. Some of these projects are situated in Boujdour, Dakhla and El Aaiun, all three situated in the Western Sahara region recognized under international law as a non-self-governing territory, to which Morocco has territorial pretensions.

Whereas the environmental and social impacts of hydrogen technologies, projects and systems have had quite some attention in impact assessments so far, these impact assessments insufficiently address justice concerns. The concept of energy justice has gained increasing attention and can be used to understand the justice dimensions of energy transitions. Whereas the energy justice lens has mainly been used to understand the justice dimensions of fossil fuel technologies and systems, it is increasingly being applied to understand the justice dimensions of sustainable technologies and transitions too (Müller et al. 2022).

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METHODOLOGY

The case study utilizes the GreenPaths Methodological Matrix. Our case study is particularly interested in the cross-sectoral and holistic social impact process of injustice and inequalities. To do so we investigate the concepts of sustainable growth and decarbonisation at the project level– policy surrounding the EU green hydrogen is firmly embedded in narratives of (sustainable) growth and decarbonisation. Within these concepts it works within the sectoral concepts of renewables and fossil fuel phase out–the EU hydrogen economy is explicitly meant to be a technology to phase out fossil fuels and replace it with hydrogen as a renewable alternative. At the level of the case study the concepts hydrogen, new extractivism and green/ land grabbing have been utilized, these concepts are used generally within energy justice frameworks and can help give an understanding to the social impacts. Zooming into these topics as part of our assessment framework we were able to link these processes of social impact to the specific case of the hydrogen economy and the framework of energy justice.

The case studies employed mixed methods relying both on (pre-existing) quantitative indicators and desk study of legal and policy documents and secondary reporting. The assessment framework for the case studies was the result of a literature review into energy justice and social impact assessment of green hydrogen projects and systems (Jenkins et al., 2016; Zamagni et al. 2025; Tunn et al., 2024; Dillman & Heinonen, 2022; Patonia, 2025). The review produced a framework of topics and indicators (both qualitative and quantitative) for the three 'justice dimensions' at the core of the energy justice framework: distributive justice, recognition justice and procedural justice. Distributive justice asks how the costs and benefits (broadly perceived) of the transition are distributed, this includes the negative environmental, social and economic costs of projects and systems. Procedural justice asks whether the process of decision making is transparent, fair and participatory. Recognition justice requires there to be respect and recognition for (vulnerable) stakeholders that may not have a voice. In selecting the indicators to be used we used the GreenPaths Matrix data set and identified additional indicators and topics from the literature review. These topics and indicators were paired with specific (public) data sources from renowned institutions such as the World Bank, EUROSTAT, IRENA, IEA, World Economic Forum and from policy documents of the EU, the Dutch government and the Moroccan government among others.

FINDINGS

In the case of Groningen as a region internal to the EU, distributive and procedural injustices are most prominent. In terms of distribution justice, there is a large risk of private gains versus public losses, with much of the public investments centring around subsidizing the 'business case' of fossil majors. The region meanwhile has one of the highest rates of energy poverty in the Netherlands, with the Netherlands struggling with high (renewable) energy prices since the war in Ukraine started. Moreover, certain environmental risks surrounding the production of hydrogen have become more present due to an apparent pivot to 'blue hydrogen'. This type of hydrogen suffers from (possibly substantially) more carbon emissions than green hydrogen (Howarth & Jacobson, 2021). In terms of procedural justice, many of the hydrogen plans do not sufficiently involve public (local) stakeholders or only do so at a late stage (Squintani & Schouten, 2024). In terms of recognition of justice, past injustices surrounding the adverse consequences and unfairly distributed benefits of gas mining are inadequately taken on board in law and policy (Rodhouse et al. 2024).

In the case of Morocco, we found many concerns with the introduction of green hydrogen projects especially within the Western Sahara region. In terms of distribution, we encountered risks surrounding the distribution of financial risks, land grabbing, water stress and scarcity, energy poverty and adverse labour conditions (Müller et al., 2022; Tunn et al., 2024). These risks were further exacerbated due to poor indicators in terms of procedural justice with low scores and risks

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associated to little transparency, corruption, poor public participation and obstructed civil society. Moreover, in terms of recognition justice we found that in particular in the Western Sahara, indigenous and land rights had not been recognized, there seems to have been little to no recognition of the most vulnerable members of the community and plans were not properly including a breadth and diversity of voices.

There were a number of gaps in the data. Most importantly, in access to the specific agreements that are set up by private and government institutions to realise the green hydrogen economy. These contracts and agreements would allow for further scrutiny of the distributional consequences of hydrogen projects, in particular what parties carry the financial risks and what parties stand to profit. Another problematic dimension, which is in part the result of this being a nascent technology is that there is little data on the safety of specific hydrogen technologies. Hydrogen is a volatile compound and there are indications that expanding hydrogen infrastructure may carry significant risks. Again, the limited availability of project-specific documentation makes it difficult to assess whether these risks are sufficiently addressed in implementing large-scale hydrogen projects.

DISCUSSION

The findings show that there may be a blind spot in EU law and policy on the hydrogen transition regarding the justice consequences of such policies. Both in terms of the domestic effects of the policy proposals and in their international context, little attention is paid to the injustices that accompany the hydrogen transition. We have shown that these risks are substantial. In terms of distribution, established fossil corporations are gaining large public investments to realise the EU hydrogen economy in energy-poor regions. The benefits and costs of this transition are largely skewed in favor of business interests as opposed to local communities. This distribution is further exacerbated by the lack of public participation in both areas and the lack of recognition of local voices and indigenous rights.

Whereas the EU targets for renewable hydrogen uptake have pushed Member States towards realizing an increase in green hydrogen production and demand creation, EU policy has focused too much on the economic and CO2-related costs and benefits of this transition. The social (and in particular the justice) dimension of this transition has received little to no attention in EU policy. Significant additional concerns emerge once one integrates (energy) justice concerns along the lines of distributional justice, recognition justice and procedural justice in risk and impact assessments.

Future research should seek ways in which these justice dimensions can be integrated in EU and national policymaking, including ways in which the availability of relevant information can be secured. The literature on environmental justice in general and energy justice in particular can be a good starting point for such an anchoring.

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1.2.12 Case study 12: Mining Lithium in Serbia

Summary

Table 13. Summary of case study 12

Mining lithium in Serbia
EXECUTIVE SUMMARY OF THE CASE. This case study explores the Jadar lithium mining project in Serbia to examine how EU decarbonisation and energy transition policies are shaping national strategies, political narratives, and institutional responses in a semi-peripheral context. Addressing a gap in the literature on green transition impacts beyond the EU core, the research asks how such policies influence governance practices and provoke local resistance. Using discourse analysis and the Loss and Damage framework, the study investigates environmental, social, cultural, and economic dimensions at the project, sectoral, and national levels. Key findings reveal that decarbonisation goals, while framed as sustainable, may justify extractive practices and marginalize communities. The case contributes to broader literature on green extractivism, environmental justice, and post-socialist development, demonstrating how EU-aligned climate policies can reproduce inequality and sacrifice local interests for global green agendas.
SUMMARY OF THE MAIN FINDINGS. The Jadar case shows how green transition policies, driven by EU decarbonisation goals, can create serious environmental and social risks when implemented through extractive and top-down approaches. The project threatens ecosystems, pollutes water sources, and disrupts agricultural livelihoods, while also undermining public trust and democratic participation. Environmental degradation is closely linked with social impacts— land acquisition, community divisions, and loss of cultural heritage. Mass protests across Serbia signal strong public resistance and a lack of procedural justice in how the project has been handled. The main argument of the case is that the green transition, without proper safeguards, can reproduce and widen inequality and environmental injustice. This aligns with broader literature on green extractivism, which warns that climate action can perpetuate uneven power relations if not grounded in fairness and transparency.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Contamination of groundwater and soil with toxic substances such as arsenic, boron, and lithium during the exploration phase. • Destruction of biodiversity and habitat loss, with over 30% of local habitats falling into priority conservation categories. • Deforestation and alteration of hydrological systems due to planned removal of 2,600 m^3 of forest biomass and construction of industrial waste sites. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Contribution to global decarbonisation efforts by supplying lithium, a critical raw material for electric vehicle (EV) batteries and renewable energy storage. • Potential to develop cleaner energy systems indirectly through integration into the green technology value chain. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Displacement and loss of livelihoods, especially in agriculture-dependent rural communities. • Social fragmentation and conflict, including divisions within communities between those who sold land and those who resisted. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Potential job creation, with projections of 1,300 permanent and 3,500 temporary jobs. • Positioning Serbia as a strategic partner in EU industrial supply chains, potentially boosting foreign investment and international cooperation.

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BACKGROUND

This case study investigates the Jadar lithium project in Serbia to explore how EU decarbonisation and energy transition policies influence national policymaking, political discourse, and public resistance. The research question asks: *How are EU green transition policies shaping narratives and institutional responses around the Jadar project, and what tensions arise between decarbonisation and new extractivism in a semi-peripheral context?*

The study addresses a gap in the literature on how green transition strategies unfold outside the EU core, especially in countries with weak rule of law and limited democratic oversight. It builds on environmental justice and green extractivism literature, using the Loss and Damage framework to analyse environmental, social, and political impacts.

By situating Serbia within global raw material supply chains and the EU accession process, the case illustrates how sustainability agendas can reproduce inequalities. It contributes to wider debates on just transition, democratic participation, and the geopolitics of decarbonisation.

METHODOLOGY

This case study uses a qualitative methodology combining discourse analysis with secondary data review to explore how EU decarbonisation and energy transition policies influence political narratives around the Jadar lithium project in Serbia. Framed through the Loss and Damage concept, the analysis captures both material and non-material harms, such as environmental degradation, biodiversity loss, forced displacement, cultural erosion, and weakening of democratic processes. Social impacts are examined at three levels: the project level focuses on local consequences of decarbonisation; the sectoral level considers how Serbia's lithium is positioned within renewable energy supply chains; and the case level situates the project within broader patterns of new extractivism tied to Serbia's EU integration. Discourse analysis was applied to political speeches, EU communications, civil society narratives, and media statements. The study defines costs as ecological damage, social conflict, and economic dependency, while benefits are framed by project proponents as employment, increased tax revenue, and alignment with EU climate and industrial strategies.

FINDINGS

The Jadar lithium mining project in western Serbia, led by the multinational company Rio Tinto, illustrates the deeply contested and complex nature of the green transition. Positioned as a critical site for lithium extraction, key to EU's decarbonisation and battery production goals (European Parliament & Council of the European Union, 2023), the project reveals the often-overlooked environmental and social costs of 'green growth', especially in semi-peripheral regions such as Serbia.

The ecological risks of the Jadar project are severe and largely irreversible. Toxic substances including arsenic, boron, and lithium were found in groundwater and soil during the exploration phase, with contamination observed up to 20 kilometers downstream (Đorđević et al., 2024). The region is highly dependable on agriculture, where 34.75% of the land in the territory of the city of Loznica is agricultural (Republički zavod za statistiku, 2014), making pollution particularly alarming. The Environmental Impact Assessment (EIA), released only in draft form in 2024 after intense public pressure, proposed the removal of 2,600 m^3 of forest biomass and the construction of a waste site in a hydrologically sensitive area (Ministarstvo građevinarstva, saobraćaja i infrastrukture, 2020). Over 30% of habitat types in the affected area fall into high-priority conservation categories, with experts warning of permanent biodiversity loss (Stevanović, Šolaja, & Radmilović, 2024). Moreover, recent legal amendments raised allowable arsenic and boron

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levels in soil (Đorđević et al., 2024), further undermining public confidence. Instead of preventing ecological damage, these changes appear to anticipate and legalize it.

The project has triggered widespread opposition and social polarisation. Allegations of intimidation tactics, including demolition of purchased homes to pressure remaining landowners, have further eroded public trust (Latković, 2023). The Jadar project has also become a symbol of broader political disillusionment. Despite over 300,000 citizens signing an online petition, and over 30,000 verified signatures for the initiative against the ban on the exploitation of lithium and boron on the territory of Serbia, and tens of thousands joining mass protests, the Serbian Constitutional Court overturned the government's 2022 decision to halt the project. This was followed by the signing of a non-binding EU–Serbia Memorandum of Understanding on sustainable raw materials (European Commission & Government of the Republic of Serbia, 2023), intensifying public anger and reinforcing the perception of external pressure overriding local democratic processes. Beyond physical displacement and livelihood loss, the project threatens intangible values, centuries-old agrarian traditions and cultural heritage, such as the nearby Paulje necropolis. These non-material losses contribute to a growing sense of injustice and alienation.

Rio Tinto and the Serbian government argue that the project will drive economic development, create 1,300 permanent and 3,500 temporary jobs, and generate €25 million annually in local taxes (Ergo Strategy Group, 2023). They frame it as Serbia's 'oil moment', a transformational opportunity to enter the European electric vehicle (EV) supply chain. However, independent experts contest these claims. The forecasted €696 million in total national income over 40 years fails to consider Serbia's obligation to fund key infrastructure and absorb environmental risks (Šoškić, Popović, Mijatović, & Drakulić, 2024). The state would hold no ownership stake and would remain exposed to potential liabilities from environmental damage. Consequently, projected benefits appear overstated, while risks are largely externalized to the host country and its citizens.

The central message of the Jadar case is that Serbia's green transition, which is marketed as a leap toward sustainable development, is, in reality, producing new forms of environmental injustice, economic dependency, and social fragmentation. The study confirms the initial hypothesis that green transition policies, particularly those driven by the Global North, can replicate colonial extractivist dynamics under a green façade. Additionally, the ambivalence and strategic shifts in both EU and Serbian government messaging revealed the fragile legitimacy of green transition policies when not grounded in procedural justice.

Discussion

The Jadar case study contributes to the broader literature on the green transition by applying the Loss and Damage (L&D) framework to assess the socio-ecological impacts of lithium extraction in Serbia. While L&D is typically used to evaluate climate change impacts in the Global South, this case shows its relevance for semi-peripheral contexts where decarbonisation policies result in significant local harm.

The case challenges mainstream narratives that present the green transition as universally just. Instead, it aligns with literature on environmental justice and green extractivism, demonstrating how EU-driven sustainability agendas can reproduce unequal power dynamics and impose costs on vulnerable regions. In Jadar, policies intended to support decarbonisation have triggered groundwater pollution, biodiversity loss, displacement, and a breakdown of community trust.

Using discourse analysis and secondary data, the study documents both material (e.g., loss of farmland, contamination, infrastructure costs) and non-material losses (e.g., cultural heritage, intergenerational trauma, democratic erosion). These harms are often ignored in cost-benefit assessments but form the core of local resistance.

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This case illustrates that just outcomes in the green transition are not automatic. Justice must be deliberately built through transparency, public participation, and equitable decision-making, especially when transition policies intersect with extractive development in politically weaker settings.

The green transition policies at the heart of the Jadar case study highlight both the promises and perils of decarbonisation efforts. These policies, while framed as sustainable, often fail to account for local ecological vulnerabilities, democratic participation, and social equity. In the case of the Jadar project, the push for critical raw materials has led to environmental degradation, weak institutional safeguards, and community conflict. They externalize environmental and social costs to countries with limited political leverage.

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1.2.13 Case study 13: Green transformation of tourism industry – The case of Croatian urban tourist destinations

Summary

Table 144. Summary of case study 13

Green transformation of the tourism industry – The case of Croatian urban tourist destinations
EXECUTIVE SUMMARY OF THE CASE. This study explores the state of art and potential for green transformation in Croatian tourism industry focusing on five key urban tourist hubs. Research addressed gap between growth-oriented tourism industry generating nearly 20% of the national GDP and unsustainable extractive practices that irreversibly change urban landscapes with their high environmental footprint, pressure on poor public infrastructure and detrimental impact on spatial/urban planning and housing. Some of the key research questions were: what is the transformative potential for ecological transition of tourism industry in Croatia, with focus on main urban touristic destinations? What are the key adverse environmental and social impacts of touristic activity in selected cities? Where are the key systemic obstacles for ecological transition in tourism sector? What are the cities responses and municipal policies to prevent or address adverse environmental and social impacts of (over) tourism? Findings have demonstrated that green transformation in the tourism industry is still underdeveloped at national/local level and that relatively weak regulation at the EU level does not play a decisive role in the green transformation of the whole sector. Furthermore, it has revealed a number of gaps in coordination between key local and national stakeholders in the tourism industry, cities and ministries accountable for green transition.
SUMMARY OF THE MAIN FINDINGS Taking into account important role of tourism contribution to the GDP and to national economy, our research shows that tourism industry landscape, particularly in selected tourist urban destinations, is characterized by prevailing growth orientation that relies on numerous extractive practices while neglecting environmental and social impacts of tourism activity. This is manifested by rapid increase of real estate prices, gentrification, decrease of labour rights and excessive pressure on public infrastructure leading to lower quality of life in tourist urban destinations. Furthermore, findings demonstrate limited capacity for trade-offs between economic benefits from tourism industry on one side and mainly detrimental environmental/social impacts of industry. Absence of enforcement mechanisms at the EU level, coupled with the voluntary nature of stakeholder's commitments at national/local level, undermine the green transformation of the tourist industry thus placing short-term orientation on immediate monetary gains without significant payback to local community and re-investments in public infrastructure. Our findings show that in such constellation key winners are ''business-as-usual'' players which generate direct profit through massive tourism orientation, mainly multinational companies that offer services accommodation (such as *AirBnb, Booking*) and air transport. These two activities contribute significantly to unsustainable practices in spatial planning and gentrification, but also to a high environmental footprint. Another party that has a key interest in lifting environmental constraints for tourist operators is the State itself, as it highly relies on income from tourism. Key losers are citizens and local communities who might have limited short-term gains, but in the long term they lose the opportunity for affordable housing in their urban environments and experience further decrease of quality of life and public services. Furthermore, irreversible changes in eco-systems, particularly due to sea pollution, biodiversity loss, and irregular waste management make the life of local communities less sustainable. In overall, findings also indicate that in cities which are key urban destinations there is, contrary to state, growing awareness of local policy makers based on the need to regulate tourism activity and develop mechanisms and policies which can decrease their climate vulnerability and neutralize local social impacts.

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ENVIRONMENTAL COSTS OF THE GREEN TRANSITION

- High carbon/environmental footprint of the tourism activity.
- Intense resource consumption.
- Increased pollution.
- Climate vulnerability.

ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION

- Limited but slowly increasing number of sustainable practices in tourism sector.
- Promotion of public transport in tourism industry.
- Incremental decarbonisation.

SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION

- Increased prices of housing and real estate, and generally living costs.
- Lower quality of life in local communities/cities (e.g. access to public services).
- Tourism induced "wild" urbanisation.

SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION

- Significant contribution of tourism to GDP rate.
- Increase of employment rate and job creation due to tourism activity.

BACKGROUND

This case study focused on the environmental and social footprint of tourism activity in five selected Croatian cities thus exploring transformative potential toward green transition and needed policy shifts to counter overtourism. Research has identified evidence of policy gaps that measure and evaluate tourism resilience exclusively in economic and service-related terms, while neglecting severe environmental and social detrimental impacts of overtourism. Additionally, EU, national and local levels of policy making and their potential agency were closely examined to identify blind spots and coordination gaps in the implementation of various green policies.

With almost 20% of the national GDP originates from tourism (14.6 billion euros and 20 million tourists) Croatia profiles itself as key European tourist destination. Yet, absence of measures to adapt tourism to climate change and mitigate its carbon footprint, environmental degradation and adverse social impacts (mainly on housing, labor rights and public services) have appeared to be instrumental in undermining deeper and systemic ecological transition in this industry. Case study focused on seven policy/sectoral areas in selected cities to provide a more detailed and in-depth outlook on the stage of ecological transition in the tourism industry. Furthermore, it will place discussion into contradiction between development of eco-tourism as a specific sub-industry vs. green transformation of the overall tourism sector.

The EU tourism policy, driven by the *European Agenda for Tourism 2030* and the *Transition Pathway for Tourism* aim to develop resilient and sustainable tourism model for Europe by focusing on green and digital transitions, resilience and inclusion, skills development, and an enabling policy framework. Yet, our as our research shows, in case of Croatia, it appears that this policy framework is still too weak and without enforcing mechanisms to support substantive policy shifts toward integration green transition principles within tourism industry. Hence, our research has identified several opportunities where the agency of local/municipal governments can be instrumental in pushing toward green transition objectives.

METHODOLOGY

This study uses the Green Paths Methodological Matrix and employs mixed-method approach using various tools for data collection: literature overview, secondary data review, discourse analysis and policy review with primary data drawn from field work and interviews with local stakeholders. Our research focus is relying on the Loss and Damage concept where our analysis

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aims to demonstrate harmful impact of current extractive model of tourism taking place in key urban destinations in Croatia. Review of literature has been conducted to provide necessary information about the key strategic objectives of tourism at policy level–EU, national and local level. Reviewing secondary data from Ministry of tourism, Croatian Tourist Board, Croatian Bureau for Statistics and EUROSTAT and limited body of research on the topic we explored in-depth environmental and social impact of tourism. Discourse analysis was applied to speeches from key stakeholders, reports and media statements.

The study defines costs as environmental degradation, growth dependency and increase of social inequalities while benefits promoted by tourism industry stakeholders are economic growth, job creation and international reputation.

Environmental impacts are examined in 5 policy areas (1) transport, 2) resource efficiency 3) climate change, 4) energy and waste, 5) spatial and urban planning where objective was to gain basic insights in footprint of current model of tourism. Social impacts were explored in two additional areas, namely 1) housing and 2) public infrastructure and public services. Stating the development of tourism in these areas and relating it to the concept of "growth dependency" research has created a mental map situating tourism as significant disruptive element when addressing green transition objectives. With aim to explore potential of tourism model to be transformed into non-extractive economic activity, we further engaged into stakeholder analysis identifying various roles and interests in green transformation of tourism. This analysis was supported by field work and interviews with selected number of protagonists, experts, industry protagonists, municipal bodies and local community representatives.

FINDINGS

Our research findings have shown striking disparity between official narratives on tourism and its role in the green transition promoted by key stakeholders and prevailing extractive practices which create detrimental environmental and social impacts. They highlight the continuing adherence of economic growth in tourism development and lack of capacity to decouple tourism model from extractive practices and growth dependency. Even in the official documents at the EU and national level these destructive linkages are not sufficiently recognised nor addressed in existing policies. We can group key findings in few categories:

Excessive pressure of tourism activity on public infrastructure and natural resources: Evidence from field research shows that intense resource use significantly contributes to environmental footprint of tourism activity and to increase of social inequalities related to access to public services and infrastructure in selected tourist hubs. Impacts vary from use of drinking water, peaks in energy consumption, inadequate urban planning, carbon intensive transport to lack of affordable housing and poor material infrastructure. Yet, local governments and stakeholders increasingly recognize that this development pathway is unsustainable and the need to be regulated at local level. Still, policy responses are scarce and underdeveloped.

Resistance of tourism industry toward systemic transformation: Maintaining ''business-as-usual'' model that gives priority to short-term profit and extraction of monetary value in relation to nature protection or responsible use of natural resources. Tourism industry overall perceives green transition as a direction of development only for small, targeted and specific ‘enclave’ for specific target group rather than complies with imperatives for systemic transformation of whole supply chain.

Limited trade-off capacity: Cities are perceived as the machines of growth and in this framework, tourism is employed to achieve this goal thus limiting capacity to trade economic growth and generated income with social well-being and environmental justice. Various blind spots and coordination gaps at institutional and governmental level are used to maintain inefficient system characterised with lack of coordination and regulation. Yet, cities and their local communities

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show increasing level of recognition of detrimental impacts of tourism activity and need to have stronger agency in creating conditions for green transition.

Weak enforcement mechanisms: Voluntary commitment of key stakeholders to continue with green transition within the tourism sector and weak/slow regulation of tourism activities don't provide proper framework to implement green measures and policies. Data gaps are generated primarily through inadequate framework of evaluation of results in the sector which are framed to present results through lenses of profit/income accumulation and contribution to GDP while neglecting a diverse spectrum of detrimental impacts on ecological and social well-being.

DISCUSSION

Findings provide an in-depth overview of the tourism impact on urban infrastructure, public services, quality of life and resource use suggesting a need for stronger regulatory agency of local decision makers. Since systemic character of green transformation in the tourist industry is still rare or absent, this research is valuable to demonstrate the huge disparity and divergencies between the notion of sustainable but still extractive tourism (as one operating within a 'business-as-usual' framework) and potential degrowth of the tourist industry characterised by lower environmental footprint and less damage for local communities. While the tourist industry seems to be for the time being the national 'winning card' contributing to job creation and economic growth, the status of local communities as key losers of the process remains relatively invisible and it is necessary to obtain capacity to manage trade-offs which is at present underdeveloped. Without stronger enforcing mechanisms and more coherent coordination, green transition within the tourist sector is expected to maintain limited and marginal. Further calls for competitiveness voiced by the European Commission mean EU policy is not expected to significantly contribute to local governments to limit detrimental impact of the industry.

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1.2.14 Case study 14: Energy poverty in Central and South-Eastern Europe

Summary

Table 155. Summary of case study 14

Energy poverty in Central and South-Eastern Europe
EXECUTIVE SUMMARY OF THE CASE. This case study examines energy poverty alleviation within the context of Central and South-Eastern Europe (CSEE), with focus on Croatia and comparative references to Slovenia and Serbia. The research addresses a key gap in data availability and policy implementation, particularly regarding housing tenure, undocumented dwellings and the accessibility of renovation schemes for vulnerable groups. The objective is to assess how EU-level frameworks are translated into national measures and whether these measures enable a socially just transition. The guiding research question is: How do energy renovation policies mitigate or reproduce social inequalities in the housing sector? Headline findings reveal persistent structural blind spots: the very groups most at risk (low-income households, elderly residents, single parents, tenants, rural communities and those reliant on solid fuels) are often excluded from funding schemes. Civil society organisations emerge as essential intermediaries yet remain underfunded and precariously positioned. The main contribution demonstrates that energy poverty is not merely a technical or welfare issue but is co-produced by - property relations, housing regimes, territorial distribution and governance structures, which advances the research on eco-social state transitions and policy design for just energy transitions.
SUMMARY OF THE MAIN FINDINGS. The CSEE's energy renovation policies, while formally aligned with EU objectives, often fail to address the structural roots of energy poverty. The main winners of the current framework are property owners with financial and legal capacity to access subsidies, as well as construction and energy service providers who benefit from EU-backed schemes. Conversely, losers are vulnerable households (low-income, elderly, single-parent families, tenants, social welfare recipients, and residents of unregistered dwellings, etc.) who face barriers in eligibility, information and affordability. Findings underscore the central role of civil society organisations (CSOs) as intermediaries between policy frameworks and end-users, as they push and have high influence on policy making regarding energy poverty. However, their contribution remains limited and unstable due to the funding and responsiveness of decision-makers. This way the energy transition is mostly carried by the affluent neighbourhoods and households while the vulnerable groups and settlements remain largely left behind.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Vulnerable groups remain reliant on fossil fuels and cheaper energy sources due to the lack of targeted policies. • Twofold territorial bias: favoring urban over rural areas, and affluent neighborhoods over disadvantaged neighborhoods. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Reduction of household energy consumption and greenhouse gas emissions. • Improved building performance that supports long-term climate resilience. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Exclusion of vulnerable groups from funding schemes (because of legal, financial or procedural barriers). • Rising rents and potential displacement following renovations ('renoviction'). **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Potential long-term reduction in energy spendings and improved housing quality. • Strengthening of civil society engagement and awareness in energy justice debates.

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BACKGROUND

In this research, we examined how energy renovation and energy poverty alleviation measures address the social dimension of housing, that is, how they reproduce social and spatial inequalities related to structure of housing stock and the socio-economic structure of inhabitants, both conditioning the process of energy renewal and determining the ability to access the energy renovation processes. Our case study thus looks at the socio-economic impact of the EU and national policies for energy renewal of residential buildings in Croatia, with the parallel contextualisation in wider Central and Southeastern Europe and comparative examples in Slovenia and Serbia.

The case study focuses on how the EU regulatory framework in the energy sector is reflected in national institutional and regulatory frameworks. This comprises of the EU Renovation Wave for Europe Strategy, the EU Directive on the Energy Performance of Buildings (EPBD), and other relevant directives from which national programs and financing schemes are developed to combat energy poverty by channeling EU funds, primarily through objectives set in the National Energy and Climate Plans (NECPs).

By analysing national strategies and plans (NECP, RRF) and implementation of national and municipal measures in Croatia for combating energy poverty, a significant gap was detected regarding the data on which these measures are based. The most vulnerable groups in Croatia's energy transition include low-income and single-parent households, elderly residents, social-welfare recipients, tenants in the private rental sector and households reliant on polluting solid fuels and those living in unlegalized dwellings. These research results fully align with the available data related to vulnerable groups in energy transition elsewhere in the CSEE region. A gap regarding the data is reflected in the national financing schemes where procedures on accessing funds for alleviating energy poverty oversee the capacities and possibilities of the mentioned vulnerable groups. Within this case study we analysed how these shortcomings possibly contribute to reproducing inequalities, 'renoviction' and green gentrification causing displacement and segregation.

METHODOLOGY

Following the conceptual and methodological matrix of the project, the case study applies the concept of eco-social state and public services. The case study examines sectoral concepts of state-aid, green finance and renewables, which are explored through the lens of housing and its role in enabling a socially just transition.

The study employs a mixed-methods approach, combining desk research and policy analysis on energy poverty in Croatia, Slovenia and Serbia, interviews with researchers and members of civil society organisations working within the field of energy poverty (4 from Croatia, 2 from Serbia and 2 from Slovenia) and a focus group with decision-makers from Croatia including two members of ministries dealing with energy poverty, one member from Environmental Protection and Energy Efficiency Fund responsible for allocation of funds and a member of City of Zagreb administration as the only municipality with a programme for combatting energy poverty.

The analysis was conducted by mapping the procedures of implementing the European directives and policies on the national level – primarily through analysis on how energy poverty was included in the National Energy and Climate Plans (NECPs) of all three countries and analyzing how many municipalities have employed their own local programmes for addressing energy poverty. Additionally, we mapped the financial allocation of funds distributed through ministries and national entities with a specific focus on criteria for accessing these funds. Within the interviews with researchers and members of civil society we have mapped the process of creating first laws that provided definition of energy poverty within national legal frameworks where civil society played a crucial role. Both within interviews and focus group with decision-makers we

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have detected the gaps in the systemic lack of data on housing tenures and accessibility to information and legal procedures regarding the most vulnerable groups which are crucial for effectiveness of the measures for combating energy poverty. Based on the combination of the data collected through research, statistical data, policy analysis and interviews/focus groups we were able to assess the shortcomings of existing policies.

FINDINGS

Our analysis shows there is a significant gap between national strategies and policies on reducing energy poverty and the effectiveness of the measures put in place. Following the main goals of the green transition, reducing energy poverty was included in the National Energy Climate Plan (NECP), Recovery and Resilience Plan and national legislation recognized the energy poverty within its energy policy in Croatia in the last 5 years. However, the implementation of these policies remains limited in scope and does not address the most vulnerable groups - low-income households, elderly residents, single parents, tenants, rural communities and those reliant on solid fuels. These groups therefore remain reliant on fossil fuels and cheaper energy sources due to the impossibility of funding renovations, while more affluent households benefit the funding schemes provided by the state and municipalities. This creates a twofold territorial bias which favours urban over rural areas, and furthermore affluent neighbourhoods over disadvantaged ones.

Although absent in our initial hypothesis, the research shows that civil society plays a crucial role as an intermediary between policy frameworks and end-users, as their advocacy and research highly influenced policy making regarding energy poverty in studied countries, and at the same time they maintain the contact with the most vulnerable groups, mapping their needs. Whilst their progress is evident within project-based collaborations (most often through EU-funded initiatives) the volatility of financial support and stable backing by the state remain striking, particularly given the essential functions CSOs perform. The findings suggest that CSO actors require more stable and substantial funding, which would serve not only the interests of vulnerable groups but also the broader objectives of the public authorities.

Whereas we find consistency in producing national strategies and plans in analysed countries, we find significant gaps in their implementation. One of the key issues is the lack of data regarding housing tenures and households living in unregistered homes that would connect socio-economic status with the territorial and technical data. This way the criteria for allocation of funds are excluding the most vulnerable groups thus reproducing inequalities. Main funding schemes remain dependent on the state, where ministries operate in a silos structure with scarce coordination between social and territorial sectors. This affects the way funding is allocated, often neglecting local and territorial specificities and needs. Finally, the effect of public subsidies in the area of energy efficiency and alleviation of energy poverty is not systematically monitored in an adequate manner which needs to change in order to effectively contribute to the fair and social energy transition.

DISCUSSION

The analysis of Croatia's energy-poverty measures exposes the contradictions of a transition framed as socially just, yet operationalized through mechanisms that are, in practice, often exclusionary. The central finding is not the absence of social considerations-on the contrary, policy discourse abounds with references to vulnerable groups and distributive fairness-but rather the persistence of structural blind spots encoded in eligibility criteria, legalistic requirements and the governance of multi-apartment renovation. The very households most vulnerable to energy poverty often remain those least likely to access the benefits of the transition. This is a stark reminder that energy poverty is co-produced by the intersection of housing policies, property relations and uneven access to state support.

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Empirically, this case study complicates the usual owner–tenant divide. High ownership rates do not necessarily guarantee access to energy-renovation benefits. Many owners lack the resources or documentation to apply. Tenants are even more disadvantaged, excluded from subsidies while facing eventual rent hikes and displacement in upgraded properties. Conceptually, this case shows the limits of treating energy poverty as an efficiency or welfare problem and available data remain fragmented and insufficiently disaggregated for tenure-sensitive policy design, limiting the precision with which interventions can be tailored to those most at risk.

Energy poverty cannot be addressed without a clear definition and systematic monitoring. Yet current frameworks remain complex, fragmented and poorly targeted, with limited data on tenure and household types. Without tackling these structural and informational gaps, policies risk staying incremental and selective. The EU-level instruments such as the Social Climate Fund provide an opportunity to improve the existing frameworks, but only if linked to palpable and measurable social outcomes at the national level, which are currently lacking. All things considered, the unresolved tension between ecological modernisation and social protection makes the idea of a 'just transition' deeply contested in Croatia.

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1.2.15 Case study 15: Public food procurement as a lever to foster the just and green transition – Dordogne case study

Summary

Table 16. Summary of case study 15

Public food procurement as a lever to foster the just and green transition – Dordogne case study
EXECUTIVE SUMMARY OF THE CASE. Public procurement has increasingly emerged as a strategic policy lever within the European Commission's Green Deal and Clean Industrial Deal to drive sustainability, competitiveness and social equity. Likewise, the Farm to Fork (F2F) strategy recognizes public food procurement as a tool for sustainable and fair food systems. Yet, a research gap remains in understanding how these evolving frameworks can reconcile financial and regulatory pressures with the need for robust public investment and inclusive, community-driven approaches. This study addresses that gap by examining how public food procurement can integrate green and just transition principles while strengthening local economies. It focuses on the Dordogne school canteen model in France, which since 2018 has delivered 100% organic, local and homemade meals. The guiding research question asks: How can sustainable public food procurement simultaneously advance environmental goals, economic competitiveness and social equity? Our headline finding is that inclusive, sustainability-driven food procurement fosters healthier diets, reduces carbon footprints and boosts local farmer income without increasing costs. This study contributes a scalable benchmark for aligning EU procurement policy with systemic food system transformation.
SUMMARY OF THE MAIN FINDINGS. The Dordogne school meal model shows that public food procurement can generate significant environmental and social benefits without increasing overall costs. By shifting to 100% organic and predominantly local sourcing, Dordogne has exceeded national legal targets and aligned with EU F2F objectives, reducing food miles, supporting organic farming and cutting food waste. Socially, the model sustains local farm incomes, improves job quality and professionalisation in school catering, and delivers healthier meals and food education for children while maintaining affordability for families. Winners include local organic producers, school catering and teaching staff, students and their families; losers are large, conventional agri-business and private caterers excluded from public contracts. The case confirms wider evidence that sustainable public procurement can drive just transitions, showing how integrated local governance can overcome cost barriers and generate systemic change. It also shows the strength of direct public management of school catering, which better enables high organic standards and integration of local food into regional value chains.
ENVIRONMENTAL COSTS OF THE GREEN TRANSITION • Higher energy/resource use for small scale and frequent logistics. • Potential vulnerability to local and climate shocks. • Higher resource use due to organic farming practices and seasonal/local sourcing. **ENVIRONMENTAL BENEFITS OF THE GREEN TRANSITION** • Reduced use of synthetic pesticides and fertilizers due to organic food sourcing. • Reduced long-distance transport-related emissions through local sourcing. • Reduction in food and packaging waste. **SOCIAL/SOCIO-ECONOMIC COSTS OF THE GREEN TRANSITION** • Resistance of local suppliers doing conventional farming. • Higher initial investment costs for public authorities. • Administrative burden to manage multiple smaller contracts/lots and suppliers. **SOCIAL/SOCIO-ECONOMIC BENEFITS OF THE GREEN TRANSITION** • Increase income and stability for local farmers.

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- Greater professionalisation and job quality for school catering staff.
- Access to healthier meals for students and food education opportunities, with affordable costs for families.

BACKGROUND

Public food procurement is increasingly recognized as a strategic lever for sustainable development, capable of driving environmental stewardship, local economic resilience, and social equity. School canteens, as major institutional buyers, are uniquely positioned to influence local food systems, supporting small-scale farmers and promoting healthier diets for children. Yet, conventional procurement practices often favour low-cost, industrialized suppliers, limiting participation of local producers and marginalized communities.

The Department of Dordogne in France exemplifies a transformative approach, implementing a 100% organic, predominantly local, and homemade school meal program. This initiative aligns with the Farm to Fork Strategy and national legislation (EGAlim Law), exceeding sustainability targets and demonstrating the feasibility of integrated local governance.

The case study addresses the research question: How can public food procurement simultaneously advance environmental objectives, economic competitiveness, and social equity? It further explores the role of policy innovation in enabling a green and just transition within public institutions.

METHODOLOGY

This case study employs a mixed-methods design, combining quantitative indicators with qualitative stakeholder insights to capture both measurable outcomes and contextualized experiences. Quantitative assessment relies on a KPI matrix across four dimensions:

- Economic: Local supplier participation rate, producer income, employment in agriculture and food production, procurement cost analysis.
- Environmental: Carbon footprint, organic and sustainable food share, food waste reduction, increase of organic farming on total agricultural land.
- Social: Health outcomes for students (ages 6–18), inclusivity of small-scale and marginalized suppliers, and public satisfaction.
- Policy & Implementation: Compliance with sustainability standards, training and capacity building, policy coherence, and procurement innovation.

Data were collected through multiple complementary methods: surveys and questionnaires targeting school staff, local farmers, and suppliers to capture perceptions of benefits, challenges, and economic impacts; 20 in-depth interviews and a video documentary conducted within the SchoolFood4Change (SF4C) project, providing detailed insights from policymakers, school directors, nutritionists, chefs, and producers; and document analysis of procurement contracts, school menus, and policy reports to assess compliance, strategy, and sustainability practices.

The analytical framework integrates environmental science (carbon footprint, biodiversity), economics (cost–benefit, local development), public health (nutrition, food security), and social science (equity, participatory governance). Data were evaluated through a cost–benefit and impact analysis framework linking procurement practices to measurable environmental, social, and economic outcomes, while also highlighting governance processes, cross-sector coordination, community engagement, and lessons for scalability and replication.

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FINDINGS

The Dordogne school food transition demonstrates that public procurement, when managed as a territorial project, can generate measurable environmental, social, and economic benefits without disproportionately raising costs. The analysis of indicators, complemented by more than twenty interviews with policymakers, procurement officers, farmers, chefs, and educators, reveals not only positive outcomes but also critical enablers and remaining gaps.

Environmental outcomes are among the most visible achievements. By shifting towards 100% organic and predominantly local sourcing, Dordogne has exceeded French legal targets and aligned with EU Farm to Fork objectives. Carbon emissions have been reduced by shortening supply chains, while organic farming contributes to improved soil health and biodiversity. Food waste has fallen to 40–70g per student, compared with 135g nationally and up to 200g in some EU contexts, partly thanks to education initiatives and careful portioning. At the same time, the transition entails environmental costs: reliance on seasonal and local supply requires greater investment in logistics, cold storage, and menu adaptation. This illustrates that 'local' does not automatically mean lower resource use.

Socio-economic impacts are equally significant. Farmers now access a reliable and fairly remunerated market, with the share of school purchases from local suppliers rising from 20% to 80% in under a decade. This has been translated into millions of euros reinvested in the local economy. Catering staff benefit from retraining, better equipment, and the professional pride of cooking from scratch rather than reheating industrial meals. For students, the quality of diets has improved, supported by nutrition monitoring and education programs such as tasting brigades and school gardens. Importantly, affordability has been preserved: parental contributions remain lower than national averages, thanks to subsidies and efficiency gains in kitchen management. Yet challenges remain, as procurement complexity creates administrative burdens, and large agri-business suppliers and private caterers are increasingly excluded from local tenders, raising questions about market fairness and scalability.

Governance and implementation emerged as a decisive factor in the interviews. Beyond the expected quantitative indicators (organic share, waste reduction, costs), qualitative evidence highlighted how strong political leadership, cross-departmental collaboration, and tools such as Agrilocal, À Table, and Manger Bio Périgord allowed the system to function. Actors stressed that transforming school food was not a single-sector reform but a territorial strategy integrating education, agriculture, health, social policy, and environment. This holistic approach proved essential to overcoming legal and logistical obstacles that might have otherwise blocked smaller producers.

In terms of the research hypotheses, the findings broadly confirm that sustainable public procurement can simultaneously advance environmental sustainability, social equity, and local development without inflating costs. Unexpectedly, the interviews revealed that governance structures and direct public management play a larger role than anticipated in shaping outcomes. This suggests that replicability may depend less on replicating technical tools and more on building cross-sector capacity and maintaining public control of catering services.

Finally, data gaps remain. Carbon footprint assessments are partial and often rely on proxies; long-term health outcomes for students are not systematically monitored; and there are few standardized indicators for job quality in school catering. These gaps limit comparability with national and EU benchmarks and underscore the need for more robust monitoring systems if the Dordogne model is to serve as a true reference for scaling across Europe.

Overall, Dordogne shows that when procurement is understood as a lever for systemic change rather than a cost-minimisation exercise, it can catalyse a just and green transition in food systems.

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DISCUSSION

The Dordogne case broadly confirms findings in the literature that sustainable public food procurement can deliver environmental and social co-benefits at limited cost. Yet it also extends this debate by demonstrating that technical instruments alone (e.g., procurement criteria, certification) are insufficient. The decisive factor in Dordogne was strong political commitment, cross-sectoral governance, and direct public management of catering services—elements often underplayed in existing studies. This suggests that institutional design and territorial coordination are as important as the sustainability criteria themselves.

The winners and losers of the transition reveal more nuance than a simple 'farmers versus agribusiness' dichotomy. While local organic producers, catering staff, students, and families benefit, small farmers must also navigate new administrative burdens, and kitchen staff face increased manual labour despite higher job satisfaction. Conversely, large-scale suppliers and catering firms lose contracts, though some could potentially adapt by shifting to sustainability services. These tensions reflect broader debates on just transitions, where benefits and burdens are unevenly distributed.

From a policy perspective, Dordogne illustrates the strengths of aligning local initiatives with national and EU frameworks such as the EGalim and Climate & Resilience Laws, and the EU Farm to Fork strategy. These policies provided legal legitimacy for sustainability criteria, yet challenges remain: procurement complexity continues to exclude some smaller producers, metrics for environmental impact are incomplete, and the model relies heavily on departmental investment in infrastructure and training. These weaknesses question the scalability of Dordogne's approach in less resource-endowed regions.

Conceptually, the study confirms the value of a multidimensional framework integrating economics, environmental science, public health, and social equity. This approach helped uncover synergies (cost neutrality, waste reduction, farmer stability) as well as trade-offs (labour intensity, administrative burdens). It also highlights blind spots in existing monitoring systems, pointing to the need for indicators on governance capacity, job quality, and long-term health effects.

In sum, the Dordogne case strengthens the argument that school canteens can act as laboratories of just transition. At the same time, it underscores that success depends less on setting sustainability targets than on building governance structures and institutional capacities capable of delivering them.

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2. Discussion and Conclusions

The case studies presented in this report and their preliminary findings offer insight into the interconnected, intersectional and interdisciplinary social, economic and environmental impacts – both potential and actual – of green transition policies. In this section we consolidate responses to GreenPaths' research questions: How are green transition policies impacting environmental sustainability and social wellbeing? How are these impacts measured or assessed so far? *Who are the key actors and how are they responding (e.g. institutional/policy; local/community; external actors) in Europe and the Global South? What are the anticipated social and economic costs and benefits?* We focus in particular on this last question, the main focus of this deliverable, with added reflection on which actors emerge as the 'winners' and 'losers' in this ongoing transformation. First, based on keyword analysis and careful reading of all the cases, we highlight the main socio-environmental-economic costs and benefits of green transition policies. In so doing, we follow the key concepts underpinning our cases as well as the processes of social impact they identify (see GreenPaths analytical framework D3.4 and conceptual and methodological matrix D3.1). Second, based on a thematic analysis, we present several recurring metanarratives across the cases related to governance, justice and policy measurement. Finally, we conclude by highlighting examples of promising policy initiatives and synthesising the case findings into a set of general policy recommendations.

2.1. Summary of key findings

Keyword analysis of the costs and benefits (Table 1) of the green transition highlights some commonality between case studies. Figure 2 shows consolidated word clouds of the main keywords (x4+ uses) of environmental and social/socioeconomic costs and benefits from case studies. In broad brushstrokes, these keywords communicate complex, multifaceted and often contradictory understandings of the winners and losers of green transition policy.

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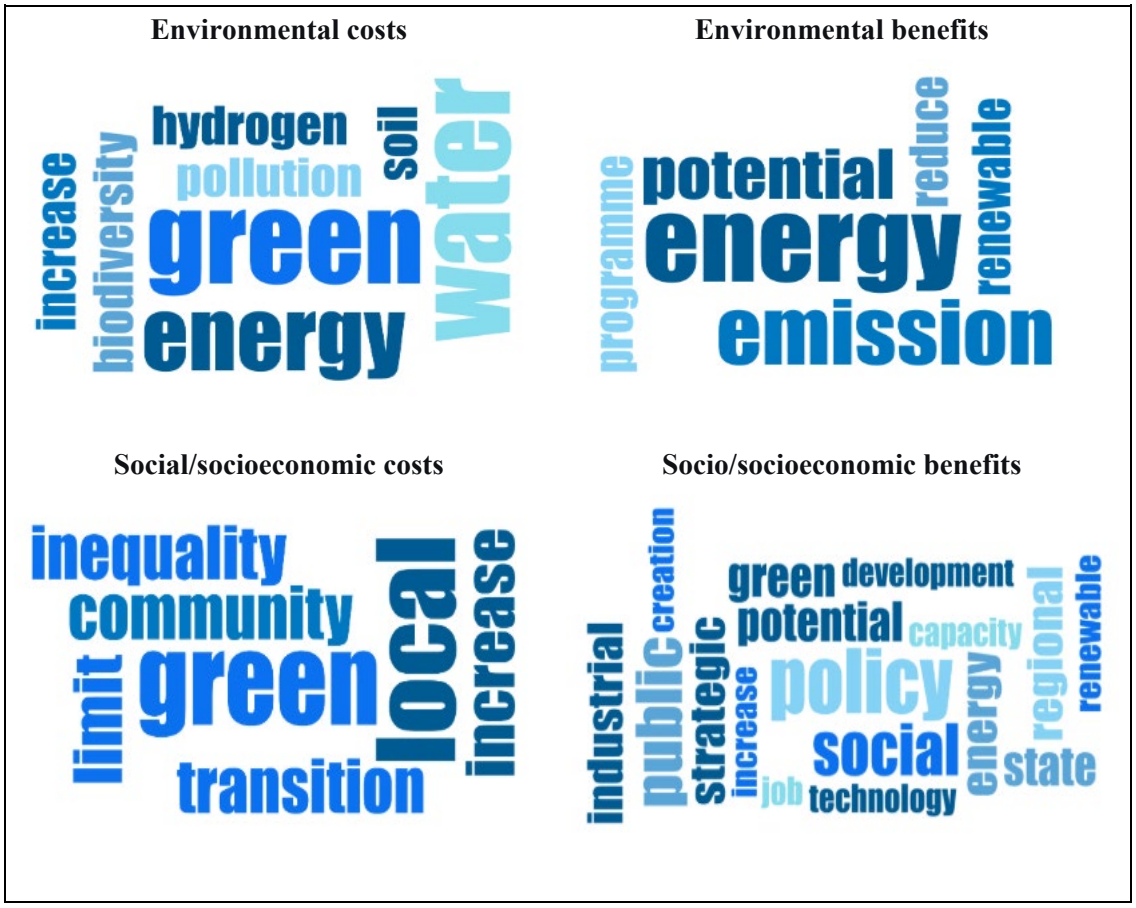
Figure 2. Environmental cost and benefit keywords



The processes of social impact identified in the cases studies reflect the themes established in the GreenPaths analytical framework. Overall, 80% of cases (11/15) identified aspects of injustice/inequality, 67% (10/15) focused on issues of governance/policies in a green/just/fair transition, 40% (6/15) centred on aspects of labour, a third (6/15; 33%) identified examples of loss and damage and a quarter (4/15; 27%) focused on mitigation/adaptation measures and strategies and another quarter (4/15; 27%) on recovery/resilience/restoration (whilst we note a lack of definition/distinction between this theme and mitigation/adaptation).

The 15 case studies cover a diverse range of concepts. For example, cases 1 (lithium, Portugal), 3 (coal, Spain), 5 (critical minerals, Latin America), 7 (critical minerals and green hydrogen, Southern Africa), 10 (decarbonisation policy, Europe/select countries in Global South) and 12 (lithium, Serbia) all focus on different conceptualisations of fossil fuel phase-out, decarbonisation and renewables linked to the extraction/extractivism of criterial raw materials and/or the phase-out of fossil fuel industries. Cases 2 (ecotourism, Romania), 4 (land use, Slovenia, Croatia, and Serbia), 13 (green tourism, Croatia) and 15 (farm-to-fork, France) encompass concepts of eco-social state/public services, green-grabbing and organic/agriculture. Furthermore, cases 6 (green industrial policy, Southeast Asia), 8 (green industrial policy, North Africa), 9 (sustainable green finance, EU/Spain), 11 (hydrogen economy, Netherlands and Morocco) and 14 (building renovation, Central and South-Eastern Europe) encompass concepts of State-aid, green finance, employment, green jobs, sustainable growth and housing.

The findings demonstrate tangible environmental benefits, primarily framed around carbon emission reduction and a greater potential take-up of renewable energy, with standout examples like Costa Rica and Uruguay generating over 98% of their electricity from renewables (5). These

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benefits extend beyond emissions, encompassing biodiversity protection and rewilding, as seen in Romanian conservation efforts (2), as well as in public food procurement in France that can reduce food waste, increase sustainability of supply chains and encourage organic farming, which in turn contributes to improved soil health and biodiversity (15). Socioeconomic benefits were also documented, including job creation initiatives (3), the expansion of social protection in some regions (6), promising policy innovations (5, 6, 7, 10, 15), and ecological restoration such as in the open-pit mines in Spain (3), which could enhance economic value of the area. At the EU-level, direct cash transfers can mitigate the regressive impact of climate policies (10). In Croatia, early steps to adapt tourism to climate change and mitigate its carbon footprint are generating policy recommendations for sustainable tourism, such as the promotion of public transport (13). Green finance for green infrastructure and transportation via the European Investment Bank (EIB) provided Paris €1 billion towards an automated metro line and Madrid €518 million for railway expansion (12).

However, these benefits are shadowed by a pervasive and more consistent narrative of significant socio-environmental costs. The keyword analysis and detailed case evidence point to recurrent negative impacts. Environmentally, the push for green technology is linked to pollution, water stress and soil contamination from mining for critical minerals (1, 3, 5, 12), alongside threats to biodiversity and the creation of green sacrifice zones. Socially and socioeconomically, the costs are profound and intertwined with environmental injustices. These injustices highlight an intersectional and neo-colonial 'green divide' that reinforces preexisting disparities based on gender, ethnicity, urban/rural location and power imbalances between the EU's core and its periphery and the Global North and South.

Costs materialise through specific, damaging processes, including; green-grabbing for mineral extraction (1, 5, 12), green hydrogen and solar projects (8, 11), agricultural (4) or neo-conservation projects (2); tangible and intangible loss and damage to cultural heritage and ancestral practices (1, 4, 5, 8); and widespread injustice and inequality, with consistent findings of procedural, distributional and recognitional injustice across the cases. The transition has also engendered labour precarity, evidenced by job losses, regional emigration and insufficient reskilling in 'new green' industries (1, 3, 7), as well as insecure 'green' labelled jobs in special economic zones (5, 6). A recurring tension exists between decarbonisation imperatives and livelihood dependencies, where new projects often prioritise temporary, high-skilled employment while displacing pastoral and rural communities, failing to generate sustainable economic alternatives for affected populations (1, 3, 5, 7, 8). This is compounded by widespread scepticism about the number and quality of jobs green projects will actually create (1, 3).

2.2. Unpacking the costs: key themes from the cases

The consistent negative impacts observed across such diverse contexts are not random. They stem from identifiable and interconnected themes related to governance, justice and measurement that inhabit procedural, distributional, recognitional dimensions of environmental injustices in the attribution of costs and benefits.

A primary driver is the prevalence of a top-down governance model which reflects and replicates a lack of participation in policy design and implementation. This is evident in the Jadar lithium project in Serbia (12), in Portuguese mineral extraction (1), in Romanian forest conservation (2), and in green hydrogen, wind and solar projects where public participation, due process, and transparency are insufficiently guaranteed (6, 8, 11). The logic of urgency, used to fast-track projects in the EU and Portugal, often sidesteps substantive public consultation, sacrificing a community's right to decide (1). This approach consistently sidelines vulnerable groups, leaving them behind while affluent actors drive the transition (1, 5, 14). Even proposed institutional innovations, like in South Africa, can fail in practice, with workers reporting a lack of consultation and retraining (7). Abrupt, unplanned closures of mines and power plants can erode social trust

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and destabilise democracy (3), while authoritarian models, as in Southeast Asia, achieve rapid growth at the expense of labour rights and civil society participation (6). In the EU context, this is compounded by a lack of coordination between local, national and regional levels, as seen in the tourism sector (13) and in the implementation of EU funds (14).

These governance problems are exacerbated by a flawed system of impact assessment and measurement. Gaps in measurement include a lack of intersectional and socio-geographic data about marginalised, vulnerable and impacted populations, that could provide gender-disaggregated insights on, for example, economic (e)migration patterns, land use, subsidy beneficiaries, employment quality, environmental effects and distributional outcomes (1, 2, 3, 4, 5, 14). Furthermore, standard assessments often ignore non-material losses and psychosocial harms (12), and fail to adequately evaluate distributive, procedural, and recognition justice (11). Earlier on, in WP2, the GreenPaths project mapped potential indicators (D2.1), frameworks (D2.3), methodological tools (D2.3) and designed an analytical framework (D2.4) and conceptual and methodological matrix (D3.1) for investigating social (environmental and economic) impacts of green transition policy. Where broad initiatives accompanying the transition were brought in by the EU (e.g. the EGD's Just Transition Mechanism), it is also telling that indicators, tools, policy appraisal methodologies, standard for community based/informed/led policy design and consultation were not firmly baked into the EGDs rollout, which raises inquiry as to why these elements and approaches appear so fragmented.

Governance and measurement failures in governance perpetuate the assumption that 'green' is inherently 'just'. Evidence from multiple cases reveals that green policies can replicate colonial and extractivist dynamics under a sustainability façade, as explicit in cases of green extractivism (Cases 1, 5, 8, 12, 13). The EU's focus on economic and CO2-related costs often sidelines the social and justice dimensions of the transition (9, 11), leading to outcomes where environmental improvements coincide with social deterioration (7). This can manifest as carbon offshoring that increases inequality within the EU and externalises burdens to the Global South (10), or in the formation of green sacrifice zones where conservation and rewilding lead to the dispossession and cultural erosion of local communities (1, 2, 8). Policy incoherence is also common, such as in the EU's CAP, where environmental aims are undermined by regressive subsidies that fuel land concentration (4). Without robust protections, green industrialisation can perpetuate exploitative labour conditions beneath a sustainable label (6).

Consequently, the transition is creating clear and predictable winners and losers. The winners are typically large corporations, international investors, state elites, property owners and urban metropolitan areas with the capacity to access subsidies and finance (8, 9, 13, 14). The losers, however, are consistently the most vulnerable: low-income households, rural communities, indigenous peoples, precarious workers and small-scale farmers who are systematically excluded from benefits and bear the higher burden of social and environmental costs, especially in EU-periphery countries or regions (3, 4, 9, 12) and the geographical Global South (1, 5, 7, 8, 10, 11, 13, 14). Ethnic groups, women, the elderly and youth are also identified as disproportionately and negatively affected (1, 2, 3, 4, 5, 6, 8). This uneven distribution of impacts and financial incentives highlights pervasive elite capture, institutional fragmentation and a transboundary green divide associated with global power dynamics in green growth. The latter also offer geopolitical significance for 'good green governments', as demonstrated in the case of Portugal (2), Slovenia (4) Serbia (12) and regionally, in Latin America and Southeast Asia (5, 6).

In this context, the role of the state is pivotal. It can either reproduce inequalities by benefitting from neoliberal market dynamics (4), or it can play a compensatory role through progressive taxes and transfers to protect the vulnerable (10). The state's capacity to negotiate favourable terms, impose conditions and direct revenues toward productive transformation is a crucial variable for a just outcome, as demonstrated by the contrasting experiences of Costa Rica and Uruguay versus the lithium triangle countries (5). Otherwise, it can help mitigate energy investment that prioritises investor returns over energy sovereignty: in Morocco, there are plans to double (the disputed

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territory) Western Sahara's green power capacity by 2027, harnessing a $32.5 billionaire commitment to green hydrogen via overseas investors, which aims to enhance European, not North African, energy security, with multinational corporations capturing value chains (8).

The role of the state is therefore also contingent on the regulation of third parties. Ultimately, strong, democratic state institutions are essential to coordinate a transition that is both green and just, avoiding the risks of regulatory capture while ensuring public action is tailored to local needs (3, 7). A common loophole in law and policy enable grey-zones in which transnational non-state actors operate and exercise disproportionate influence, with loose obligations to adhere to guiding principles and non-binding agreements. For example, the Critical Raw Materials Act (2024) (1, 5, 7, 12) contains opaque references to human, labour and indigenous peoples' rights, calling on EU principles for sustainable raw materials (2021) and UN Guiding Principles on Business and Human Rights (2011), instead of cross-referencing substantive and binding legal instruments under international human rights law (IHRL) that protect rights (e.g. to housing, land, water, cultural heritage etc.) and link to tangible mechanisms for public restitution.

2.3. Conclusions and suggestions

Based on the preliminary evidence from 15 case studies from targeted European countries and regions of the Global South (see Figure 1), this report concludes that, while a low-carbon economy is under development, it does not yet represent a just transition. A stark paradox lies at the heart of current efforts: policies designed to solve a global environmental crisis are, in their implementation, frequently generating localised social crises and reinforcing entrenched inequalities. The prevailing approach, characterised by top-down governance, a flawed system of impact measurement, and the erroneous assumption that 'green' is inherently 'just', has created a landscape of clear winners and losers, disproportionately benefitting corporate actors and urban centres while marginalising rural communities, indigenous peoples, women and low-income households across the globe.

The anticipatory nature of many of the costs and benefits identified, are in some cases predictive or promissory, and could have alternatively been classified as 'fears' and 'aspirations' of the green transition. Where our case studies identify more costs than benefits, our research is not a catalogue of failures. It illuminates a more hopeful path by demonstrating that positive and alternative models are not only viable but already in practice. The issues identified in our research are interconnected, intersectional and interdisciplinary and so must the policy solutions be. Standout examples include the state-led renewable energy programmes in Costa Rica and Uruguay, which show that holistic approaches can successfully decarbonise energy systems (5). Similarly, the case of public food procurement in Dordogne, France, demonstrates that inclusive, sustainability-driven governance can foster healthier diets, reduce carbon footprints and boost local farmer incomes without increasing overall costs (15). Furthermore, the strong institutional capacity of developmental states in Southeast Asia, as seen in Vietnam's solar expansion, proves that coordinated state intervention can achieve the rapid deployment of renewables, even if these models require greater democratisation to ensure justice (6). At the same time, case studies also identify positive policy initiatives to include populations in the green labour transition, which aim to reskill local populations, offer educational opportunities, create economic activity and employment in territories affected by the energy transition in Europe, Latin America and Southeast Asia (3, 5, 6, 10).

To align the green transition with the principles of justice and social wellbeing, a fundamental reorientation is urgently needed. The evidence compels a shift from technical, top-down implementations to approaches that deliberatively centre justice, democratic participation and equity. Our findings evidence real world impacts, critique imperfect policies and highlight gaps in data in order to improve, not castigate, steps to strengthen civil society engagement and awareness in environmental and energy justice debates. The case studies collectively recommend

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strengthening state capacity to negotiate favourable terms with transnational corporations and to capture resource rents for public benefit, as highlighted in Latin America, Southern and Northern Africa (5, 7, 8). This must be coupled with robust democratic governance that ensures genuine community engagement and procedural justice, moving beyond tick-box consultation to empower local communities in decision-making about their socioeconomic future and resource use (1, 3, 7, 12).

Our methodologically diverse case studies all identified gaps and weaknesses in existing indicators, tools and approaches for measuring the social-environmental-economic impacts of green transition policy. A critical priority is to overhaul impact assessments to fully incorporate dimensions of distributive, procedural, recognitional, restorative and cosmopolitan justice and to address non-material and intangible losses and incommensurable damages (5, 11, 12). This requires closing critical data gaps by collecting intersectional and geo-locational data on marginalised populations to enable tailored, effective interventions (2, 3, 4, 5, 9, 14). Policy coherence is also essential; for example, policies such as the EU's CAP must be redirected through redistributive reforms and transparent land governance to stop fuelling land concentration and instead support smallholders and agroecology (4), whilst policy instruments like the Social Climate Fund could be harnessed and strengthened to measure social outcomes in fields like sustainable tourism (13).

Finally, a just transition demands a rebalancing of power, both internationally and locally. This includes prioritising domestic energy needs and resource sovereignty in the Global South over export-oriented models (8, 14), ensuring climate finance reaches the most vulnerable regions rather than just the most competitive (9), and fostering South-South cooperation to enhance collective bargaining power (5, 7, 8). By adopting these recommendations—from embracing convivial conservation to prevent green sacrifice zones (2) to exploring degrowth perspectives in sectors like tourism (13)—policymakers can move beyond the current rhetoric of a just transition and build a future that is truly both green and just for all.

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