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Romania in the Context of Global Megatrends and Uncertainties for Green Growth

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Romania in the Context of Global Megatrends and Uncertainties for Green Growth

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About EPG

EPG is an independent, non-profit think tank focused on energy and climate policy in Romania and the European Union. Founded in 2014, EPG operates as a policy research institute primarily financed through competitive grants, philanthropic organisations and, to a limited extent, private sector projects. EPG aims to promote an evidence-based dialogue on how to balance decarbonisation, economic competitiveness and social fairness, engaging decision-makers, industry, and the public.

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Key findings

The contemporary global landscape is defined by deep structural vulnerabilities, economic fragmentation, and increasingly fraught geopolitics, as evidenced by the recent energy crises. Trade volumes are expected to decline in 2026 followed by a slow recovery, reflecting a broader trend of protectionist tariffs and the adjustment of supply chains. The energy transition will need to acclimatise to the changing world order. Romania's ability to implement its energy transition is dependent on supply chains' resilience, especially for low-carbon technologies.

Policy within the European Union continues to pursue ambitious climate targets, though the focus has shifted from decarbonisation to energy security and industrial competitiveness. New EU strategies such as the Green Deal Industrial Plan, the Net Zero Industry Act, the Industrial Accelerator Act, and the Critical Raw Materials act demonstrate this new approach where meeting energy targets is viewed through the lens of maintaining a competitive edge with global powers such as China and the USA. This shift is also visible in Romania, as domestic energy sources, particularly nuclear and natural gas, are viewed as strategic assets for energy security during periods of geopolitical crises.

The present policy mapping exercise has revealed opportunities for green growth upon which Romania can capitalise. Romania's comparative advantage across low-carbon exports reveals opportunities for growth in areas of electronics, precision measuring devices and machinery. Decades of experience with nuclear energy and a growing IT sector can be capitalized on through export of services. The country's geographical location could be advantageous as Ukraine's reconstruction begins, as well as for potential nearshoring to support European green manufacturing.

On the other hand, Romania remains exposed to external shocks and internal systemic failures. Although imports are predominantly from within the EU, imports critical for the energy transition are dependent on non-EU suppliers and vulnerable to disruption in trade policy. Ageing and congested grid infrastructure creates uncertainty over future energy costs and reliability. Grids and other critical infrastructure are exposed to the intensifying impacts of climate change. The future workforce is uncertain due to persistent 'brain drain' and a widening gap between the skills needed by employers and the offering within the labour force. Finally, Romania continues to struggle with institutional instability as low administrative capacity, governmental adjustments and unpredictable legislation continue to undermine investor confidence and limit its ability to absorb EU funds.

Policy recommendations

- Strategically foster industrial specialisation by leveraging exports with comparative advantage in low carbon tech manufacturing.
- Align human capital with the needs of a net-zero economy through dedicated educational programmes, re-skilling and retention focused mechanisms.

- Reduce the cost of the energy transition through integrated infrastructure planning to ensure efficient allocation of funds.
- Design transition policies to explicitly address distributional concerns and energy poverty to maintain and grow public support.

Mesaje cheie

Peisajul global actual este caracterizat de vulnerabilități structurale profunde, fragmentare economică și tensiuni geopolitice în creștere, așa cum o demonstrează recentele crize energetice. În 2026, se preconizează o scădere a volumului schimburilor comerciale, urmată de o redresare lentă, reflectând o tendință generală de impunere a tarifelor protecționiste și de ajustare a lanțurilor de aprovizionare. Tranziția energetică va trebui adaptată la noua ordine mondială. Capacitatea României de a-și pune în aplicare tranziția energetică depinde de reziliența lanțurilor de aprovizionare, în special în ceea ce privește tehnologiile cu emisii reduse de carbon.

Uniunea Europeană își menține obiectivele climatice ambițioase, deși accentul s-a mutat de la decarbonizare la securitatea energetică și competitivitatea industrială. Noile strategii ale UE, precum Planul industrial al Pactului verde (*Green Deal Industrial Plan*), Regulamentul privind industria cu emisii nete zero (*Net-Zero Industry Act*), Legea privind accelerarea industrială (Industrial Accelerator Act) și Legea privind materiile prime critice (*Critical Raw Materials Act*), reflectă această nouă abordare, în care îndeplinirea obiectivelor energetice este privită prin prisma menținerii unui avantaj competitiv față de puteri globale precum China și SUA. Schimbarea este vizibilă și în România, întrucât sursele domestice de energie, în special energia nucleară și gazul natural, sunt considerate active strategice pentru securitatea energetică în perioadele de crize geopolitice.

Prezenta cartografiere a politicilor identifică oportunități de dezvoltare pentru industriile ecologice pe care România le poate valorifica. Avantajul comparativ al României în ceea ce privește exporturile cu emisii reduse de carbon indică oportunități în domeniile electronicii, dispozitivelor de măsurare de precizie și utilajelor. Experiența de zeci de ani în sectorul energiei nucleare și creșterea industriei IT pot fi valorificate prin exportul de servicii. Poziționarea geografică a țării ar putea deveni avantajoasă în contextul reconstrucției Ucrainei, precum și în fața unei posibile relocări a producției, în sprijinul producției ecologice europene.

Pe de altă parte, România rămâne expusă șocurilor externe și disfuncționalităților sistemice interne. Deși importurile provin în principal din interiorul UE, importurile critice pentru tranziția energetică depind de furnizori din afara Uniunii, fiind vulnerabile la perturbări ale politicii comerciale. Infrastructura de rețea învechită și suprasolicitată generează incertitudine cu privire la costurile și fiabilitatea viitoare ale energiei. Rețelele și infrastructura critică sunt expuse la impactul tot mai intens al schimbărilor climatice. Forța de muncă viitoare este incertă din cauza „exodului de creiere” și a decalajului tot mai mare între competențele necesare angajatorilor și oferta din forța de muncă. În cele din urmă, România continuă să se

confrunte cu instabilitate instituțională, întrucât capacitatea administrativă redusă, ajustările guvernamentale și legislația imprevizibilă continuă să submineze încrederea investitorilor și să limiteze capacitatea de absorbție a fondurilor UE.

Recomandări

- Promovarea strategică a specializării industriale prin valorificarea exporturilor cu avantaj comparativ în producția de tehnologii cu emisii reduse de carbon.
- Adaptarea capitalului uman la nevoile unei economii cu emisii nete zero prin programe educaționale dedicate, precum și prin mecanisme axate pe recalificare și menținerea forței de muncă.
- Reducerea costurilor tranziției energetice prin planificarea integrată a infrastructurii, pentru a asigura alocarea eficientă a fondurilor.
- Elaborarea de politici de tranziție care să abordeze în mod explicit problemele legate de distribuție și sărăcia energetică, pentru a menține și a spori sprijinul public.

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Introduction

The ongoing Middle East oil and gas crisis has revealed structural vulnerability across Europe, from import dependence, exposure to volatile fuel prices and fragile industrial value chains, giving the energy transition a decisively new security and competitiveness dimension to grapple with. What was once framed primarily as decarbonisation policy is increasingly approached as industrial strategy, with the Commission and Member States rolling out instruments ranging from the Clean Industrial Deal and the proposed Industrial Accelerator Act to national reindustrialisation packages in Germany, France and Italy. Romania must now organise itself accordingly within this shifting European landscape. However, the energy transition is being perceived -- within the political class and the broader public -- as a fiscal burden rather than an economic driver.

Previous work led by the Institute of Baltic Studies and in partnership with EPG has outlined six megatrends as part of an analysis of Global Megatrends and Green Growth Uncertainties, namely: (1) Evolution of Technological Leadership in Green Industry; (2) Future of Global Trade and Protectionism; (3) Stability of Climate Commitments Amid Geopolitical and Security Crises; (4) Scale and Timing of Environmental Shocks; (5) Social Cohesion, Migration, and Demographics, and; (6) Societal Support and Value-Based Divides.

EPG has undertaken a review of relevant national and regional policy documents, regulations and institutional framework to understand how Romania will be impacted by these macro-critical challenges and the extent to which Romania is prepared to meet them. Each risk has a dedicated chapter in the remainder of this report, outlining Romania's current policies addressing them and the extent to which the risk is already unfolding.

The outputs of this report will be used to inform a scenario analysis exercise examining how the trajectory of low carbon manufacturing exports in response to the uncertainty around climate change commitments and the future of global trade and protectionism.

Evolution of Technological Leadership and Green Industry

The economy behind the energy transition is already changing as critical technologies mature and demand grows for novel, critical tech. For example, new energy-intensive applications for artificial intelligence (AI) are looking for sources of electricity to expand and sustain their operations, and a country's ability to access high levels of clean energy, alongside robust power infrastructure, will become a key area for competitiveness. How well Romania can address these challenges will directly impact the extent to which the transition becomes an economic driver as opposed to an expensive requirement.

Romania's policy documents align industry research and development with the energy transition through the National Strategy for Research, Innovation and Smart Specialisation 2022-2027 overseen by the Ministry for Research, Innovation and Digitalisation. However, its effectiveness is hampered by institutional instability, creating uncertainty for businesses and low levels of implementation.

More targeted, sector specific policies complement this main framework, including a 2023 law on using hydrogen from renewable and low-carbon sources in industry and transport, which acted as a precursor to Romania's national Hydrogen Strategy.[1] Adopted in 2025, the Strategy builds on this foundation by addressing hydrogen production, demand and end-use applications, and the broader regulatory, market and innovation framework, in alignment with EU hydrogen and climate objectives.[2] Similarly, the National Strategy for Green Jobs 2018–2025 is designed to encourage green entrepreneurship and develop the skills aligned with a net-zero economy. Much of the funding for the implementation of these strategies comes from Romania's National Recovery and Resilience Plan (NRRP), which allocates money to support industrial decarbonisation, renewable energy projects, and the development of green technologies. In theory, the funding helps foster innovation and lower the risk for private investors.[3] In practice, Romania experiences persistent delays to meet reform milestones which has direct effects on the disbursement timelines of these funds, creating a disincentive for businesses who plan medium- and long-term investments.

Romania's better path to technological success is to undertake a specialised strategy focused on complex fields with high barriers to entry. This project excludes export markets of products which have damaging effects on the environment, are highly dependent on natural resources or have risk to human beings and instead focuses on low carbon technologies, or low carbon enabling technologies.

[1] European Commission, 2023, Renewable hydrogen production: new rules formally adopted
[2] HOTARARE 855 09/10/2025 - Portal Legislativ
[3] European Commission, n.d., Romania's recovery and resilience plan

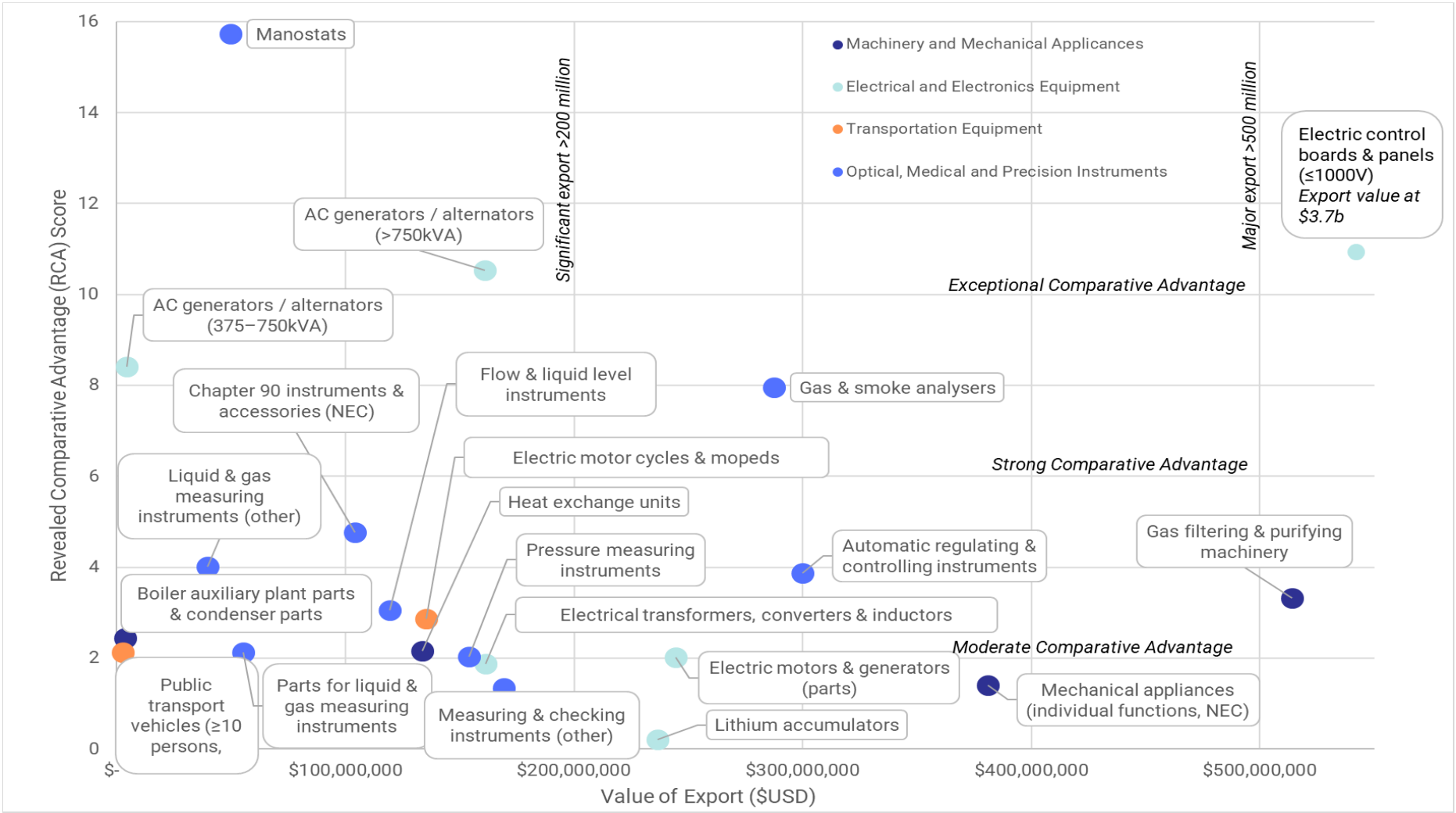

Figure 1: Romania's 2024 Top Clean Tech-Related Exports by Value and Revealed Comparative Advantage

Analysis of Romania's 2024 exports (Figure 1) shows Romania's top 10 low carbon exports by value and by revealed comparative advantage (RCA), which indicates if a country has a competitive advantage. It is measured by the extent to which a country exports an item relative to its overall export level. A country is considered to have an advantage if it exports a higher share of the product relative to the global average. Any score above a 1 indicates some advantage, with scores of higher than 2 indicating a significant advantage. Romania's scoring indicates advantages in products across electronics, precision measuring instruments and machinery.

Romania's strength is heavily concentrated in a single product. Electrical control boards & panels (≥1000 Volts) are one of Romania's top exports with a dominant comparative advantage (10+) and a high export value at $3.7 billion in 2024. The high advantage and export value present an opportunity to learn best practices for replication, as well as a vulnerability to the Romanian economy, should trade and supply chains be disrupted. Alternating current (AC) generators of both size bands and manostats are modest in export value but could prove highly beneficial for Romania should demand increase. Promising exports also include gas and smoke analysers, automatic regulating and controlling instruments and gas filtering and purifying machinery as they are clustered as moderately advantageous with an export value of $200-400m.

Other options may require building or rebuilding supply chains from scratch, as these may prove strategically beneficial over the longer term. For example, Romania could build on decades of experience with CANDU technology at the Cernavodă plant and capitalize on the know-how and local content after the planned construction of the NuScale SMR (Small Modular Reactors), for which a (conditional) Final Investment Decision has been taken on a first plant in Doicești.[4] Indeed, the nuclear sector has government backing through state-owned companies like Nuclearelectrica, which help increase its viability. While Romania has no current exports for nuclear components, developing a supply chain would capitalise on a growing need within Europe and reduce the need for imports.

Second, Romania can use its rapidly growing IT and software sector to expand into the digitalisation of the energy system.[5] This could involve developing advanced software for smart metering, demand management, grid automation, and cybersecurity for critical energy infrastructure.

Innovation systems in Romania are growing but are still in early stages. The green startups[6] are beginning to multiply in major cities and organisations like the Green Digital Innovation Hub are set to support them. However, Romania's innovation sector is fragmented, severely

[4] Nuclearelectrica, 2026, The Doicești Small Modular Reactors (SMR) project obtains the Final Investment Decision and enters the third stage of development
[5] Studiul de industrie ANIS: IT&C devine liderul exporturilor de servicii și depășește pragurile din anul anterior la contribuția la PIB, taxe și valoare adăugată – ANIS
[6] Energynomics, 2025, Green startups in Romania: dominant in agribusiness, circular solutions, green energy and electromobility

underfunded[7] and faces a lack of systemic support, capital and confidence resulting in low profitability. Within the region, Romania lags significantly behind neighbouring countries like Poland for the number of renewable energy startups and Hungary for cleantech investment volumes,[8] albeit the World Bank has indicated that Romania could potentially triple its clean tech exports under current policies.[9]

The deep-tech venture capital market is still missing within Romania, leading to capital scarcity. EU financial instruments, such as the European Innovation Fund (EIF), which intends to stimulate private sector investment in technology innovation, tend to be generalist and risk averse. Growing this market in Romania would require a dedicated clean tech co-investment mechanism. Advanced orders are critical to fostering enough demand for clean tech products, thereby reducing investment risk entirely borne by the private sector. Public procurement across Romania's state-owned enterprises could act as a substantial and stable market, however this lever remains unused.

Clean tech manufacturing is also dependent on the energy to produce it and the grid infrastructure supporting it. Grid congestion, particularly in Dobrogea and Transylvania, creates uncertainty over energy cost, which has a knock-on effect on the economics of energy-intensive manufacturing. Addressing grid congestion requires bridging the substantial gap in grid investment. Romania needs an estimated €6.8bn for transmission and €9.2–11.5bn for distribution by 2030, underpinned by a stable regulatory framework and scaled EU funding mechanisms.[10] Manufacturing opportunities cannot be capitalised on without a credible grid investment programme to guarantee a stable, affordable source of energy.

[7] European Commission, 2025. EU spending on R&D exceeded €403 billion in 2024 - News articles - Eurostat
[8] Romania Journal, 2025, 9.3 Billion Tons of CO_2 Could Save the Planet by 2050
[9] World Bank, 2024, Clean Tech Value Chains: Using Trade Data to Guide a Complex Policy Space
[10] Energy Policy Group, 2024. Bolstering the grid: A priority to achieve Romania's 2030 decarbonisation objectives

Future of Global Trade and Protectionism

The evolution of global trade regimes will play a significant role in shaping the energy transition. Trade volumes are expected to decline globally from 5.1% in 2025 to 2.8% in 2026 before rising again to 3.8% in 2027.[11] These dynamics reflect the early purchase of goods in anticipation of higher tariffs, as well as the slow adjustment in trade linkages and supply chains in response to tariffs.

The medium-term outlook remains modest, with global expansion projected to be 3.1% annually from 2028-2032, which is lower than the pre-pandemic average of 3.7%.[12] This evolution of global trade regimes will have significant impacts for Romania's energy transition as existing dependable partnerships sway and increasing pressure on geoeconomic competition, supply chain resilience and strategic industrial policy.

Like the rest of Europe, Romania will need to navigate the United States' shifting approach on energy policy, as the pendulum swings from the Inflation Reduction Act (IRA) subsidies for onshore clean technology manufacturing to the more recent emphasis on fossil fuel production. Similarly, China's established dominance across green supply chains has fundamentally altered the global landscape.[13][14] In response, the EU has launched the Green Deal Industrial Plan (GDIP), which includes the Net-Zero Industry Act (NZIA), the Industry Accelerator Act and the Critical Raw Materials Act (CRMA) to establish a new regulatory and strategic framework within which Member States like Romania will now operate.[15][16]

While Romania's overall import dependency on non-EU suppliers, including China, appears moderate overall,[17] a sectoral deep dive reveals a more concerning picture. For the technologies driving the energy transition, supply chain exposure is considerably higher. For example, a typical 1MW solar project sources PV panels and inverters predominantly from China, which account for roughly 26% of total project costs.[18] Although this share may seem limited in isolation, the scale of Romania's planned PV rollout means that cumulative dependency on a single non-EU supplier could leave both the decarbonisation pathway and energy security exposed to external shocks, whether from trade disruptions, geopolitical tensions, or supply bottlenecks. Strategies must be targeted at the sectoral level to address specific supply chain dependencies within the energy transition.

Romania's primary policy framework on mining is the National Strategy for Non-Energy Mineral Resources, which shifts focus from coal extraction towards minerals needed for the energy transition. The strategy was updated in 2024-2025 to align with the EU's Critical Raw Materials Act (CRMA). As of March 2025, Romania is hosting three projects approved under

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[11] World Economic Outlook, April 2026: Global Economy in the Shadow of War
[12] World Economic Outlook, April 2026: Global Economy in the Shadow of War
[13] ACEA, 2023, Net-Zero Industry Act and Critical Raw Materials Act: proposals welcomed but questions remain
[14] Wood Mackenzie, 2025, Soaring copper demand: An obstacle to future growth?
[15] Energy Policy Group, 2025, Can the Net-Zero Industry Act boost Romania's clean tech sectors?
[16] European Commission, 2024, Alert mechanism report 2024
[17] European Commission, 2024, Alert mechanism report 2024
[18] Nedea, 2025, Imports from China don't exceed 26% of PV project costs in Romania

the CRMA. These projects on copper, graphite and magnesium are worth an estimated €615 million and benefit from fast track permitting for up to 24 months of extraction. Romania is also aligned with the European Clean Industrial Deal and the RESourceEU Action Plan which was launched in late 2025. One of the major challenges Romania is experiencing is that there are no mid-stream processing and downstream manufacturing, resulting in limited domestic value addition from extraction only.

Despite these challenges, Romania is well positioned to benefit from supply chain regionalisation and become a nearshoring hub for European green manufacturing. The geographic proximity to Ukraine would allow Romania to support logistics and post-war reconstruction materials and services, creating a market for these manufacturing components domestically. Competitive labour costs, a skilled industrial workforce, and a strategic geographic location could make Romania an attractive destination.[19] Furthermore, the EU enlargement process provides the necessary framework for technical expertise. However, national administrative capacity must be significantly improved to meet this opportunity, in addition to diversifying local supplier networks, fixing persistent infrastructure deficits and increasing predictability of the legislative environment,

Romania embraced the EU's objectives, dedicating initially 44.1% of its €28.5 billion NRRP to the green transition and adopting a strategy for climate neutrality by 2050.[20] As of 2024, the country had received approximately €10.7 billion, with the green transition pillar accounting for around 11% of this disbursement.[21] However, the plan's renegotiation in 2025 intends for the green transition pillar to account for 40%.

Financial instruments such as Contracts for Difference (CfDs) and green bonds are indicative of progress in de-risking private investment.[22] Despite this alignment, implementation gaps remain and new EU policies, such as the NZIA, are designed as enabling frameworks, providing tools like fast-track permitting and "Net-Zero Acceleration Valleys", though no areas have been designated as of yet.[23] Such policies require a high level of national administrative competence, obviating a mismatch with Romania's public administration, with its limited institutional capacity, poor coordination, and one of the lowest EU fund absorption rates.[24][25]

[19] Maersk, 2024, Near-sourcing in Romania: Opportunities and challenges for European businesses
[20] Ministry of Environment, Waters and Forests, 2022, Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions
[21] European Commission, 2025, Romania Disbursements
[22] The Ministry of Energy, 2024, Ministerul Energiei… anunță inițierea primei licitații… Contracte pentru Diferență
[23] European Commission, n.d., Net-Zero Industry Act
[24] European Parliament, 2023, Absorption of the EU Cohesion policy funds in 2014-2020
[25] World Bank, 2023, Systematic Country Diagnostic Update: Romania

Stability of Climate Commitments Amid Geopolitical and Security Crises

Romania's energy transition is evolving and remains highly susceptible to the global uncertainties where climate, geopolitical, and energy security challenges intersect.[26][27] Russia's 2022 invasion of Ukraine resulted in an energy crisis that hit Eastern Europe especially hard and intensified concerns of national security and economic stability. In response, Romania recast the energy transition as a national security priority. The push for energy independence from Russia has accelerated investment in domestic sources — renewables, nuclear, and indigenous natural gas, as well as energy efficiency.[28][29] Yet despite of this forward step, energy policy is shifting more slowly, as evinced by the delays to the phase-out calendar of the lignite power plants.[30]

Romania's climate policy is anchored in EU's frameworks, particularly the European Green Deal and the 'Fit for 55' legislative package, which protect the long-term decarbonisation goals from political shifts at the national level. For example, the updated National Energy and Climate Plan (NECP) and the country's Long-Term Strategy of decarbonisation, both published after the 2022 energy crisis, transpose EU targets into national policy, aiming to reduce net greenhouse gas (GHG) emissions by 99% by 2050 compared to 1990 levels.[31]

Political support for the development of domestic energy has grown as a result of Russia's invasion of Ukraine, turning energy security into a matter of national security and accelerating the energy transition.[32][33][34]

The energy crisis has stressed nuclear energy's value as a stable source of clean power, as well as the value of Romania's own natural gas, which is leveraged as a 'transition fuel' and a strategic asset for national and regional security, and for economic competitiveness.[35] These circumstances have also increased Romania's role in ensuring the energy security of neighbouring Ukraine and Moldova through pipeline transport of non-Russian gas from the Caspian region, alongside Romanian electricity. However, this role can only be fulfilled if the grid constraints are managed. Indeed, the ageing transmission and distribution networks require upgrading and expansion to accommodate the integration of new renewable energy

[26] Bertelsmann Stiftung, 2024, BTI 2024 Romania Country Report
[27] Sîrbu et al., 2024, Navigating the Polycrisis: Romania's Energy Security and Green Transition in the Context of the War in Ukraine
[28] Calotă, 2024, Romania's strategic energy independence: A turning point
[29] Certan, 2025, Energy is key to Romania's trade resilience
[30] România în fața renunțării graduale la cărbune: O alegere dificilă, dar necesară - EPG
[31] Ministry of Environment, Waters and Forests, 2022, Romania's Long-Term Strategy for Reducing Greenhouse Gas Emissions
[32] Calotă, 2024, Romania's strategic energy independence: A turning point
[33] Sîrbu et al., 2024, Navigating the Polycrisis: Romania's Energy Security and Green Transition in the Context of the War in Ukraine
[34] Atlantic Council, 2025, Energy is key to Romania's trade resilience
[35] Atlantic Council, 2025, Energy is key to Romania's trade resilience

sources, energy storage and enhanced flexibility. Without such upgrades, new solar and wind are increasingly likely to be curtailed instead of exported.

Initially scheduled to start in 2027, the implementation of the ETS2 system (i.e., carbon allowances for the buildings and road transport sectors) has been postponed in November 2025 by one year, until 2028, to offer MS extra time to prepare and ensure a smooth start. However, the postponement might create additional longer-term pressures, as EU funding from the associated Social Climate Fund (SCF) will also be delayed. Currently, MS stand divided on the ETS2, with CEE countries being more cautious or against it, due to the higher costs consumers may bear.[36]

A recent letter requesting the urgent review of the EU Emissions Trading System to protect the EU's industry and competitiveness was signed by leaders from Romania and nine other EU countries.[37] These positions come ahead of the revision of the ETS directive, which is due in July 2026, attempting to dampen the backbone of European climate policy, citing higher costs for industry but missing out on the benefits coming from revenue recycling that the ETS enabled.

From a decision-making perspective, Romania's energy policy has unfolded over the past decade against a backdrop of persistent political instability, marked by frequent government reshuffles and limited continuity for structural reforms. That notwithstanding, successive governing programmes have maintained broad support for strategic energy investments, particularly in nuclear and gas, though concrete action has often lagged behind stated ambitions until recently.

The traditional governing parties, PSD and PNL, alongside the UDMR (the political representatives of the country's Hungarian minority), have broadly backed both conventional energy investments and renewable energy support. The political flanks, though, pull in opposing directions: the far-right AUR has channelled nationalist scepticism toward EU climate policies. This fragmented political landscape has constrained the consistency and speed of energy policy implementation, even where cross-party consensus on the general direction nominally exists.[38]

However, Romania’s biggest challenge in implementing decarbonisation strategies is the lack of administrative capacity, including poor inter-institutional coordination and unpredictable legislative frameworks.[39][40][41] These weaknesses and delays have resulted in the suspension of a significant portion of Romania’s NRRP funding until key management positions in state-owned enterprises are professionally recruited, independent of any political control. This gap

[36] Energy Policy Group, 2025, ETS2 in Romania: Turning Climate Policy in Economic Opportunity
[37] Romania Insider, 2026, Romania joins group of EU states calling for review of Green Deal targets | Romania Insider
[38] The Parliament Magazine, 2024, What the rise of Romania's far-right AUR could mean for the future of parliament
[39] European Commission, 2024, Alert mechanism report 2024
[40] OECD, 2024, OECD economic surveys: Romania 2024
[41] World Bank, 2023, Systematic Country Diagnostic Update: Romania

between plans and action establishes a risk to the energy transition as it threatens Romania's ability to absorb and effectively use the of EU funding available.

Integrated infrastructure planning presents a way for Romania to meet its energy transition targets at least cost.[42] Electricity and gas are planned independently and in a reactive manner, creating the risk of increasing infrastructure duplication and stranded assets. If Romania can manage to coordinate cross-sectors and plan using proactive, scenario-based modelling outputs, it can align its infrastructure investments with decarbonisation trajectories. Tying infrastructure investment to avoided additional costs and decarbonisation, climate objectives may remain resilient to political and security volatility, while ensuring the security of supply.

[42] EPG, 2025, Overcoming Barriers to Integrated Infrastructure Planning

Scale and Timing of Environmental Shocks

Romania's energy transition and economic development is unfolding during a time of intensifying climate change and unreliable weather patterns.[43] Romania, in particular, is facing severe water stress and recurrent flooding in combination with frequent heatwaves. These are no longer mere potential threats but can presently endanger the economy, the infrastructure and the viability of mitigation efforts. Although a policy framework focused on adaptation exists, implementation remains limited and it is not focused on in political rhetoric.

A critical climate vulnerability is the acceleration of aridification, particularly in the regions of Oltenia, Dobrogea, the Romanian Plain, and the Moldavian Plateau. Drought and desertification in these regions resulted in the loss of around 1,000 hectares of agricultural land per year in the south.[44] A combination of rising temperatures and declining rainfall of exacerbated the impacts of recent deforestation, which eliminated the forest belts essential for soil stability and the abandonment of communist-era irrigation systems.[45] Farmers identify drought as their primary challenge, leading to significant crop yield instability and economic losses exceeding 1 billion euros in recent years solely for maize.[46] This degradation is a driving factor for increased rural depopulation and reliance on food imports.[47] Furthermore, renewable water resources are at approximately 1,840m³ per capita per year which is already close to the United Nations' water stress threshold.[48] [49]

In parallel, the country is susceptible to flood risk, particularly within the Danube River basin. Between 1970 and 2021, Romania experienced 90 major disasters, predominantly floods, affecting over two million people and causing damages estimated at $6.2bn.[50] Projections indicate that the frequency of such extreme events could increase sixfold by 2080.[51] Recent flooding in September 2024 has highlighted ongoing risks, impacting thousands of households.[52] These hydrological extremes create cross-border challenges, as changes in the Danube's flow directly impact navigation, energy security, and ecosystems in neighbouring countries like Bulgaria and Serbia.[53] This necessitates close cross-border cooperation in disaster response and water management.

In response to these vulnerabilities, Romania has developed the National Strategy on Adaptation to Climate Change (2024–2030), which takes a systemic approach across 13 key

[43] Energy Policy Group, 2026, Deșertificarea în România: risc climatic, impact social și economic.
[44] Agroberichten Buitenland, 2025, Around 100,000 hectares are turning into desert in Romania
[45] Agroberichten Buitenland, 2025, Around 100,000 hectares are turning into desert in Romania
[46] Mihailescu et al., 2024, Climate change impact on maize cultivation in Romania: A regional analysis of yield variability and economic consequences
[47] Agroberichten Buitenland, 2025, Around 100,000 hectares are turning into desert in Romania
[48] Ecostratos, 2025, Romania's water resources – Current state of water reserves and sustainable future directions
[49] European Commission, 2025, Water Statistics
[50] Global Facility for Disaster Reduction and Recovery, 2024, Building inclusive resilience in Romania
[51] Global Facility for Disaster Reduction and Recovery, 2024, Building inclusive resilience in Romania
[52] Global Facility for Disaster Reduction and Recovery, 2024, Building inclusive resilience in Romania
[53] International Commission for the Protection of the Danube River, 2018, Update of the climate change adaptation strategy for the Danube River Basin

vulnerable sectors and is aligned with EU directives.[54] This is complemented by the Disaster Risk Reduction Strategy (2024–2035) and Flood Risk Management Plans developed with World Bank support, which are beginning to shift focus from grey infrastructure to nature-based solutions.[55][56]

Nonetheless, despite comprehensive frameworks, significant implementation issues have been identified, including the aforementioned absence of a legally binding national climate framework law.[57] Analysis from the Organisation for Economic Co-operation and Development (OECD)[58] indicates a systemic failure to mainstream preventive measures into spatial planning and sectoral investment strategies, reflecting a broader deficit in administrative capacity to implement. Besides, as note, political discourse, in general, and energy policy planning, in particular, pays little attention to the impacts of climate change on the very resilience of energy systems and infrastructure.

Indeed, extreme weather events also pose a direct physical threat to energy infrastructure.[59] The country's hydropower capacity is vulnerable to drought-induced reductions in the Danube's summer river flow.[60] Similarly, the expansion of nuclear reactors at Cernavodă will increasingly rely on the Danube for cooling and has already experienced shutdowns in 2003 and 2011 during droughts[61].

At the same time, heatwaves are often associated with low wind speeds, creating 'energy droughts' that can reduce wind power production by up to 30% and diminish the efficiency of solar panels, precisely when energy demand for cooling is at its peak.[62] Furthermore, the large-scale deployment of solar and wind farms compete for land with an agricultural sector already under severe pressure from desertification, as well as with reforestation programmes which are crucial adaptation measures.[63] Without an effective spatial planning policy that considers all competing pressures, Romania risks undermining interdependent adaptation and mitigation goals.

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[54] European Parliament, 2025, Roadmap to EU climate neutrality - Scrutiny of Member States Romania's climate action strategy
[55] World Bank, 2022, Planning for resilience: Romania's new flood risk management plans
[56] Global Facility for Disaster Reduction and Recovery, 2024, Building inclusive resilience in Romania
[57] European Parliament, 2025, Roadmap to EU climate neutrality - Scrutiny of Member States Romania's climate action strategy
[58] OECD, 2024, OECD economic surveys: Romania 2024
[59] OECD, 2024, OECD economic surveys: Romania 2024
[60] International Commission for the Protection of the Danube River, 2018, Update of the climate change adaptation strategy for the Danube River Basin
[61] The Guardian, 2011, Persistent drought in Romania threatens Danube's power
[62] CEEnergy News, 2025, How are heatwaves shaping electricity demand in Southeastern European countries?
[63] Agroberichten Buitenland, 2025, Around 100,000 hectares are turning into desert in Romania

Social Cohesion, Migration, and Demographics

Romania is facing a substantial and worsening human capital deficit which threatens to undermine the labour capabilities required to implement the energy transition. These challenges include significant population decline, sustained emigration of skilled labour and blue-collar workers, and persistent workforce challenges. Since the fall of the Communist regime in 1989, the population has decreased from 23.2 million to approximately 18.5 million in 2025, largely due to mass emigration and low birth.[64][65] Projections from international bodies suggest a continuation of this trend, with the population potentially shrinking to 16.4 million by 2050[66], a trajectory placing Romania among the EU Member States facing the most acute demographic decline.

The demographic decline has a direct impact on workforce availability, in terms of labour shortages and skills gaps that hinder economic competitiveness and productivity. Romania's overall employment rate was 69% in 2025 and remains one of the lowest in the EU.[67] Labour force participation rates for women lag behind that of men; among young people, the rate of those Not in Education, Employment, or Training (NEETs) is among the highest in the Union.[68]

Despite notable exceptions, the national education system is generally not well aligned with the needs of the modern labour market, with the result that graduates often lack of critical thinking, as well as the socio-behavioural and digital skills demanded by employers.[69] This has led to a significant "skills mismatch", a situation where employers cannot find enough qualified candidates for high-skilled technical roles, while a large number of tertiary-educated Romanians are overqualified for the lower skilled jobs they occupy.[70]

Government policy is making reforms to fill these gaps. The National Strategy on Education for the Environment and Climate Change 2023-2030 aims to integrate sustainability into all school subjects and the vocational education and training (VET) system that is being updated with new "green" qualifications, such 'photovoltaic systems electrician.' This uncertainty over workforce availability is particularly acute for the clean tech industrial strategy, as Romania continues to lose significant levels of STEM graduates to Western European labour markets, and further abroad.

The regional disparity within Romania is amplified by emigration dynamics. Economic opportunity is highly concentrated in a few urban poles, primarily Bucharest and urban centres such Cluj-Napoca, Iași, Timișoara where GDP per capita vastly exceeds the national average.[71] These urban poles have attracted the bulk of private investment, skilled labour, and

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[64] National Institute of Statistics (INSSE), 2021, Populaţia României 1860–2020 – serii istorice de date
[65] Eurostat 2026: [proj_23np] Population on 1st January by age, sex and type of projection
[66] National Institute of Statistics (INSSE), 2021, Proiectarea populaţiei României în profil teritorial, la orizontul anul 2060
[67] Eurostat 2026. Romania Employment Rate.
[68] World Bank, 2023, Systematic Country Diagnostic Update: Romania
[69] World Bank, 2023, Systematic Country Diagnostic Update: Romania
[70] World Bank, 2023, Systematic Country Diagnostic Update: Romania
[71] National Commission for Strategy and Prognosis (CNSP), 2025, Prognoza 2025-2028 în profil teritorial – aferentă Prognozei macroeconomice de primăvară 2025

public infrastructure spending. Meanwhile, a significant share of smaller towns and rural areas have been caught in a self-reinforcing cycle of decline. This disparity is a major driver of internal migration from rural and smaller urban areas to metropolitan centres, resulting in the outmigration of human capital from peripheral regions and perpetuating an imbalance in development.[72]

In response to immediate labour shortages, Romania has significantly increased the issuance of work permits to non-EU nationals, becoming a key entry point for workers from countries such as Moldova, Sri Lanka, Nepal, and Turkey.[73] However, this policy appears to focus on filling low-skilled positions in sectors such as construction, retail, and hospitality. Furthermore, the restrictive nature of initial work permits, which often tie migrant workers to a single employer, are less effective in attracting or retaining the high-skilled, internationally mobile talent needed for a knowledge-based green economy.[74] This approach risks creating a low-skill immigration trap by addressing immediate labour shortages at the bottom end of the market without counteracting the continuous 'brain drain' of highly educated Romanians.

The EU's Just Transition Fund (JTF), the primary policy instrument designed to ensure social cohesion through the transition, has been underutilised to address this issue in Romania. The JTF was intended to provide €2.13 billion to support the economic diversification and reskilling of workers in the six counties most affected by the phase-out of fossil fuels, such as the coal-dependent Jiu Valley. Yet as of mid-2025, the fund had disbursed €113 million, with only one of the sixteen planned funding calls having been finalised.[75] Experts and civil society organisations widely describe the programme as 'dysfunctional' and a 'missed opportunity', paralysed by administrative bottlenecks, a disconnect between central and local authorities, and a lack of strategic vision.[76] As workers in carbon-intensive industries face layoffs without receiving any tangible support, the state's institutional credibility is eroded and local attitudes towards the energy transition are diminished.

[72] World Bank, 2023, Systematic Country Diagnostic Update: Romania
[73] AmCham, 2023. AmCham Romania Analysis on the Labor Market in Romania

[74] KPMG Romania, 2025, Romanian work permits

[75] Ministerul Investițiilor și Proiectelor Europene, 2025 , Lista plăților PTJ
[76] PressOne, 2025, "We don't know exactly what has been funded." The Romanian state, a dismal failure in attracting EU funds for the most polluted counties

Societal Support and Values-Based Divides

Poor governance has stalled key policies like the Just Transition Fund, creating fertile ground for public cynicism and political opposition. While there is widespread concern over climate change, public support remains conditional and is vulnerable to economic pressures and distrust in the state's capacity to deliver a fair and efficient transition.

A 2023 survey on the public perceptions of climate change in Romania found that around 87% of citizens believe the environment directly affects them, 97% recognise the need for the country to adapt to climate change, and 88% feel its impact on their daily lives -- a figure significantly above the EU average[77], suggesting a high level of awareness. However, the same survey also found that only 23% of Romanians identified climate change as one of the four most serious problems facing the world, compared to a 46% EU average[78].

This conditionality is reflected in attitudes towards the costs of the transition. Although a minority, over 40% of Romanians express a willingness to pay more for climate action and there is strong support for the principle of a just transition.[79] The majority of Romanians believe the transition can only succeed if social and economic inequalities are addressed simultaneously, and two-thirds of Romanians would be willing to accept a modest income tax increase, specifically to help lower-income households cope with the costs. This suggests that the fairness and distributional impact of a policy are determinants of its public acceptance.

These trade-offs are experienced differently between urban and rural Romania, and the electoral weight of the rural regions can influence how mainstream parties progress climate-related policy. Rural communities are often more directly dependent on agriculture, forestry, and other natural resources, making them aware of direct climate impacts like drought but also more vulnerable to policies that affect land use or traditional industries.[80]

Issues such as energy poverty are also more severe in rural areas, where a majority of households (up to 80%) rely on inefficient solid fuel heating.[81] Meanwhile, much like in other countries, green industries, innovation hubs, civil society organisations, and climate-related political discourse is concentrated in major cities, so that the transition agenda is often perceived as an "inherently urban notion".[82] This framing can create a perception that climate policy is disconnected from the realities of rural life, where approximately 45% of the population resides.[83]

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[77] European Investment Bank (EIB), 2024, Most Romanian respondents consider climate adaptation a national priority – EIB survey shows
[78] European Parliamentary Research Service, 2025, Romania's climate action strategy
[79] European Investment Bank (EIB), 2023, Romanians believe climate change can only be tackled if inequalities are addressed at the same time, EIB survey finds
[80] World Bank, 2021, Romania Country Climate and Development Report
[81] European Environment Agency, 2025, Romania Country Profile
[82] Brett, 2018, Why Romania's protests have failed to bring about real change
[83] World Bank, 2020, Romania country program snapshot

This gap can be exploited to fracture social movements, a pattern seen in past protests in Romania[84] as well as more broadly across Europe. Despite Romania's climate policy being anchored in EU frameworks, the domestic political consensus that underpins it has been fracturing. Fuelled by misinformation spread on the social networks, rhetoric attributing climate policy as detrimental to national sovereignty is beginning to influence mainstream politics[85] and senior figures have begun publicly questioning the Green Deal and calling for delays to coal-phase out and to prioritise short-term economic concerns, often under the guise of tech neutrality.[86]

[84] Brett, 2018, Why Romania's protests have failed to bring about real change
[85] The Parliament Magazine, 2024, What the rise of Romania's far-right AUR could mean for the future of parliament
[86] Euractiv, 2024, Romanian minister warns of Green Deal's negative impact on energy sector

Conclusions

Romania's policy context is a patchwork of strategies which together attempt to address the six uncertainties laid out in this paper. In theory, some of these strategies have substantial funds to underpin their implementation from EU sources, like the Modernisation Fund or from the NRRP. While Romania has made progress in increasing EU funds absorption rates in recent years, this remains insufficient to close the investment gap accumulated over decades of underperformance. Recent political crises have added further risk, with delays and uncertainty around the NRRP threatening to slow disbursement of EU funds which Romania cannot afford to lose. The country's ability to manage the uncertainties laid out on the global scale is dependent on its ability to convene stakeholders across industry and policy together under well-funded programmes to see out its strategic goals.

How Romania's energy transition unfolds depends on the extent it can participate in reindustrialisation and benefit from the growing global demand for low carbon technology. A foundational policy framework is in place, yet Romania's transition is lagging behind neighbouring countries like Poland and Hungary. Maintaining competitiveness requires Romania to leverage its existing comparative advantage in exports like electrical equipment and control systems, its expertise in nuclear energy, as well as growing and exporting digitalisation know-how. However, Romania will need to train up and attract sufficient levels of competent workforce to move beyond reliance on NRRP funding and attract investment on its own merit.

Romania passively consumes subsidised green technology, although it could develop the capabilities to become a strategic exporter for the European market in limited, high value tech. Romania is somewhat protected from global supply shocks through EU protectionist measures but is also risking a too expensive energy transition, without access to the most affordable materials and systems. Navigating this landscape requires Romania to transition away from being only a recipient of EU funds to proactively use its geographic and labour advantages into strategic nearshoring, especially given the circumstances requiring Ukraine's reconstruction.

While rhetoric around the energy transition has shifted towards national security interests, Romania's progress is limited. The country struggles with chronic regulatory unpredictability, frequent shifts in fiscal and sectoral policy, and weak institutional capacity, which have consistently undermined its attractiveness to private investors, foreign and domestic. This challenge extends beyond direct investment decisions to the underdevelopment of domestic financial instruments in capital markets to blended financing mechanisms. Without overcoming these challenges, Romania will likely execute its transition in response to external EU pressure as opposed to a well-designed and properly internalised pathway based on domestic economic analysis. Meanwhile, though, the success of the Contracts for Difference scheme highlights how this problem can be partially overcome when financing is secured.

Romania's climate strategy is focused on mitigation, although the energy transition infrastructure is being deployed into an increasingly challenge environment, that requires robust adaptation measures. Romania must expect increasing aridification and hydrological

extremes, both of which will affect the lifespan of existing infrastructure. Without legislation compelling the enforcement of cross-sectoral spatial planning and integration of resilient infrastructure, Romania's energy security is at risk.

The viability of Romania's energy transition is contingent on fixing its structural labour deficit. The shrinking youth population coupled with an immigration framework that limits migrants to low-skilled labour creates a persistent gap in high-value technical sectors. Negligible absorption rates of EU funding are threatening the economic stability of the transitioning coal regions. The technical requirements of the future net-zero economy needs to align with vocational training. Without structural adjustment, the disconnect between national objectives and the local capacity to execute will continue to hinder Romania's ability to deploy and maintain its clean energy infrastructure.

Romania's energy transition is susceptible to the erosion of the social contract, against a background of perceived institutional incompetence. While the Romanian population has a high-level awareness of climate risks, public support is focused on socioeconomic benefit and the reduction of energy poverty, especially in rural regions. The urban-rural divide is increasingly exploited by political actors to challenge the legitimacy of EU-led regulations. Maintaining momentum for the energy transition requires policy to address the challenges with distributional equity to avoid increasing political polarisation and a retreat from national commitments.

Policy Recommendations

1. **Strategically foster industrial specialisation by leveraging exports with comparative advantage in low carbon tech manufacturing.** Strategically growing areas of existing advantage or areas of possible new advantage, such as nuclear, can support Romania's economic growth and strengthen existing partnerships. Innovation to support this specialisation will need a dedicated co-investment mechanism to attract the private capital needed for the startup and innovation arena.
2. **Align human capital with the needs of a net-zero economy through dedicated educational programmes, re-skilling and retention focused mechanisms.** The future economy will need to be supported STEM graduates, tradespeople (i.e. welders, technicians, electricians) as well as project managers and entrepreneurs. Romania will need to introduce new programmes in line with these work areas, and ensure a pipeline into the workforce. Re-skilling workers from the former fossil fuel economy and focusing on retention of existing talent will need to accompany this overhaul. At the same time, the government would be well-advised to elaborate an intelligent, systematic, and forward-looking immigration policy.
3. **Limit the cost of the energy transition through integrated infrastructure investment planning to ensure efficient allocation of funds.** Decision-making frameworks must be amended to allow investments to be made on the basis of cross-sector modelling and scenario analysis, thereby avoiding costly stranded assets and infrastructure duplication.
4. **Design transition policies to explicitly address energy poverty and socio-economic inequalities to maintain and grow public support.** Romania's transition is vulnerable to shifts across the political spectrum. Rooting the energy transition in Romania's future economic growth and ensuring distributional equity may help prevent the exploitation of the rural-to-urban divide.

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