CEESEU-DIGIT

Central and Eastern Europe Sustainable Energy Union's Design and Implementation of regional Government Initiatives for a just energy Transition

Regional analytical report

D4.4 Regional Analytical report

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Background of the CEESEU-DIGIT project

The Central and Eastern European Sustainable Energy Union's Design and Implementation of regional Government Initiatives for a just energy Transition (CEESEU-DIGIT) aims to build the capacity of public administrators in Central and Eastern Europe to develop Energy and Climate Action Plans (ECAPs) that not only promote increased energy efficiency, sustainable energy, reduced carbon emissions and improved climate change adaptability, helping the region to contribute towards meeting the EU's climate goals, but also plans that follow the intent of the Commission to "leave no-one behind" in the process of the just transition to energy security and the goal of a climate-neutral Europe. To ensure a clear understanding among partners, the project's Advisory Board, and the EC that an ECAP includes sufficient and well-targeted attention to the social justice components of the clean energy transition, the term ECAP+ is used in the project.

CEESEU-DIGIT's primary objective is to build capacity in 6 carbon intensive regions in 6 countries in the CEE for holistic regional ECAPs aligned with NCEP national targets supporting the Green Deal, and will involve marginalised and vulnerable groups, especially energy-poor households. A second objective is to assist municipalities to formulate, fund, and implement their ECAPs aligned with regional ones. At both levels, extensive capacity building will be extended to assist with building ECAPs.

Drawing municipalities into energy regions will help cross-pollinate ideas, share knowledge and tasks, and apply for financing. Public-sector capacity building (WP2, WP3) will help (a) formulate a holistic ECAP with energy provisions and carbon footprint reduction while improving climate-sensitive social goods - mobility, parks, playgrounds, clean air and water, biodiversity conservation; (b) address energy poverty - heating/cooling, adequate ventilation/lighting, domestic hot water, cooking; (c), attend to constituents and act on behalf of their needs; (d) understand financing options and how to apply for these; and (e) work with the private sector to mute opposition to the CET and to encourage and incorporate funding of ECAP initiatives by business (WP5). A just Clean Energy Transition (CET) needs to maximise support, minimise opposition, and overcome apathy, requiring social science/social psychology theory to be applied (WP3). Non-public sector stakeholders (key players, context setters, the crowd, and subjects) will each be targeted by specific social and conventional media outreach (WP6).

Dissemination will be (a) upward to national levels, the CoM, and the EU for use in energy transition planning (WP5, WP6); (b) across a broader CEE geography via the Central and Eastern Europeans Sustainable Energy Union (CEESEN), a recently

established NGO, to have by the end-of-project 2500 members using its online platform to share best practices, lessons learnt, and ideas that can advance the EU's climate goals (WP6).

As a result of implementing the CEESEU-DIGIT project, it is anticipated that several important longer-term impacts will be achieved, a selection among which include:

- 6 high-quality ECAP+s formulated that align GHG reduction targets with 2030 goals and address the special needs of energy-poor, elderly, and minority communities, to include people with disabilities;
- Public/private participation of 900 people in ECAP+ planning meetings to voice their concerns;
- 18 Regional Work Groups are formalised to provide ongoing input into ECAP+ implementation and a longer-term, holistic vision for a just transition;
- At least 66 public sector employees are capacitated to develop regional ECAP+s including mapping of stakeholders and collection of baseline data, and to utilise participatory governance structures to ensure involvement of all stakeholders, especially groups that are often marginalised (energy poor, ethnic minorities, migrants, elderly, people with disabilities, Roma, etc.);
- At least 200 people from civil society and vulnerable groups are capacitated to advocate on behalf of their interests in relation to energy policy/transition;
- Regional/municipal governments designate 7% of their budget to energy transition activities.

Relevance of this Deliverable

Building on the efforts of other work packages, we produced a Regional Analytical report (T.4.5.2) that compares the three-targeted CEE sub-regions (Baltics, Visegrad, and Balkans). This report will address the political, social, and environmental aspects of the ECAP and just transition planning processes, identifying shared or prevailing needs, challenges, opportunities, and threats faced by each region. In this report, we chose to analyse the different National Energy and Climate Plans (NECP) of the named countries using a SWOT method to provide a comprehensive evaluation of each region's energy transition framework. In each country, we gave specific attention to the consequences of national policies for the local energy transition.

Summary

Across the Baltics, Visegrad, and Balkans regions, significant strides are being made towards energy transition and climate resilience, but the pathways and challenges differ notably. A shared feature among all regions is a strong alignment with EU climate targets and strategies, reflected in their respective National Energy and Climate Plans (NECPs). However, local economic structures, administrative capacities, and demographic trends shape both opportunities and vulnerabilities in markedly different ways.

In the **Baltic states** (Estonia, Latvia), the energy systems are technically robust, interconnected, and increasingly diversified (**Vidzeme**), supported by proactive decarbonization strategies. There is a clear focus on grid modernization, regional cooperation, and digitalization. However, the Baltics remain exposed to external risks, notably their historical reliance on energy imports from Russia, and growing geopolitical threats. Public support for renewables is strong, yet administrative bottlenecks and some regions (**Ida-Viru**) deep cultural and economic reliance on fossil fuels limit rapid scaling. Vulnerabilities around energy poverty persist, especially in rural areas.

Turning to the **Visegrad group**, differences are more pronounced between countries like the Czech Republic and Poland. In **Broumovsko (Czech Republic)**, while energy system reliability and EU program alignment are strengths, challenges arise from an aging population, protected landscapes restricting renewable deployment, and high fossil fuel dependency. **Mazowieckie (Poland)** similarly faces structural barriers such as outdated infrastructure, persistent coal reliance, and limited administrative capacity at the municipal level. However, both regions share opportunities tied to decentralized energy models, community energy, and targeted EU funds like the Modernisation Fund and upcoming Social Climate Fund. The Visegrad regions particularly struggle with governance complexity and risk falling behind urban centers unless administrative and capacity gaps are urgently addressed.

In the **Balkans**, **Međimurje (Croatia)** and **Podravje (Slovenia)** show more systemic alignment with EU climate goals, supported by strong technical infrastructure and proactive policy frameworks. Both areas benefit from access to modernization funds and emphasize innovation, green skills development, and decentralized renewable energy. Yet vulnerabilities persist, such as Croatia's ongoing reliance on natural gas and imports, and Slovenia's regional inequalities—particularly as Podravje is excluded from Just Transition funding mechanisms. The Balkans' rural areas risk marginalization due to demographic decline, underdeveloped alternative fuel infrastructure, and insufficient local coordination despite national commitments.

Across all regions, **decentralization**, **resilience building**, and **community-driven energy models** emerge as common opportunities. Each region recognizes the importance of tackling **energy poverty** and integrating **rural development** with the green transition. Nevertheless, disparities in **digital infrastructure**, **local administrative strength**, and **public engagement** differentiate their prospects for success. The Baltics benefit from a head start on digitalization and regional integration but face external geopolitical pressures. The Visegrad regions struggle with fossil lock-in and bureaucratic fragmentation, while the Balkans show strong ambition but are hampered by systemic energy import dependence and risks of regional marginalization.

Finally, while **EU funding instruments** such as the Recovery and Resilience Facility, Modernisation Fund, and upcoming Social Climate Fund are pivotal across all territories, their effective absorption depends heavily on local capacity—often lacking in more rural or economically weaker areas. Without stronger regional coordination, stakeholder inclusion, and administrative support, there is a risk that some regions will experience a "two-speed" transition, deepening social and territorial inequalities within and between member states.

In summary, while all regions try to align toward EU climate goals, their readiness, challenges, and vulnerabilities diverge based on historical energy structures, administrative capacities, and local socio-economic conditions. Success will depend not only on national policy design but critically on empowering regional and local actors to lead the energy and climate transition on the ground.

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
BALTICS	• Strong renewable energy potential and well-developed electricity infrastructure • Support from the EU Just Transition Fund	• Deep economic and cultural dependence on fossil fuels • High investment needs for retrofitting aging infrastructure	• Potential for industrial transformation towards clean energy • Regional collaboration can foster sustainable energy and climate solutions	• Geopolitical instability and shifting national priorities can divert funding away from climate action. • Institutional weaknesses and fragmented governance
VISEGRAD	• Clear NECP targets for emissions reduction and renewable energy expansion • Strong electricity grids support decentralized renewable energy.	• Limited capacity for renewable energy deployment in rural areas. • Local governments lack resources to implement complex projects.	• Community-based energy models and local solar farms. • EU funds offer opportunities for modernization and sustainable development.	• Slow investment in energy systems risks leaving rural areas behind. • Strong coal sector influence may hinder policy adoption.
BALKANS	• Access to EU funds and structured support for R&D and decentralization • Strong grid systems and EU-aligned energy policies, enhancing stability and interconnectivity	• Limited progress in electric/hydrogen mobility and clean heating solutions. • Regional Disparities lead to funding and support gaps	• Potential for growth in green technologies, smart grids, hydrogen, and CO_2 storage solutions. • Decentralized energy systems can empower rural communities.	• Extreme weather, energy price volatility, and dependence on imports threaten system resilience. • Resistance in fossil-reliant areas and lack of local engagement may hinder implementation.

Table 1: Comparative SWOT analysis of Baltics, Visegrad and Balkans

Methodology

This SWOT analysis examines the National Energy and Climate Plans (NECPs) of three key regional blocs within the EU: the Baltic states (Estonia, Latvia), the Visegrád Group (Czech Republic, Poland), and selected Balkan countries (Slovenia and Croatia). The methodology involves a structured assessment of each countries NECPs to identify internal strengths and weaknesses in energy and climate policy frameworks, alongside internal and external opportunities and threats posed by geopolitical, economic, and environmental factors with a specific focus on the regions part of the CEESEU-DIGIT project.

Country	Region	Estimated regional population	Number of admin. units	Total primary energy consumption in region, GWh	Public sector energy consumption in the region, GWh	RE production in in the region, GWh
Estonia	Ida-Viru County (excluding Narva)	80 460	7	2 911,00	340,47	13,40
Latvia	Vidzeme Planning Region	+/- 278 000	11	714,61	663,73	627,53
Poland	Mazovia Voivodeship (excluding Warsaw)	3 705 000	47	33 348,94	8960,58	28710,00
Czech Republic	Broumov Region	23 800	22	106,51	85,42	7,78
Slovenia	Podravje Region	325 990	43	11 700,00	848,01	1700,00
Croatia	Medjimurje County	113 800	35	2 373,00	268,22	20,70
	Total:	4 413 250	165	51 154	11 166	31 079

Table 2: Overview of regions part of CEESEU-DIGIT

Primary data sources include official and draft NECP submissions to the European Commission, EU progress reports, national energy strategies, and secondary literature on regional climate governance.

Baltics

The Baltics possess strong renewable energy potential, with abundant wind, solar, and biomass resources, and well-developed electricity infrastructure, supported by EU financial instruments like the Just Transition Fund. However, challenges persist due to a deep reliance on fossil fuels, outdated industrial infrastructure, and regulatory constraints that hinder renewable energy development. Opportunities for industrial transformation and community-driven resilience exist, but threats such as geopolitical instability, climate change impacts, and institutional weaknesses, including fragmented governance and short-term political cycles, pose risks to the region's transition. Addressing these issues will be crucial for realizing the full potential of the green transition in the Baltics.

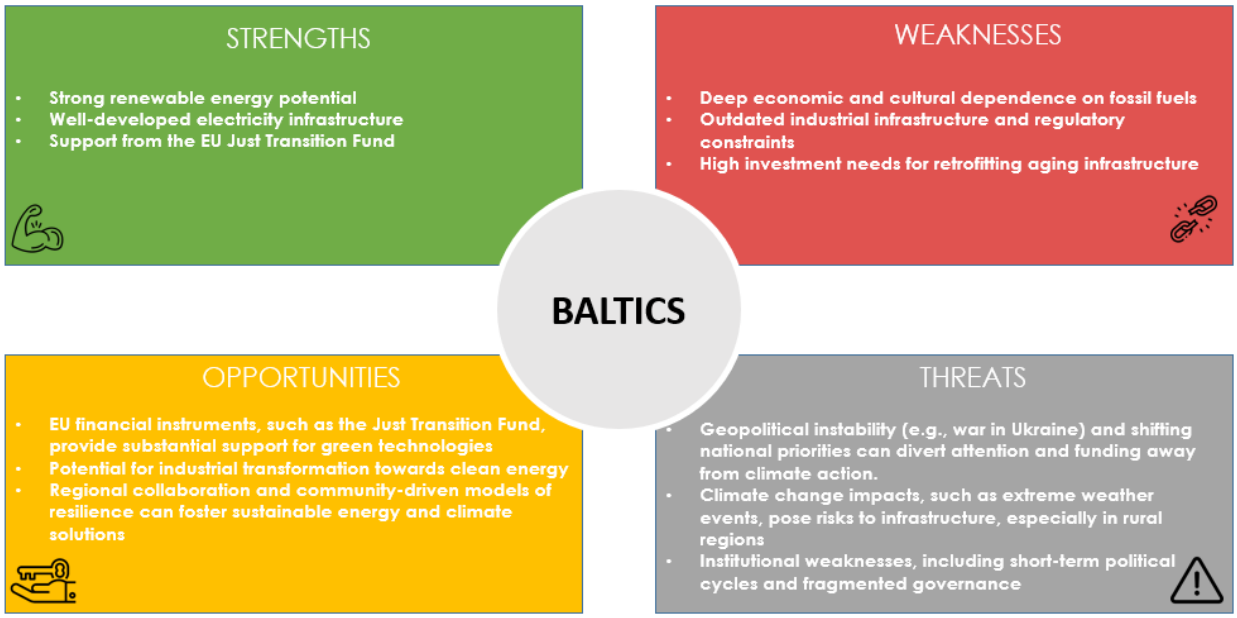

Table 3: SWOT analysis of Baltics

Estonia

Estonia's National Energy and Climate Plan (NECP) outlines an ambitious roadmap toward decarbonisation, energy diversification, and a green economy. Nowhere is this more relevant—or more complex—than in the Ida-Viru region, a historically fossil-fuel-dependent area undergoing profound transformation. The region's legacy in oil shale energy production makes it both a challenge and an opportunity for Estonia's energy transition efforts.

Strengths

Ida-Viru holds a strategic advantage in renewable energy potential, with ample capacity for developing large-scale wind, photovoltaic (PV), and biomass projects. This aligns strongly with Estonia's NECP targets, which emphasize a rapid expansion in renewable energy deployment. One of the region's most significant assets is its well-developed electricity infrastructure, a legacy of its industrial past. The robust grid capacity provides an ideal technical foundation for integrating new renewable energy sources without major structural overhauls.

Another defining strength is the allocation of 100% of Estonia's Just Transition Fund (JTF) to Ida-Viru County, underscoring the national commitment to a fair and inclusive energy transition. These funds are earmarked to support not only the phasing out of oil shale production but also the creation of green jobs, retraining programs, and sustainable infrastructure projects, thereby enhancing the region's economic and social resilience.

Weaknesses

Despite its assets, the region faces substantial hurdles. Ida-Viru's deep economic and cultural dependence on oil shale presents a complex challenge to decarbonisation. For many, oil shale is not just an energy source but also a cornerstone of local identity and livelihood. This can lead to social resistance, hesitation from local stakeholders, and slower implementation of NECP measures.

Furthermore, aging industrial infrastructure and outdated buildings require significant investment and time to bring up to modern energy efficiency standards. These retrofitting demands could delay progress on both emissions reductions and energy savings. Compounding the issue, regulatory constraints—such as limits on windmill height and output due to airspace monitoring—directly hinder renewable energy development. Although Estonia's NECP includes measures such as installing new radar systems to accommodate wind energy expansion, these solutions have not yet sufficiently addressed constraints specific to Ida-Viru, leaving renewable projects in the region at a relative disadvantage.

Opportunities

Despite the challenges, the future holds considerable opportunity for Ida-Viru to emerge as a leading example of industrial transformation in the Baltic region. The NECP lays the groundwork for a diversified and innovation-driven economy, with emphasis on green technologies and sustainable energy infrastructure. Ida-Viru's existing energy grid can be adapted to support new energy sources, particularly onshore wind and solar installations, allowing the region to meet and exceed national targets.

Perhaps most importantly, the EU Just Transition Fund provides a significant financial cushion to mitigate economic disruptions and accelerate progress. With targeted investments, the region can foster the development of clean industries, advanced manufacturing, and research hubs—all while ensuring that displaced workers are retrained and re-employed in future-facing sectors. This also provides an opportunity to strengthen public engagement and education, helping to overcome cultural resistance and build a more inclusive, locally supported transition.

Threats

A key threat to realizing the ambitions of Estonia's National Energy and Climate Plan (NECP) lies in the social resistance to change in Ida-Viru County, the country's oil shale heartland. The region is economically and culturally dependent on oil shale, which not only accounts for over half of Estonia's greenhouse gas emissions but also provides thousands of well-paying jobs. The planned phase-out by 2040 raises serious concerns about unemployment, economic decline, and a lack of viable alternative employment opportunities. The county's aging and shrinking population adds pressure, as outmigration of younger workers threatens long-term regional viability. Additionally, the region's unique demographic—dominated by ethnic Russians—adds political and cultural sensitivity, with fears of social exclusion and mistrust in national policies potentially fueling opposition. Legal challenges to oil shale expansion also reflect growing environmental activism, further complicating the transition landscape. While the EU's Just Transition Fund provides significant financial support, the success of the NECP ultimately depends on how well the government can balance environmental goals with the socioeconomic realities of affected communities. Failure to deliver a fair, inclusive transition risks eroding public support, worsening regional disparities, and delaying Estonia's broader climate targets.

Conclusion

Estonia's NECP presents both a challenge and a turning point for the Ida-Viru region. On one hand, it must contend with the inertia of a fossil-fuel-dependent

past; on the other, it has the tools, infrastructure, and funding to lead the way in climate transition. If effectively supported and engaged, Ida-Viru has the potential to transform from a coal-based economy into a model of just and sustainable energy transformation—one that demonstrates how regions with industrial legacies can become cornerstones of a greener European future.

Latvia

The Vidzeme region in Latvia finds itself at a unique intersection of natural abundance, decentralised living patterns, and evolving national climate policy. The country's National Energy and Climate Plan (NECP) offers broad ambitions aligned with EU decarbonisation and energy independence goals, and Vidzeme's characteristics suggest it could become a model of rural resilience. Yet, underlying systemic weaknesses and emerging global threats reveal the fragility of such potential.

Strengths

Latvia's national framework provides a promising foundation for energy and climate action. The country boasts a high share of renewable energy in both heat and electricity sectors, and Vidzeme benefits directly from this legacy. A strong electrical grid, partially state-owned, supports the region's potential for greater electrification. National efforts to phase out inefficient biomass and move away from natural gas—which Latvia does not produce domestically—further support Vidzeme's push for cleaner, decentralized energy systems.

The NECP outlines concrete goals for CO_2 reduction and climate neutrality, creating policy alignment across sectors. Legislation also supports the growth of energy communities, while changes allowing multi-apartment renovations with fewer owner approvals could accelerate building efficiency upgrades—a crucial factor in a region with older housing stock.

Vidzeme's identity as a low-density, rural region with strong natural connections offers additional leverage. Residents' connection to land, gardens, and countryside traditions supports lifestyle patterns that align with low-emission living. This local context, when combined with a high level of renewable generation and limited fossil fuel infrastructure, means Vidzeme is well-positioned to embrace the green transition without some of the friction experienced by more industrialized areas.

Weaknesses

Despite these strengths, several entrenched weaknesses threaten the region's ability to fully benefit from the NECP. While wind energy development is encouraged, there is no national cap on installed capacity or designated exclusion zones (beyond border areas). This places an outsized burden on environmental impact assessment experts, without offering a framework to assess cumulative ecological impacts, especially in sensitive areas like Gauja National Park. This lack of policy clarity risks both environmental degradation and community pushback.

The legislative landscape still lacks comprehensive goals and frameworks around critical issues such as biodiversity protection, circular economy practices, and energy poverty. In Vidzeme, energy poverty remains poorly defined, with limited data available and few targeted interventions beyond general social assistance. Similarly, data gaps in the building sector—including renovation status and building stock characteristics—make it difficult to set or track measurable goals.

While recent legal changes aim to improve the pace of energy renovations, labour shortages and material scarcities are driving up costs and slowing implementation, particularly in smaller municipalities. Bureaucracy and fragmented governance further complicate local-level planning and execution.

Opportunities

Vidzeme has a number of unique opportunities it can seize in the climate transition. The region's low population density, abundant forests, and pre-existing collaborative networks among municipalities create fertile ground for localised energy and climate solutions. Partnerships across municipalities foster knowledge exchange and coordination, enabling region-wide strategies for energy efficiency, sustainable transport, and renewable deployment.

The NECP's alignment with climate neutrality, electrification, and reduced car emissions gives municipalities a strong narrative and policy backing when engaging with communities and decision-makers. Additionally, access to European funding instruments, including the Recovery and Resilience Facility and

Cohesion Funds, offers much-needed financial support for infrastructure and innovation projects.

Vidzeme's cultural orientation toward nature, including widespread ownership of countryside homes and self-reliance in food production, provides a unique platform for building sustainable, community-driven models of resilience. In the face of national limitations, Vidzeme's inherent assets—land, forests, and traditions—offer alternatives to conventional urban-centric planning.

Threats

Still, numerous threats hang over the region's transition trajectory. The ongoing war in Ukraine and its impact on budget allocations are shifting national priorities toward defense, reducing the attention and investment available for climate action. This is particularly damaging for rural regions like Vidzeme, where overall poverty levels and limited public resources already slow the pace of innovation and uptake of sustainable technologies.

Climate change impacts are already evident, and Latvia's infrastructure—especially in buildings—is not equipped to handle hotter summers, increased rainfall, or extreme weather. Buildings lack cooling systems, and city infrastructure is not climate-adapted, posing public health and productivity challenges in coming years.

Institutional weaknesses also undermine progress. Short-term political cycles, bureaucratic inertia, and low accountability among ministries prevent the development of cohesive long-term strategies. Civil society and NGO voices are often sidelined, while private sector lobbies continue to influence decision-making, risking a transition driven more by economic interests than public benefit.

A broader lack of understanding about key climate and energy concepts—from circular economy to energy poverty—within policy documents and among some regional planners threatens to delay or misdirect implementation at a crucial moment.

Conclusion

The Vidzeme region is not only naturally positioned but also culturally and technically equipped to become a leader in rural climate resilience. Backed by Latvia's NECP and European funding, the region has the potential to pioneer community-based renewable energy models, push for deep renovation in housing, and build a self-sufficient energy and food system. However, success depends on addressing policy blind spots—especially around environmental protection, social equity, and long-term infrastructure planning.

Without stronger national coordination and investment, and without addressing the governance and data gaps that inhibit local action, Vidzeme risks being left behind in a transition it is otherwise ready to embrace. The next five years will be pivotal in determining whether this rural region emerges as a climate success story—or becomes a cautionary tale of potential left untapped.

Visegrad

The Visegrad countries benefit from robust and reliable energy systems, strong cross-border interconnections, and well-defined national climate targets that support energy efficiency, social equity, and innovation. These strengths provide a solid foundation for the energy transition, especially in regions like Broumovsko (Czech Republic) and Mazowieckie (Poland), where rural characteristics and demographic challenges prevail. However, fossil fuel dependency, aging infrastructure, and limited local administrative capacity remain significant obstacles. The gap between strategic planning and practical implementation is wide, often exacerbated by bureaucratic hurdles and low digital readiness in rural areas. Despite these barriers, opportunities exist in community-led renewable initiatives, improved heating systems, and access to EU funding such as the Modernisation Fund and the forthcoming Social Climate Fund. Still, threats such as strong fossil fuel lobbies, economic volatility, and a lack of meaningful local engagement could hinder a fair and inclusive transition.

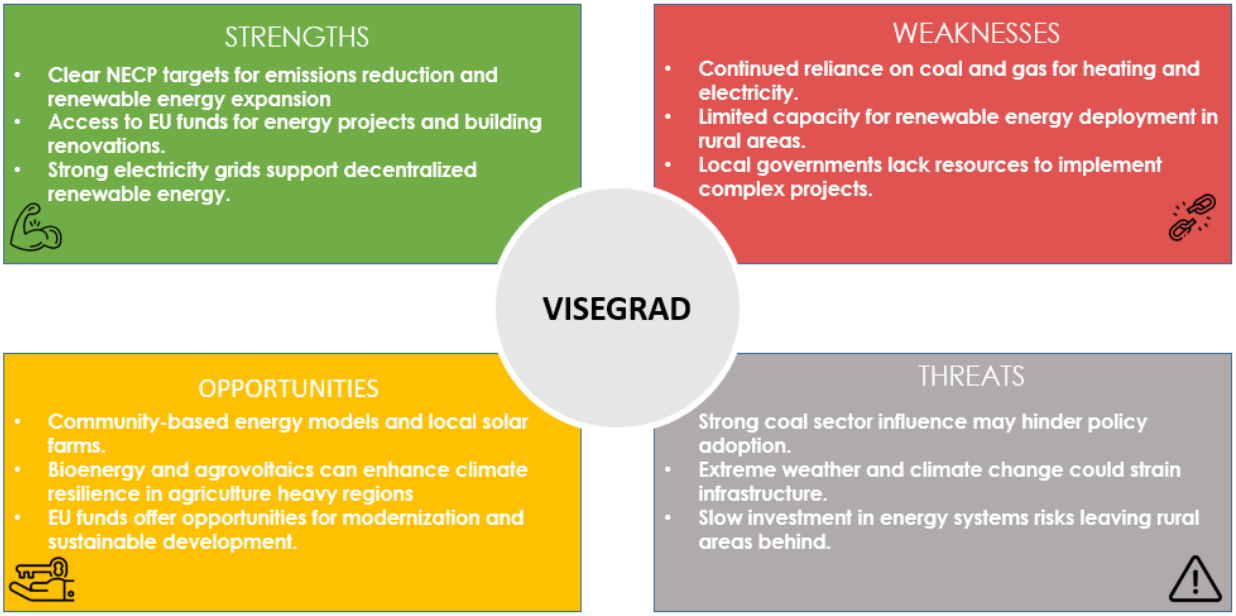

Table 4: SWOT analysis of Visegrad

Czech-Republic

Nestled within a protected landscape and shaped by both natural beauty and economic modesty, Broumovsko is emblematic of the challenges and opportunities that rural and environmentally sensitive regions face in the Czech Republic's energy and climate transition. The country's National Energy and Climate Plan (NECP) outlines a strategic roadmap towards decarbonization and resilience, yet translating this vision into localized impact remains a nuanced process.

Strengths

The Czech Republic's energy system stands out for its operational reliability and strong interconnectivity. Adhering to EU energy standards such as the N-1 resilience criterion and maintaining a robust cross-border transmission capacity, the national grid is well-positioned to support stable energy delivery—even in times of market or supply volatility. This resilience supports the stability of rural regions like Broumovsko, where access to consistent energy supply is essential for both residents and tourism infrastructure.

The NECP establishes clear national targets for renewable energy expansion, energy efficiency, and innovation—anchored in a scientifically modeled transition scenario. Programs like Nová zelená úsporám Light and kotlíkové dotace directly support vulnerable households, many of which are found in Broumovsko. These schemes encourage energy-efficient renovations and transitions to cleaner heating, offering a tangible way for the region's lower-income and aging populations to participate in the green transition.

Moreover, the NECP's commitment to deep building renovations, capacity building, and the integration of green skills programs opens pathways for regions

like Broumovsko to improve housing quality and workforce adaptability. Importantly, the emphasis on regional consultation and stakeholder involvement provides smaller areas with a formal avenue to influence policy implementation—crucial for ensuring the national vision resonates locally.

Weaknesses

Despite this strategic alignment, Broumovsko faces several barriers that limit its ability to fully engage with or benefit from the NECP's aspirations. The region's aging population, limited economic base, and administrative capacity constraints make it difficult to absorb complex financial aid processes, digital tools, or co-financing mechanisms—particularly for multi-family or heritage buildings in need of renovation.

At the national level, the Czech Republic remains highly dependent on fossil fuels, especially natural gas for electricity and district heating. While the NECP identifies the phase-out of coal and the need for renewable integration, the existing grid infrastructure was built around centralized, fossil-based energy systems and is technically unprepared for large-scale integration of intermittent renewables like wind and solar. This is especially problematic in Broumovsko, where environmental protections (CHKO status) restrict the deployment of large-scale renewable projects.

The country also underutilizes its renewable potential, hindered by slow permitting processes, fragmented governance, and public resistance—challenges that are amplified in environmentally sensitive and bureaucratically constrained regions. As energy and mobility systems become increasingly digital, Broumovsko may also be left behind due to digital literacy gaps and limited infrastructure.

Opportunities

Nonetheless, the NECP offers real opportunities for Broumovsko—particularly through targeted use of EU funding instruments like the Modernisation Fund, the Recovery and Resilience Facility, and soon, the Social Climate Fund (from 2026). These funds can support local efforts to modernize public buildings, expand renewable self-consumption systems (like rooftop PVs on schools or municipal buildings), and reduce energy poverty.

The NECP's promotion of decentralized energy systems and community energy models is especially relevant. These approaches align well with Broumovsko's dispersed settlement pattern and could enable the development of small-scale, community-owned renewable systems, including solar microgrids or local battery storage initiatives.

Beyond energy, the integration of climate resilience into tourism and regional development policies presents a valuable pathway for the region. Investments in sustainable transport, nature-compatible infrastructure, and climate-adapted tourism can strengthen the region's economy while aligning with conservation goals. Moreover, the NECP's emphasis on knowledge transfer and support for innovation ecosystems can help connect academic institutions and local SMEs around clean energy solutions tailored to rural needs.

Threats

Yet, the energy transition is not without risk. Nationally, the continued reliance on fossil fuels and the influence of entrenched industrial lobbies may delay the shift to renewables and stall crucial reforms. In Broumovsko, this may translate into delayed access to modern infrastructure or subsidies, further entrenching local disparities.

Climate change impacts pose another significant threat. As summers grow hotter and weather patterns become more erratic, the region's energy-insecure buildings, outdated cooling infrastructure, and tourism-reliant economy may suffer. Without adaptation measures, this could lead to economic losses and heightened social vulnerability.

The NECP also warns of cybersecurity threats, particularly as energy systems digitize. While more relevant for urban centers, any interruption in service could disproportionately affect rural regions with fewer redundancies. Additionally, bureaucratic inefficiencies, short-term political cycles, and uneven quality in regional planning may delay or dilute implementation—especially in less resourced municipalities like those in Broumovsko.

Finally, without meaningful inclusion of local stakeholders in project planning, there's a risk of low acceptance of transition measures or a mismatch between national strategies and local realities, which could lead to both missed opportunities and community frustration.

Conclusion

The Broumovsko region stands at a crossroads between preservation and progress. The Czech NECP provides a robust framework for national decarbonization, but its success in Broumovsko will depend on localized, context-sensitive implementation. The region's strengths—its natural beauty, community identity, and potential for small-scale energy independence—must be leveraged through targeted investments, simplified administrative pathways, and regional empowerment.

To ensure the energy transition is just, inclusive, and resilient, national policymakers must work closely with local actors to overcome infrastructural and demographic

challenges. Only then can Broumovsko serve not just as a protected landscape, but as a living example of rural transformation in the age of climate change.

Poland

The Mazowieckie region beyond Warsaw paints a very different picture from the modern, well-connected capital city. This vast rural and peri-urban landscape is dotted with smaller towns, agricultural holdings, and former industrial zones. These areas often lack the institutional capacity, infrastructure, and investment access needed to fully benefit from Poland's national climate goals. The NECP and ECAP+ offer a comprehensive roadmap, but the ability of non-metropolitan Mazowieckie to follow that path depends on how equitably and practically these strategies are implemented.

Strengths

Even outside Warsaw, the Mazowieckie region benefits from clear national commitments to emissions reductions, with the NECP aiming for a 50.4% cut by 2030. The region's ECAP+ recognizes its more limited capacity and sets a lower, more realistic target of 26.9%. This nuanced approach allows adaptation to local realities while staying aligned with overarching EU goals.

The region also gains from a nationally coordinated approach to energy poverty, a major issue in non-urban Mazowieckie where inefficient heating systems and poorly insulated buildings are common. The NECP outlines a targeted reduction in energy poverty, while ECAP+ explicitly recognizes this issue as a regional development priority. This creates a framework for targeted funding to assist vulnerable households with building renovations, energy-efficient appliances, and renewable installations.

Moreover, agriculture and forestry, central to the rural economy, are acknowledged in both plans as sectors needing climate adaptation. While challenging, this recognition provides a basis for pilot projects and funding to modernize agricultural practices and explore bioenergy or agrovoltaic solutions.

Weaknesses

One of the region's biggest limitations is its continued reliance on coal, especially for household heating. Many rural homes still use outdated, inefficient furnaces, and despite legal deadlines for coal phase-out by 2040, the lack of alternative infrastructure (gas, heat pumps, district heating) makes this transition especially difficult in dispersed areas.

The energy infrastructure in rural Mazowieckie is weak. Electricity grids are often outdated, and gas networks remain limited, particularly in eastern and northern parts of the region. This severely limits the deployment of new renewable energy projects or clean heating alternatives.

Administrative capacity is another bottleneck. Local governments in smaller municipalities frequently lack staff, expertise, or experience to apply for complex EU funds or manage energy investments. Even though policy frameworks and funding exist, the gap between strategic planning and on-the-ground execution remains wide.

Additionally, energy poverty is compounded by aging populations, low incomes, and a lack of access to digital tools—barriers that make it harder for residents to engage in programs such as energy communities, co-financed renovations, or subsidy applications.

Opportunities

The NECP and ECAP+ provide a significant opening for regional energy diversification, particularly in heating. New funding mechanisms—such as the Social Climate Fund (starting 2026)—can be used to replace outdated coal systems with clean alternatives, upgrade insulation, or support community-based renewable projects.

There is strong potential for bottom-up energy initiatives, such as energy cooperatives or municipal solar farms, especially where land is available, and population density is low. Decentralized, small-scale projects could be more appropriate than large grid-connected systems in these areas.

The ECAP+ also acknowledges the potential to improve gas and district heating networks in certain towns, which could reduce coal reliance and support economic development. Meanwhile, agroforestry and sustainable land use can

be framed as part of the climate transition while preserving local jobs and traditions.

Moreover, EU cohesion policy funds and climate-related programs (e.g. Modernisation Fund, LIFE Programme) offer a unique chance for rural municipalities to invest in long-term resilience, provided administrative support is available.

Threats

Despite the opportunities, several risks could derail progress. One of the most pressing is the slow pace of infrastructure upgrades. Without rapid investment in grids, clean heating, and digital systems, rural Mazowieckie risks being left behind in the national transition.

Coal sector influence remains strong, especially in communities economically dependent on fossil fuels. Resistance from unions, local political leaders, or simply public mistrust of alternatives may slow policy adoption or lead to low participation in clean energy programs.

The region also faces threats from climate change itself: extreme weather, heatwaves, and droughts could impact agriculture, stress infrastructure, and increase energy demand—especially as cooling becomes more essential in summer.

Economic volatility (e.g., inflation, energy price surges) may further disincentivize investments in sustainable technologies, particularly among low-income households and small farms. If funding mechanisms are not accessible and practical, existing inequalities could deepen, creating a two-speed transition between urban and rural Poland.

Lastly, the limited involvement of local actors in shaping NECP implementation remains a concern. Without meaningful consultation and ownership, top-down strategies risk being misaligned with local needs or capacities, leading to wasted resources or poorly targeted interventions.

Conclusion

Excluding Warsaw, the Mazowieckie region stands at a difficult but pivotal juncture. With its high dependence on coal, aging infrastructure, and limited local administrative capacity, it faces many of the classic challenges of a just energy transition. But it also has clear opportunities—especially through community-led energy, building renovation programs, and tailored climate finance.

To succeed, the NECP and ECAP+ must move beyond planning to enable implementation. That means reducing bureaucracy, building capacity at the municipal level, and prioritizing inclusivity in funding and project design. If these barriers can be addressed, non-metropolitan Mazowieckie could become a

model of rural resilience in the face of Europe's accelerating climate and energy transition.

Balkans

In the Balkans, regions like Međimurje (Croatia) and Podravje (Slovenia) show strong alignment with EU energy goals, bolstered by technically reliable infrastructure, policy support for renewables, and active planning to reduce emissions and promote energy efficiency. These areas are also benefiting from financial mechanisms like the Recovery and Resilience Facility, which offer crucial support for modernization and innovation. Nevertheless, deep-rooted challenges persist, including underdeveloped alternative fuel infrastructure, heavy reliance on energy imports, and a shortage of regional coordination—particularly in non-Just Transition areas. Still, there are promising opportunities in local RES deployment, smart grid development, CO_2 storage, and sustainable agriculture. However, both regions face external threats such as climate change, rising energy costs, cybersecurity risks, and potential marginalization in national decision-making. To realize the benefits of the NECPs, these regions must bridge the gap between policy design and local capacity through inclusive planning, equitable funding access, and stronger institutional support.

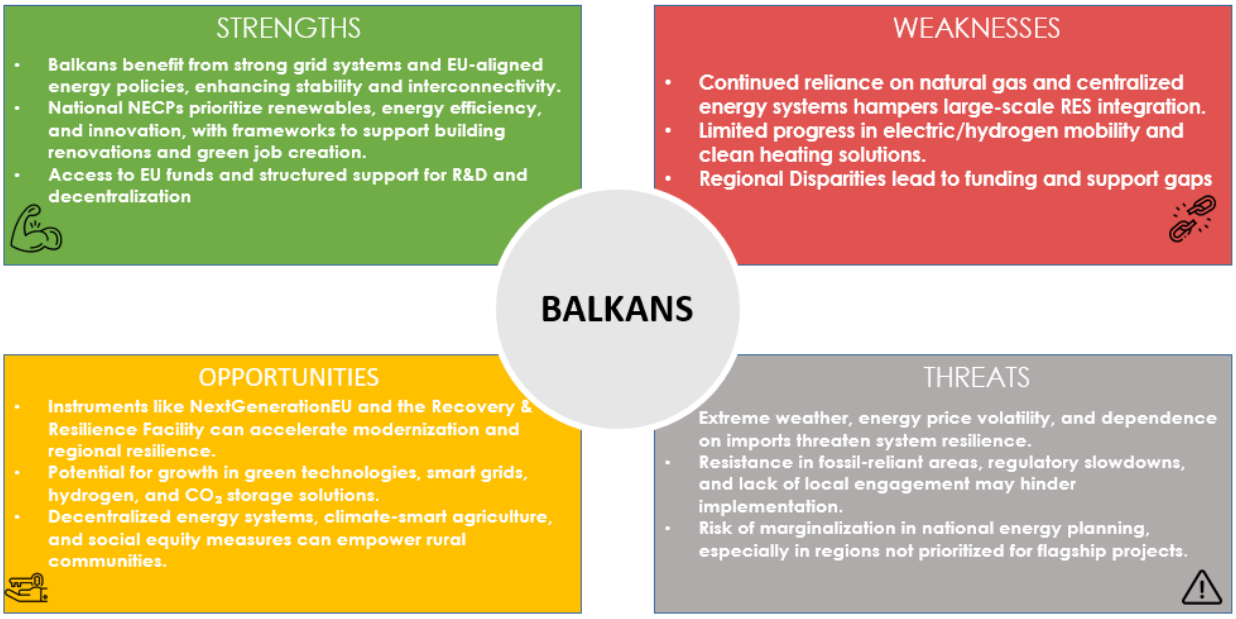

Table 5: SWOT analysis of Balkans

Croatia

Međimurje County, located in northern Croatia and bordered by Slovenia and Hungary, occupies a strategic position both geographically and administratively. As a county characterized by rural communities, strong agricultural production, and a moderately developed infrastructure, it finds itself at a critical juncture. The national energy transition presents both structural challenges and transformative opportunities for the region. Croatia's NECP outlines the direction, but its success depends on the readiness and responsiveness of counties like Međimurje to adopt and adapt national measures locally.

Strengths

Croatia's energy system benefits from a high level of technical reliability, supported by a mature infrastructure for balancing electricity and minimizing transmission losses. Its interconnection with neighboring power systems provides both energy security and a framework for active participation in regional electricity markets. Strategically, the NECP outlines clear national objectives for increasing energy efficiency, the deployment of renewable energy sources (RES), and the advancement of research and innovation in low-carbon technologies.

The policy environment also demonstrates strong alignment with European Union standards. A well-defined legal and financial system is in place to support R&D initiatives, particularly with the integration of EU funds. Specific attention is given to the building sector, where construction and renovation activities are incentivized due to their potential for emissions reduction. Croatia further supports the development of green skills through targeted educational initiatives like "green vouchers." Active plans to reduce distribution system losses and promote self-consumption via photovoltaic systems underline a shift toward decentralization. Importantly, Croatia applies the "Do No Significant Harm" (DNSH) principle across all projects, ensuring a firm commitment to sustainable development.

Weaknesses

Despite its strategic alignment, Croatia faces several internal obstacles in executing its NECP. The country's continued dependence on natural gas creates friction in transitioning toward RES, especially given the legacy of centralized, fossil-based infrastructure. Without significant modernization efforts, this infrastructure poses a serious constraint on integrating large volumes of renewables.

The infrastructure for alternative fuels—including electric and hydrogen-powered transport—is underdeveloped, limiting the growth of low-carbon mobility. Croatia also suffers from a high dependence on electricity imports, raising concerns about energy security during peak demand periods or in crises. Regulatory delays and underfunding hinder implementation, while the existing grid lacks the flexibility and capacity required to absorb increased RES inputs.

Additionally, Croatia underutilizes its own renewable and domestic energy resources. Combined with unfavorable demographic trends, such as a shrinking working-age population and population aging, these factors could impact long-term resilience and the speed of the transition.

Opportunities

Croatia stands to benefit significantly from EU financial instruments, such as NextGenerationEU and the Recovery and Resilience Facility, which offer resources for energy system modernization and digital transformation. The green transition presents a clear opportunity to stimulate employment, particularly through new technologies, retraining programs, and ICT sector growth.

The rapid evolution of hydrogen technologies, battery storage, and smart grid systems presents avenues for systemic innovation. Croatia's NECP encourages the deployment of these technologies, alongside improvements in energy management. The country also supports knowledge transfer between research institutions and industry, specifically focusing on low-carbon solutions.

An updated National Policy Framework for alternative fuel infrastructure aims to establish more ambitious transport-sector goals. Additionally, Croatia possesses geological potential for CO_2 storage in depleted oil and gas fields—an asset for long-term decarbonization. The involvement of regional climate and energy agencies will be essential for decentralized implementation, while new efforts in climate-smart agriculture can ensure environmental and economic resilience in rural areas.

Threats

However, the transition faces external threats. Regions that remain economically reliant on fossil fuels may resist policy changes, threatening national targets. Cybersecurity threats are rising and may compromise critical infrastructure. Simultaneously, inflation and high energy prices risk lowering public and political support for climate efforts.

Climate change itself poses systemic risks. Extreme weather events could undermine electricity production—particularly hydropower—and increase cooling demand during heatwaves. Strong fossil fuel lobbies may further delay or dilute reforms, while global market volatility and import dependence leave the country vulnerable to supply disruptions.

Lastly, technological access in rural areas remains limited, and lack of local-level coordination can impede smooth implementation of national measures.

Conclusion

Croatia's energy transition is marked by a strong technical foundation and strategic alignment with EU standards, offering significant opportunities for growth through innovation and financial support. However, the country faces considerable challenges, including its dependence on fossil fuels, underdeveloped infrastructure for alternative fuels, and demographic pressures. While the green transition holds promise for economic growth, particularly through new technologies and sustainable practices, external threats such as geopolitical instability, cybersecurity risks, and climate change could hinder progress. Successful implementation will require overcoming internal barriers and fostering regional collaboration to ensure long-term energy security and sustainability.

Slovenia

Slovenia's updated National Energy and Climate Plan (NECP) introduces a number of significant opportunities and policy directions for the Podravje region, particularly through the lens of its Energy and Climate Plan. The region stands to benefit from a more sustainable, energy-secure future, though not without encountering specific challenges and limitations that require careful navigation.

Strengths

The NECP brings several clear advantages for Podravje. One of the most direct benefits is the anticipated improvement in air quality, which will have a tangible and positive impact on public health and the reduction of greenhouse gas emissions. As the share of renewable energy sources, particularly solar and wind power, increases, the region is expected to enhance its energy independence and reduce its vulnerability to energy price shocks or supply disruptions.

In parallel, the implementation of energy efficiency measures is expected to lower energy bills for households and businesses, improving competitiveness and quality of life. The plan also emphasizes investment in research and development, which could serve as a catalyst for innovation-driven economic growth and the creation of new, green jobs. Notably, the NECP sets explicit targets to reduce energy poverty, which aligns well with local priorities and opens the door to dedicated funding that can be used for energy renovation and social equity initiatives in the region.

Weaknesses

However, several structural and contextual weaknesses could hinder the full realization of these benefits. For many municipalities and small businesses in Podravje, investing in new technologies and infrastructure poses a substantial financial challenge, particularly in the absence of sustained external support. Compounding this is the fact that some of the NECP's goals rely on technologies

still in developmental stages, which introduces uncertainty and risk in terms of deliverability.

The transition away from traditional energy sectors also poses socio-economic risks, particularly through potential job losses in legacy industries, which could lead to localized economic disruptions. There is a sense within the region that national energy planning does not fully consider Podravje's specific needs, particularly when major scenarios like the RES + nuclear option prioritize other regions for investment and development.

Additionally, the region is not designated as a Just Transition area, meaning it is currently excluded from targeted EU support mechanisms meant to cushion regions most affected by the transition. This could lead to disparities in funding and implementation capacity between Podravje and other Slovenian regions.

Opportunities

Despite the challenges, the Podravje region is well-positioned to take advantage of a number of strategic opportunities. The ongoing development of green technologies and low-carbon industries presents a clear pathway for economic diversification and job creation. As Slovenia accelerates its decarbonization agenda, regions that can mobilize local resources and innovation capacity may become leaders in the green economy.

The push for greater energy independence through the use of domestic renewables aligns well with Podravje's local assets and provides an opportunity to reduce reliance on imported fossil fuels. Furthermore, the NECP's inclusion of specific targets related to energy poverty creates a framework for unlocking additional EU and national funds, which can support energy efficiency projects, social programs, and housing renovations—all highly relevant for improving regional well-being.

Threats

Yet the region must also contend with external threats that could impede progress. If Slovenia fails to meet its NECP goals, this could trigger sanctions or the withdrawal of EU funding, directly impacting local energy and development projects. The construction of new renewable energy infrastructure, while necessary, may provoke environmental concerns or community resistance, especially if land use, biodiversity, or visual impacts are not carefully managed.

Additionally, there is a risk that Podravje may become marginalized in national-level decision-making, particularly if policy priorities continue to favor other regions for flagship projects. Without active regional engagement, funding

inequalities and implementation gaps may persist. Ensuring that local voices are included in national discussions will be critical to securing equitable outcomes.

Conclusion

In sum, the NECP presents both a strategic opportunity and a policy challenge for Podravje. With a focus on cleaner air, improved energy resilience, and poverty reduction, the region has much to gain - especially if local actors are empowered and funded to take action. However, ensuring an inclusive, regionally sensitive, and just energy transition will require better alignment between national ambitions and local realities. Strategic planning under the LEASP must therefore continue to emphasize local ownership, capacity-building, and access to fair funding if Podravje is to fully benefit from the green transition.

Appendix

Theme	**Baltics** (Estonia, Latvia)	**Visegrad** (Czechia, Poland)	**Balkans** (Croatia, Slovenia)
Grid and Infrastructure	Generally more modernized and digitally advanced, with strong regional cooperation	Grid resilient but fossil-oriented; weak renewable readiness in rural zones like Broumovsko and Mazowieckie.	Reliable but aging grids; high dependence on imports; Croatia still modernizing its flexibility and balancing capacity.
Renewables Integration	Advanced but hampered by intermittency and storage gaps.	Expansion ambitions exist but slow progress due to permitting and public resistance, especially in protected areas.	Renewables growing but constrained by centralized infrastructure and underdeveloped alternative fuel sectors.
Administrative Capacity	Stronger at national and urban levels, rural areas catching up with EU-backed digitalization and governance reforms.	Severe gaps in rural municipalities; local governments struggle with complex funding access and project execution.	Moderate capacity; regional climate agencies and EU frameworks support implementation, but rural outreach remains weak.
Public Engagement and Energy Communities	Growing bottom-up initiatives), with clear regulatory support emerging.	Recognized but still underdeveloped; rural skepticism and administrative complexity slow adoption.	Promoted through NECPs, but large-scale projects dominate discourse; local cooperative models less emphasized.
Climate Risk Preparedness	Increasing focus on resilience (especially coastal flooding), though physical investments lag.	Climate risks recognized but not yet systematically integrated into rural development plans.	High climate vulnerability (droughts, extreme weather); growing integration into agriculture and tourism strategies.
Threats	Geopolitical risks (e.g., Russia) are more acute; cybersecurity threats to energy systems loom large.	Entrenched fossil fuel interests and political cycles pose internal risks; climate events could deepen rural disparities.	Climate change, fossil fuel dependency, demographic decline, and lack of alternative industries challenge resilience.

Table 6: Regional differences between the Baltics, Visegrad and Balkans