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Julia Rettig, Maximilian Zoll and Stefan Zundel

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Herausgeber

Prof. Dr. Stefan Zundel

Fachgebiet Allgemeine VWL mit dem Schwerpunkt Energie- und Umweltökonomik

Brandenburgische Technische Universität Cottbus-Senftenberg

Universitätsplatz 1
01968 Senftenberg
T: +49 (0) 3573 85 441
E: zundel@b-tu.de

Autoren

Julia Rettig

Wissenschaftliche Mitarbeiterin in der Forschungsgruppe *Allgemeine VWL mit dem Schwerpunkt Energie- und Umweltökonomik*

Maximilian Zoll

Wissenschaftlicher Mitarbeiter in der Forschungsgruppe *Allgemeine VWL mit dem Schwerpunkt Energie- und Umweltökonomik*

Prof. Dr. Stefan Zundel

Leiter der Forschungsgruppe *Allgemeine VWL mit dem Schwerpunkt Energie- und Umweltökonomik* an der Brandenburgischen Technischen Universität Cottbus-Senftenberg

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Transition from Lignite in Gorj – Smart Specialisation and Regional Innovations[†]

By Julia Rettig, Maximilian Zoll and Stefan Zundel

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Introduction

Under international agreements and European Union (EU) policy, decarbonization has become a major priority. Regions that have historically been dependent on coal and lignite face unique barriers and huge challenges in the drive towards carbon neutrality. This policy brief, discussing the Romanian county of Gorj, is one in a series of three discussing lignite-dependent regions (the other two examining Eastern Wielkopolksa, Poland and Lusatia, Germany). The aim of each policy brief in this series is to shed light on barriers to an effective transition by critically assessing the regional innovation system (RIS) and potential avenues for smart specialization of the regional economy to boost innovation.

Smart specialization is especially important for peripheral or less developed regions with little endogenous innovation potential, as it creates a focused path with clear research priorities accounting for existing regional strengths and potential for innovation[1]. Relatedly, the RIS views innovational activity as learning created by interactions between many actors within the economy in research and development (R&D), such as firms interacting with universities[2]. Within this policy brief, a regional overview of Gorj is used as a baseline for examining potentials for smart specialization and potential reshaping of the RIS. Where data for indicators could not be found for Gorj County, data from the higher regional level (development region of Southwest Oltenia) were utilized.

[1] Petra Szávics and József Benedek, "Smart Specialization Priorities of Less Developed Regions. A Critical Evaluation," in *NMP 2020: New Metropolitan Perspectives*, vol. 177, Smart Innovation, Systems and Technologies (Springer, Cham, 2020), 22–36, https://doi.org/10.1007/978-3-030-52869-0_3.
[2] Bjørn T. Asheim, Arne Isaksen, and Michaela Trippl, *Advanced Introduction to Regional Innovation Systems* (Cheltenham, UK: Edward Elgar Publishing, 2019).

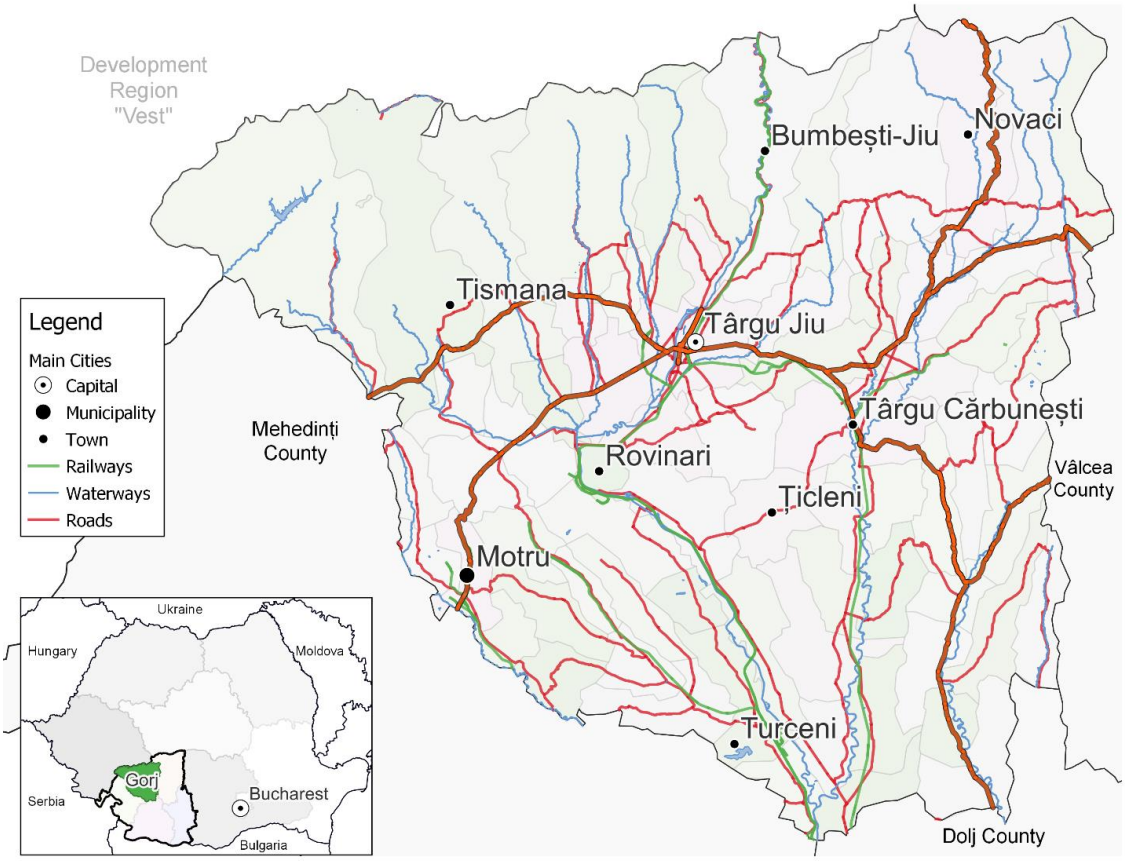

Figure 1: Map of Gorj County. Author's creation with data from online databases[3,4]

Regional Overview of Gorj

Gorj, one of five counties within the development region Southwest Oltenia, is located on the periphery of the capital region Bucharest (see Figure 1). Gorj is one of the two main coal regions in Romania, with the other, Hunedoara, lying just north along the Jiu River that flows through these counties. The natural abundance of lignite[5] within Gorj means coal extraction and power production have long been an essential part of the regional economy.

In relation to national averages, Gorj shows significantly lower levels of population density and tertiary education, while the unemployment rate in Gorj County hovers around the national average and is significantly lower than within Southwest Oltenia (see Table 1). Like the other regions examined under the scope of these policy briefs, Gorj has been experiencing a

[3] Eurostat, "The Geographic Information System of the COmmission (GISCO)," Online Database, 2021, https://ec.europa.eu/eurostat/web/gisco.
[4] Geofabrik GmbH Karlsruhe, "OpenStreetMap Shapefiles," Online Database, Geofabrik, 2021, https://www.geofabrik.de/data/shapefiles.html.
[5] Gorj County Council, "Gorj County," General Information Gorj County, 2017, https://www.cjgorj.ro/judetul-gorj/.

depopulation trend[6]. When examining Table 1, a discrepancy can be seen between the populations involved in the lignite sector between Gorj County and Southwest Oltenia. This discrepancy can be explained by differences in reporting criteria in terms of which firms qualify as indirectly relying on the lignite sector for their business. These values are also likely based on the count of employees working in the county, including those that commute into the county, rather than county residents working in the sector. Other studies[7,8] show similar ranges of direct and indirect employees in the coal sector for Southwest Oltenia and Gorj.

Table 1: Selected socioeconomic data for Gorj

	Gorj	Southwest Oltenia	National
Geographic area [km^2]	5,602[9]	29,212[10]	238,391[11]
Population density [inhabitants / km^2]	55.36	65.09	80.80
Population (2020) [millions][12]	0.31	1.9	19.26
Population with tertiary education [%][13]	-	16.7	18.7
Unemployment rate (2021) [%][14]	3.1	4.7	3
Population directly employed in lignite sector	12,268[15] (16.7%)	12,858[16] (3.3%)	-
Population directly and indirectly employed in the lignite sector (percent of total employed population)	35,268[17] (48.0%)	27,010[18] (6.8%)	-

[6] Constanta Enea, Constantin Enea, and Carina Elena Stegariou, "Comparative Analysis of the Gorj County of Socio-Economic with Neighboring Counties in Crisis," *Challenges of the Knowledge Society* 2 (2012): 1317–24.
[7] László Szabó et al., "Accelerated Lignite Exit in Bulgaria, Romania and Greece" (Center for the Study of Democracy, 2020), https://csd.bg/publications/publication/accelerated-lignite-exit-in-bulgaria-romania-and-greece/.
[8] P. Alves Dias et al., "EU Coal Regions: Opportunities and Challenges Ahead," JRC Science for Policy Report (Luxembourg: European Commission, 2018), https://op.europa.eu/s/tDwF.
[9] Gorj County Council, "Gorj County."
[10] European Commission, "South West Oltenia," Text, Regional Innovation Monitor, March 15, 2016, https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/south-west-oltenia.
[11] Eurostat, "Area by NUTS 3 Region," Online Database, Eurostat - Data Explorer, 2021, https://ec.europa.eu/eurostat/web/regions/data/database.
[12] National Institute of Statistics, "Baze de Date Statistice," Online Database, TEMPO-Online, 2021, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table.
[13] Eurostat, "Population by Educational Attainment Level, Sex and NUTS 2 Regions (%)," Online Database, Eurostat - Data Explorer, 2021, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.
[14] National Institute of Statistics, "Baze de Date Statistice."
[15] Consiliul Județean Gorj, "Annexa II PTTJ Gorj," 2021, https://www.cjgorj.ro/pttj/.
[16] Mihnea Cătuți et al., "The Sustainable Transition of Gorj County" (EPG, 2021), https://www.enpg.ro/wp-content/uploads/2021/09/Report_Gorj_EN.pdf.
[17] Consiliul Județean Gorj, "Annexa II PTTJ Gorj."
[18] Cătuți et al., "The Sustainable Transition of Gorj County."

Coal remains a significant source of fuel for energy production within Romania, where Gorj and the neighboring county of Hunedoara together produce 97% of coal-based electricity[19]. Romania has one of the earliest coal phase-out targets in the European Union, aiming for a total coal phase-out by 2032, with the largest proportion (3,780 out of 4,590 MW) retired as early as the end of 2025[20]. However, action on the subject remains to be seen. Currently, two coal power plants are still in operation in Gorj County (Table 2).

Table 2: Summary of lignite-fired power plants in Gorj[21]

Power plant	Turceni	Rovinari
Owner	CE Oltenia SA	
Commission year	1976	1976
Planned retirement	2032	2032
Coal units operational	4	3
Power capacity operational [MW]	1320	990
CO_2 emissions (2020) [Mt / year]	2.24	3.1

For a description of Gorj's economic profile, this policy brief uses varying combinations of NACE Code Rev. 2 sectors. In this case, the sector "industry" refers to NACE Code B-E[22], which includes mining and quarrying, production of electricity, manufacturing, and water and waste management.

Industry is the largest economic sector in Gorj (Figure 2), which at roughly 37% is larger than at the national level and within the development region as a whole. This reflects the heavy local dominance of the power and mining industry. In comparison with the gross value added (GVA) at the national level and level of the development region, Gorj economic sectors are underrepresented, with the exception of the construction sector.

[19] Vlad Nerau, "Romania's Coal-Fired Power Plants Efficiency and Pollution in the Context of the European Green Deal," *Theoretical and Applied Economics* XXVIII, no. 1(626) (2021): 119.
[20] Ministerul Investițiilor și Proiectelor Europene, "Planul Național de Redresare Și Reziliență (PNRR)," 2021, https://mfe.gov.ro/pnrr/.
[21] "Coal Exit Tracker" (Europe Beyond Coal, 2021), https://beyond-coal.eu/coal-exit-tracker/.
[22] Eurostat, "Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008)," Metadata, RAMON - Reference And Management Of Nomenclatures, 2008, https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_NOM_DTL&StrNom=NACE_REV2.

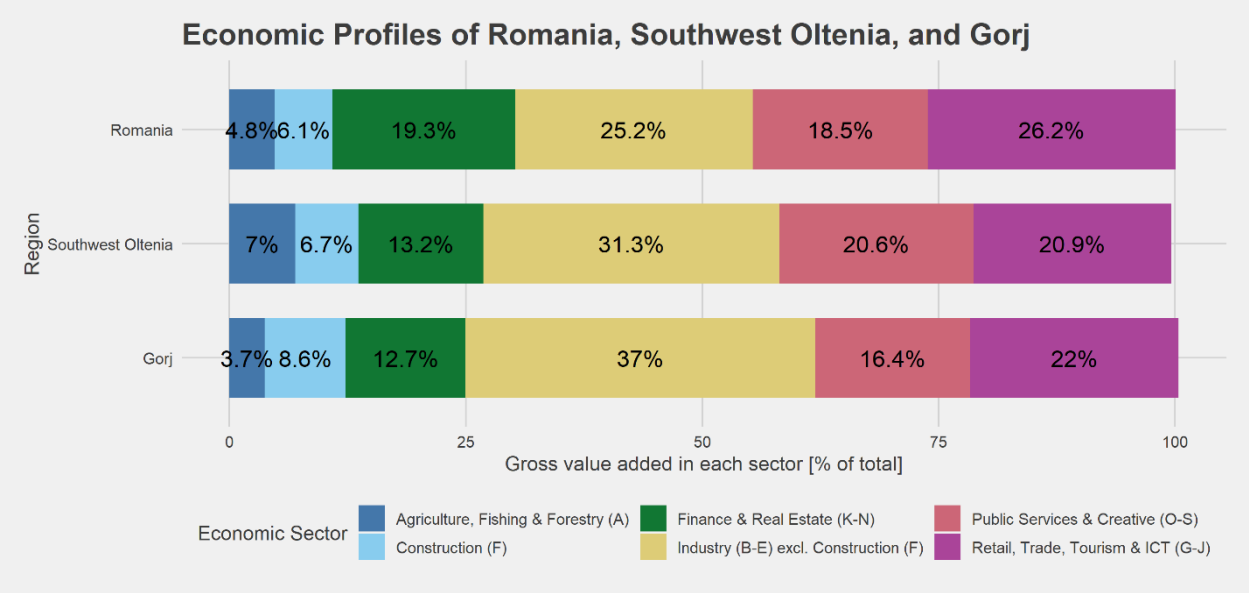

Figure 2: Economic profiles for Romania, Southwest Oltenia, and Gorj county in gross value added (GVA) [% of total][23]

In terms of employment, the energy and mining and quarrying sectors are greatly overrepresented in Gorj in comparison with national averages (Figure 3). Figure 3 shows the Balassa-Hoover Index, which represents the degree of specialization within a region, measured by a ratio of the population actively employed in each industry with the national baseline (HBI = 1.0). A value greater than one indicates that the sector is proportionately overrepresented, while a value less than one indicates an underrepresentation of that sector in the region[24]. Figure 3 illustrates that several key sectors are underrepresented in Gorj—including agriculture, forestry, and fishing, retail and tourism, and manufacturing.

[23] Eurostat, "Gross Value Added at Basic Prices by NUTS 3 Regions," Online Database, Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/nama_10r_3gva/default/table?lang=en.
[24] Marius Nagel and Stefan Zundel, "'Wat den Eenen sin Uhl', is den Annern sin Nachtigall' - Ausgewählte Aspekte der Standortqualität der Lausitz," Schriftenreihe des Fachgebiets Allgemeine VWL mit dem Schwerpunkt Energie- und Umweltökonomik (Cottbus: BTU Cottbus-Senftenberg, 2020), 8, https://www-docs.b-tu.de/fg-energie-umweltoekonomik/public/Schriftenreihe-pdf/sr01.pdf.

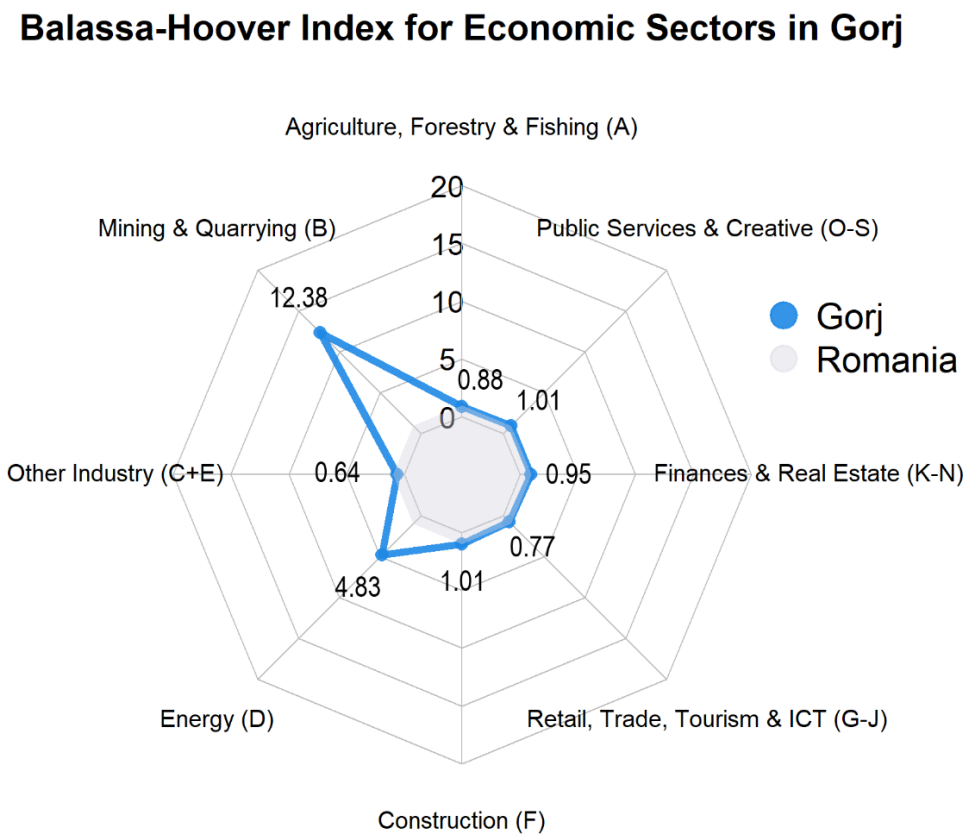

Figure 3: The Balassa-Hoover Index (BHI) for economic sectors within Gorj in comparison with national reference levels (BHI = 1). Own calculation based on 2020 employment data from the National Institute of Statistics[25].

It is important to keep Gorj's economic profile in the greater context of the profile of the larger development region—Southwest Oltenia and its capital Craiova, which has a broad industrial base (e.g., the automotive, chemical, and electronics industries) and greater specialization in forestry and agriculture (e.g., fuel crops and orchards and tree nurseries—in which Southwest Oltenia ranked second nationally from 2005-2012)[26].

Similarly, as data on Gorj's own RIS is limited regarding each indicator, a closer examination of these indicators on the level of the development region is undertaken (Table 3). Table 3 shows that the RIS in Southwest Oltenia underperforms relative to the national average.

[25] National Institute of Statistics, "Baze de Date Statistice," sec. FOM104F.
[26] European Commission, "South West Oltenia."

Table 3: Summary of indicators for Gorj's RIS

Indicator		Gorj	Southwest Oltenia	National
Intramural R&D expenditures in all sectors (2018)[27]	in millions of Euros	-	36.75	1,024.78
	as % of GDP[28]	-	0.23	0.50
Total R&D personnel and researchers (2018)[29]	in full-time equivalent (FTE)	23[30]	712	31,933
	as % of total employment in FTE	-	0.17	0.53
Patents granted (2012)[31]	in number per 100,000 inhabitants	-	3.42	30.02
Enterprise birth (2018)[32]	in the sectors industry, construction, and services excluding insurance activities of holding companies (NACE Rev. 2 B-S_X_K642)	1,154	6,724	97,070
Enterprise numbers by size class in 2019 (as % share of total)[33] Excluding micro businesses (0-9 employees)	Small (10-49 employees)	514 (86.68%)	3321 (85.46%)	49869 (83.05%)
	Medium (50-249 employees)	67 (11.30%)	475 (12.22%)	8415 (14.01%)
	Large (250+ employees)	12 (2.02%)	90 (2.32%)	1764 (2.94%)
Staff employed in enterprises by size class in 2019 (as % share of total)[34]	Small (9-49 employees)	-	80,989 (37.00%)	1,099,949 (34.54%)
	Medium (50-249 employees)	-	68,570 (31.32%)	1,029,950 (32.34%)
	Large (250+ employees)	-	57,919 (26.46%)	94,4371 (29.65%)

[27] Eurostat, "GERD by Sector of Performance and NUTS 2 Regions," Online Database, Eurostat - Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/rd_e_gerdreg/default/table?lang=en.
[28] Eurostat, "Gross Domestic Product (GDP) at Current Market Prices by NUTS 2 Regions," Online Database, Eurostat - Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/nama_10r_2gdp/default/table?lang=en.
[29] Eurostat, "R&D Personnel and Researchers by Sector of Performance, Sex and NUTS 2 Regions," Online Database, Eurostat - Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/rd_p_persreg/default/table?lang=en.
[30] National Institute of Statistics, "Baze de Date Statistice," sec. CDP103E.
[31] Eurostat, "Patent Applications to the EPO by Priority Year by NUTS 3 Regions," Online Database, Eurostat - Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/pat_ep_rtot/default/table?lang=en.
[32] Eurostat, "Business Demography and High Growth Enterprise by NACE Rev. 2 and NUTS 3 Regions," Online Database, Eurostat - Data Browser, 2021, https://ec.europa.eu/eurostat/databrowser/view/BD_HGNACE2_R3__custom_1417649/default/table?lang=en.
[33] National Institute of Statistics, "Baze de Date Statistice," sec. INT101O.
[34] National Institute of Statistics, sec. INT102D.

Indicator		Gorj	Southwest Oltenia	National
Excluding micro businesses (0-9 employees) and agriculture				

The organizational setting for Gorj's RIS is quite thin, hosting only a few organizations (Table 4). An organizationally thin RIS is defined as comprising of only a few research or knowledge organizations and small clusters[35]. The county exhibits a general lack of research supply in terms of number of academics, R&D employees, and knowledge transfer institutions. This small institutional setting, however, offers opportunities for further development by focusing on local knowledge transfer. In the greater regional context of Southwest Oltenia, on which Gorj's RIS is reliant, there are a number of further institutions, and the RIS is organizationally thicker.

Table 4: List of key organizations underlying the RIS of Gorj and their locations[36]

Type	Organization	Location
University	Constantin Brâncuşi University of Târgu Jiu[37]	Târgu Jiu
Technology Parks	Gorj Industrial Park[38]	Bumbeşti-Jiu
Research Centers[39]	Mircea Eliade Interdisciplinary Research Center	Târgu Jiu
	Konrad Adenauer Interdisciplinary Research Center	Târgu Jiu
	Research Center for Reliability and Durability of Mechanical Systems	Târgu Jiu
	Center for Fundamental and Applied Economic Studies (CSEFA)	Târgu Jiu

[35] Asheim, Isaksen, and Trippl, *Advanced Introduction to Regional Innovation Systems*, 44.
[36] ADR SV Oltenia, "Strategia Regionala pentru Specializare Inteligenta RIS3 Sud-Vest Oltenia 2021-2027," Strategia de Specializare Inteligentă RIS3 S-V Oltenia 2021-2027, 2021, 3, //www.adroltenia.ro/strategia-de-specializare-inteligenta-ris-3-s-v-oltenia-2021-2027/.
[37] UCB, "Universitatea 'Constantin Brâncuşi' din Târgu-Jiu," 2021, https://www.utgjiu.ro/.
[38] Parcul Industrial Gorj S. A., "Prezentarea Parcului Industrial Gorj," Parcul Industrial Gorj, 2017, https://parculindustrial.wordpress.com/.
[39] Universitatea Constantin Brâncoveanu, "Cercetare - Universitatea 'Constantin Brâncuşi' din Târgu-Jiu," 2021, https://www.utgjiu.ro/cercetare2/.

A Starting Point for Innovation in Gorj

Smart Specialization of the Economic Profile

Gorj's economic profile is overwhelmingly dominated by industry, particularly the energy and mining sectors. The regional smart specialization system must play to the region's strengths by including the transformation of the energy sector. As the local economy centers around lignite-based energy production, a transition to renewable energy systems could create new value chains and great potential for specialization. Additionally, a transition to renewable energies is desirable under decarbonization goals, since, per region, Gorj County produces the greatest level of carbon emissions in Romania[40].

Gorj County and Southwest Oltenia have higher solar energy potential (averaging 1,336 kWh/kWp) when compared with European levels (averaging 1,020 kWh/kWp)[41]. Within Gorj, a high proportion of land has strong solar generation potential, offering options for both large-scale solar farms and rooftop solar options[42]. It is important to note that due to the restructuring of the region's largest energy producer CE Oltenia (Table 2), the establishment of eight 725 MW solar plants is already planned[43,44]. Within Southwest Oltenia, Northern Gorj also has above average potential for wind power generation[45]. Though the translation of the workforce and economy from coal to renewables cannot be direct, the high number of human resources within in the energy field coupled with a well-established electricity grid indicates a strong potential for smart specialization into renewable energies.

In particular, the decentralized nature of renewable energies poses a challenge to a transition, as by nature of the current power source (coal), energy production in Gorj is very centralized. One possibility would be to establish large power storage plants at the sites of coal power plants or the establishment of bioenergy plants. The production of batteries and storage for renewable energy as well as hydrogen energy, strengthened by the presence of the National Research Center for Hydrogen Energy and Fuel Cells[46] in wider Southwest Oltenia offers potential for the establishment of new value chains within the energy sector. It is important to consider that, alongside research

[40] Cătuți et al., "The Sustainable Transition of Gorj County," 8.
[41] Cătuți et al., 16.
[42] Cătuți et al., 16.
[43] ClientEarth and Bankwatch, "Restructuring Ait to Complexul Energetic Oltenia - Bankwatch România and ClientEarth Observations on Commision Opening State Aid Decision of 5 March 2021 in SA.59974," 2021, https://www.clientearth.org/media/lm0nnejp/bankwatch-romania-and-clientearth-observations-on-restructuring-aid-to-complexul-energetic-oltenia.pdf.
[44] Cătuți et al., "The Sustainable Transition of Gorj County."
[45] Cătuți et al., 20.
[46] ICSI, "ICSI Energy," 2019, https://www.icsi.ro/cercetare/departamente/icsi-energy/.

institutions in the field, firms and businesses operating in renewables must be present or drawn into the region, and collaboration between research and industry must occur to establish a truly strong RIS and enable smart specialization and innovation into the field.

The existing hydropower potential[47] along the Jiu River provides an opportunity to expand renewable energy generation, though recent a recent study[48] warns against the compounding effect of hydropower dams on Romania's river systems for fish, as many of Romania's dams are currently located within important ecosystems and protected Natura 2000 areas.

The construction sector is also strong in Gorj County, both in terms of GVA and employment (Figures 1-2). Smart specialization of the construction sector towards energy efficient construction could spark potential for innovation and the evolution of value chains within the region. Construction, one of the county's most profitable sectors, with businesses comprising nearly the entire value chain for the sector already active within the county, is predicted to see a large jump in demand as decarbonization goals include retrofitting and increasing energy efficiency of existing and future buildings[49]. Once again, encouraging cooperation between research and industry in this field would strengthen innovation capabilities.

On the level of the development region, Southwest Oltenia's Regional Innovation Strategy for Smart Specialization (RIS3) 2021-2027[50], indicates priorities in transport manufacture (automotive and rail), industrial engineering and materials, the agri-food sector, health and wellness, ICT and digitalization, and creative or cultural industries. These align with eleven regional clusters identified within the strategy. Due to Gorj County's own limited capacity for innovation, Gorj risks spreading its capacities too thinly across these nine partially overlapping and broad fields for specialization in the development region. Therefore, Gorj should take an alternate approach, with highly specific vertical rather than horizontal strategies for smart specialization. Nevertheless, the priorities of Southwest Oltenia's RIS3 show potential for cross-county cooperation.

For instance, a possible battery industry in Gorj branching from a shift to renewable energy production could find connection with a specialization towards electric vehicles within Southwest

[47] Gabriel Năstase et al., "Hydropower Development in Romania. A Review from Its Beginnings to the Present," *Renewable and Sustainable Energy Reviews* 80 (2017): 297–312, https://doi.org/10.1016/j.rser.2017.05.209.
[48] Gabriela Costea et al., "A Review of Hydropower Plants in Romania: Distribution, Current Knowledge, and Their Effects on Fish in Headwater Streams," *Renewable and Sustainable Energy Reviews* 145 (2021): 111003, https://doi.org/10.1016/j.rser.2021.111003.
[49] Cătuți et al., "The Sustainable Transition of Gorj County," 38.
[50] ADR SV Oltenia, "Strategia Regionala pentru Specializare Inteligenta RIS3 Sud-Vest Oltenia 2021-2027."

Oltenia's automotive clusters. To accompany this, electric vehicle infrastructure will need to be expanded in Gorj, Southwest Oltenia, and nationally, producing yet another avenue for value and job creation. Other common strengths and priorities include industrial engineering and materials due to high regional skill levels and a relevant research center and health and wellness due to the high proportion of employees in Gorj's public services sector.

Compared with Southwest Oltenia as a whole and nationally, Gorj County has roughly 20% less agricultural land and 20% more forested land[51]. Southwest Oltenia has a large research system devoted to agricultural and horticultural topics. While this indicates prospective specialization within the agricultural field, potential specialization within sylviculture should not be excluded and could contribute positively to local value chains. However, possible land use conflicts between expansion of renewable energies and agriculture should be scrutinized. Finally, the tourism industry offers a specialization into eco-tourism, tied with the region's spas, mountains, rivers, nature reserves, and springs, agro-tourism, and cultural tourism[52] , in concert with the RIS3 priority of creative and cultural industries.

Reshaping the Regional Innovation System

Gorj, just as much of peripheral post-socialist Eastern Europe, is characterized by a highly specialized, organizationally thin RIS[53]. As such, an initial recommendation would be to build upon this specialization. A key barrier in such regions is the absence of pathways for knowledge exchange between academia or research organizations and industry. According to Asheim et al. (2019), a RIS can be altered in three ways: layering by introducing new institutions and organizations, adaptation of existing organizations and institutions to fit emerging industries, and novel application, whereby existing institutions and organizations are applied in new ways.

The shortage of research supply in Gorj means reshaping the RIS must take a highly targeted approach in strengthening existing organizations, initiating new research projects, and attracting new enterprises. Opportunities for increased R&D in Gorj exist due to greater funding being directed into the region for its transition from coal (e.g., through the Just Transition Fund). Priorities

[51] National Institute of Statistics, "Baze de Date Statistice," sec. AGR101A.
[52] Liviu Neamțu and Adina Claudia Neamțu, "Sustainable Development of Rural Tourist Product in Romania-Case Study Gorj County," *Annals of the "Constantin Brâncuşi" University of Târgu Jiu*, Information Society and Sustainable Development, 2015, 207–12.
[53] Asheim, Isaksen, and Trippl, *Advanced Introduction to Regional Innovation Systems*, 67.

for the attribution of this funding should be dictated based wholly on local considerations, to facilitate or work in tandem with priority areas of smart specialization.

To facilitate links between research or academia and industry, transfer offices and innovation hubs should be strengthened, and greater emphasis should be put on establishing avenues of knowledge transfer. Innovation hubs in particular can be considered one of the organizations with the greatest potential benefit for peripheral regions in transition like Gorj and are a relatively new concept within the RIS. Currently, Gorj County has only one established innovation hub – OlteniaHUB[54], a digital innovation hub created to support the digitalization of local SMEs. In wider Southwest Oltenia, CraiovaHUB is the first co-working space in Craiova and an innovation hub at the University of Craiova has recently gained new funding[55]. Founding local maker spaces and start-up centers could also strengthen the local RIS, though actively engaging with local industry to identify barriers and opportunities might be a more ideal first step. Finally, the establishment of investment attraction offices to assist local governments, members of the private sector, and citizens in finding funding sources would aid innovation.

Though both the academic or research-oriented organizations and businesses in Gorj's industry should make use of and boost endogenous resources to ensure long-term resilience of the RIS, collaboration with organizations throughout Southwest Oltenia is necessary by virtue of the comparative organizational thickness and diversity of Southwest Oltenia's RIS. Spin-offs from local universities or research centers, focused on the relative strengths of Gorj's industry would likely assist in inter- and intra-regional knowledge transfer.

Conclusions

Gorj County, Romania, with an economy and a workforce revolving around lignite mining and power generation, faces many challenges in the face of a coal phase-out by 2032. Valuable lessons can be learned upon examining both the potential for smart specialization and the structure of the RIS. In essence, boosting innovation within Gorj must take a very specifically targeted approach dedicated to only a couple avenues of smart specialization, due to the scarcity of research supply and thin organizational setting for the RIS. Working towards this, an analysis of the greatest potentials for innovation in each sector should take place. Strengthening existing organizations

[54] OLTENIA DIH, "OlteniaHUB," Oltenia Digital Innovation HUB, 2021, https://olteniahub.ro/.
[55] UCV, "Two more UCV projects approved for funding," Universitatea din Craiova, 2020, https://www.ucv.ro/media/det.php?id=2207.

and making use of the wider RIS of Southwest Oltenia is vital for the county's innovation system. Further, avenues of knowledge transfer between academia, research institutes, and industry must be established and reinforced.

To facilitate learning processes for the development of strategies and solutions, recommendations mentioned in this policy brief should be considered in comparison with other regions facing similar situations. Therefore, a comparative perspective is needed between the three regions included in the scope of this series of policy briefs.