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Transition from Lignite in Eastern Greater Poland – Smart Specialisation and Regional Innovations



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Chances of related variety and regional innovation system in Eastern Greater Poland[†]

By Julia Rettig, Maximilian Zoll and Stefan Zundel

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Introduction

International agreements and European Union (EU) policy have made decarbonisation a major priority. In regions where coal mining and coal-fired power generation are predominant, the push towards carbon neutrality has highlighted the challenge of safeguarding existing value chains as well as developing new ones. Simultaneously, decarbonisation also offers the opportunity to shape the impending structural change in a sustainable way through innovation. This policy brief addresses these issues in the Polish lignite region of Eastern Wielkopolska. This policy brief is one in a series of three discussing three lignite dependent regions in the EU with the other two investigating Gorj, Rumania and Lusatia, Germany. The aim of each policy brief is to shed light on barriers and challenges of the emerging phase-out of lignite mining and exiting lignite-fired power generation. It thereby critically assesses the regional innovation system (RIS) and potential avenues for smart specialisation of the regional economy to boost innovation. Smart specialisation 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 innovation potential. The RIS framework views innovation activity as learning created by interactions between many actors within the economy in research and development (R&D), such as firms interacting with universities.¹

Eastern Wielkopolska's potentials for smart specialisation and potential reshaping the RIS are examined in this policy brief. Eastern Wielkopolska is a lignite region located at the eastern periphery of the within Poland centrally located Wielkopolska Voivodeship. Limitations on the availability of statistical data will be evident throughout the following analysis.² To give a picture that is as complete as possible and where data for indicators at the exact regional level (i.e., counties) cannot be found, data from the next higher regional level is utilised.

Regional Overview of Eastern Wielkopolska

Eastern Wielkopolska (*Wielkopolska Wschodnia*; see orange shade in Figure 1) is one of the six remaining coal regions (three lignite, two hard coal) in Poland. It consists of five of the seven counties (*powiats*) that form the NUTS 3 subregion Konin (*podregion Koniński*): the city of Konin,

¹ Bjørn T. Asheim, Arne Isaksen, and Michaela Trippel, *Advanced Introduction to Regional Innovation Systems* (Cheltenham, UK: Edward Elgar Publishing, 2019).

² Limitations of statistical data require a trade-off between the sectoral and geographical dimensions of the analysis. Whereas some data sources provide detailed information on disaggregated sectors at the voivodeship level (NUTS 2 level), other provide information only on aggregated sectors at the level of subregions (NUTS 3 level). Other times data is only data for the counties – of which Eastern Wielkopolska is compromising – are available (LAU-1, formerly NUTS 4 level).

Konin county, Turek county, Koło county, and Słupca county (see rust-brown shade in Figure 1). The two remaining counties in the subregion Konin are Gniezno and Września county. These counties are all located in the eastern periphery of the NUTS 2 Wielkopolska Voivodeship (*Województwo Wielkopolskie*; see yellow shade in Figure 1). As of 2020, Eastern Wielkopolska was inhabited by 431,109 people, which constitutes 12.3% of the total inhabitants in the Voivodeship. With an area of 4,438 km², which constitutes 15% of the Voivodeship's area, it is less urbanised than the greater Voivodeship.³

Konin county is the largest county in Eastern Wielkopolska in terms of population, home to one third of the region's inhabitants. Konin city, as the regional centre, concentrates significant economic potential and performs service functions of regional importance e.g., in administration, higher education, and healthcare. Local governments have been recognised as an important element of the complex system of shaping the energy policy in Poland as their competencies in the field include, amongst others,⁴

- the identification of key energy resources and energy demands of respective regions;
- setting guidelines for the energy development of the regions based on the national strategy (development of distributed energy, including RES, prosumers);
- support for the development of smart solutions for energy systems in cities, including mobility, energy efficiency, education, and smart cities concepts;
- supporting innovative initiatives and cooperation between local authorities, businesses, as well as research institutions;
- shaping the local energy economy and strengthening goals of sustainable development;
- and building awareness in local communities.

3 Hetmański M., et al. (2021). Sprawiedliwa transformacja w Wielkopolsce Wschodniej – diagnoza i wytyczne [Just transition in Eastern Wielkopolska: diagnosis & guidelines], report by Instrat for WWF Poland. Page 14 - <https://instrat.pl/wp-content/uploads/2021/02/WWF-Poland-Sprawiedliwa-transformacja-w-Wielkopolsce-Wschodniej-Raport-2021-02-23.pdf>

4 Drożdż, W., Mróz-Malik, O. & Kopiczko, M. (2021). The Future of the Polish Energy Mix in the Context of Social Expectations. *Energies*, 14(17), 5341. <https://doi.org/10.3390/en14175341>

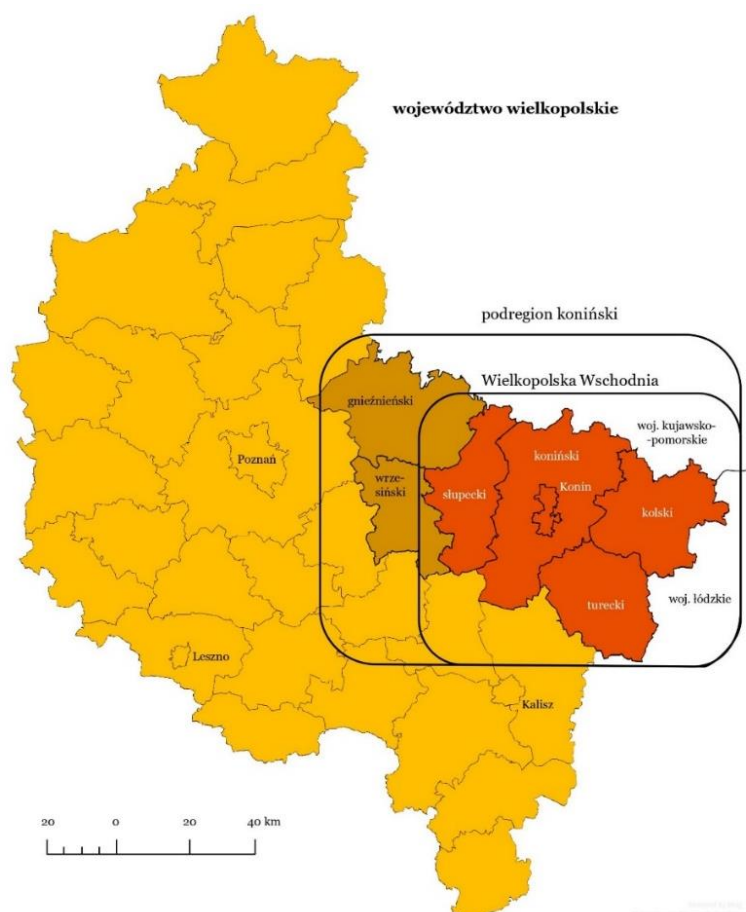


Figure 1: Map of Eastern Wielkopolska considering its subregion and the voivodeship level

Like the other lignite regions examined in this policy brief series, Eastern Wielkopolska is faced with the problem of demographic depopulation trends, characterised by an outflow of young people, while the region's remaining population is ageing.⁵ Forecasts estimate the number of Konin city residents to decrease by 16% until 2030, which is the highest rate for any county in the Wielkopolska Voivodeship.⁶

A detailed description of the regional socioeconomic profile is difficult due to the lack of comparative data, yet the few existing data show an unfavourable economic condition of Eastern Wielkopolska as compared to the rest of the region as is less diversified in economic terms, less urbanised, and less connected to large or medium cities (see Table 1). This impairs infrastructural,

5 Institute for Structural Research, IBS (2018). Transformacja Wielkopolski Wschodniej. Ludzie – Gospodarka – Inwestycje: Transformacja społecznie sprawiedliwa – scenariusze transformacji społeczno-ekonomicznej i technologicznej w subregionie konińskim. <https://ibs.org.pl/app/uploads/2018/10/3.-Kiewra-Szpor-Wyzwania-spoeczno-ekonomiczne-subregionu-koninskiego.pdf>

6 Ślimko, E. (2019). Just Transition of Eastern Wielkopolska. Challenges from the civil society perspective – analysis and recommendations. Page 7-8 <http://www.sprawiedliwa-transformacja.pl/files/Just%20Transition%20of%20Eastern%20Wielkopolska.%20Challenges%20from%20the%20civil%20society%20perspective%20-%20analysis%20and%20recommendations.pdf>

economic, and social connections between the centre of the region and its suburbs. Eastern Wielkopolska has higher unemployment rates than the entire Voivodeship. The largest group among the unemployed are people of working age with lower and upper secondary vocational education, primary education, and lower secondary education.⁷ Specific numbers for the population with tertiary education do not exist, yet it is safe to assume that percentages are lower than the national average or the Voivodeship level. Yet, any (comparative) perspective of the regional data with the Wielkopolskie Voivodeship or national level exhibits a skewed picture, as the Voivodeship numbers largely benefit from the strong growth dynamics of the Voivodeship capital Poznań. As such, the Wielkopolskie Voivodeship is one of the most developed economic regions in Poland. In terms of GDP per capita, Wielkopolskie Voivodeship occupies third place in Poland, behind the Mazowieckie Voivodeship and the Dolnoslaskie Voivodeship.⁸

The region of Eastern Wielkopolska also performs worse than the rest of the Wielkopolskie Voivodeship: the average GDP per capita in Eastern Wielkopolska amounts to 40.6 thousand zlotys (PLN), which is 73% of the average for the country and is lower than in other sub-regions of the Voivodeship. Despite the increase in GDP per capita in Eastern Wielkopolska by 68.9% between the years 2008-2017 (annual average by 5.4%), the Voivodeship's GDP fell to a level below 10% during the same time.⁹ Regarding the population employed in the lignite sector, there seems to be no variation between the Konin subregion and the Wielkopolskie Voivodeship. This can be attributed to the fact that the national data on employment structure exists only at the Voivodeship level. Luckily, the Konin subregion is the only coal basin located in the Wielkopolskie Voivodeship, so it is safe to assume that employment at the Wielkopolskie Voivodeship level almost fully reflects employment in the Konin subregion.¹⁰

7 Institute for Structural Research, IBS Research Report 03/2018: Prospects of green growth in coal-dependent regions of Poland. Macroeconomic analysis of Śląskie Voivodeship and Konin Subregion <https://ibs.org.pl/en/publications/prospects-of-green-growth-in-coal-dependent-regions-of-poland-macroeconomic-analysis-of-slaskie-voivodeship-and-konin-subregion/>

8 Hetmański M., et al. (2021). Page 16

9 Ibid.

10 Institute for Structural Research, IBS Research Report 03/2018: Prospects of green growth in coal-dependent regions of Poland. Macroeconomic analysis of Śląskie Voivodeship and Konin Subregion <https://ibs.org.pl/en/publications/prospects-of-green-growth-in-coal-dependent-regions-of-poland-macroeconomic-analysis-of-slaskie-voivodeship-and-konin-subregion/>

Table 1: Selected socio-economic data for Eastern Wielkopolska

	Konin city	Konin county	Turek county	Koło county	Słupca county	Eastern Wielkopolska	Konin subregion	Wielkopolskie Voivodeship	National
Geographic area [km ²]	82.2	1578	929.4	1011.03	837.91	4,438.54	6,397.07	29,826.51	312,696
Population density [inhabitants/km ²]	882.5	82.4	90.3	85.8	70.5	97.10	103.6	115.9	122
Population (2020) [millions] ¹¹	0.072	0.130	0.084	0.086	0.059	0.431	0.654	3,496,450	38,265,000
Population with tertiary education [%] ¹²	-	-	-	-	-	-	-	29.3	32.9
Unemployment rate (2020) [%] ¹³	7.2	9.7	4.6	2.7	7.9	5.7 (in 2019 ¹⁴)	-	3.7	6.3
Population directly employed in lignite sector ¹⁵	-	-	-	-	-	-	2,525 (in 2018 ¹⁶)		> 8,900 (in 2017)
Population directly and indirectly employed in the lignite sector (per cent of total employed population)	-	-	-	-	-	7,300 (4%) (in 2018)		-	-

A detailed picture of Eastern Wielkopolska's economic profile based on gross value added (GVA) [% of total] by NACE Code Rev. 2 sectors is difficult due to the lack of clear data. In this policy brief, the subregion's economic profile and respective combinations of NACE Code Rev. 2 sectors are shown

11 Główny Urząd Statystyczny (2020). Wyniki badań bieżących - Baza Demografia.

<https://demografia.stat.gov.pl/BazaDemografia/StartIntro.aspx>

12 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>.

13 BDL. Statistics Poland. P2392. Registered unemployment rate.

<https://bdl.stat.gov.pl/BDL/dane/podgrup/tablica>

14 Greater Poland Energy Valley. In Numbers. <https://www.wde.org.pl/en/in-numbers>

15 Alves Dias, P. et al. (2018). EU coal regions: opportunities and challenges ahead, Publications Office of the European Union, Luxembourg, ISBN 978-92-79-89884-6

<https://publications.jrc.ec.europa.eu/repository/handle/JRC112593>

16 Institute for Structural Research, IBS Research Report 03/2018: Prospects of green growth in coal-dependent regions of Poland. Macroeconomic analysis of Śląskie Voivodeship and Konin Subregion <https://ibs.org.pl/en/publications/prospects-of-green-growth-in-coal-dependent-regions-of-poland-macroeconomic-analysis-of-slaskie-voivodeship-and-konin-subregion/>

in Figure 2. In this case, the sector “industry” refers to NACE Code B-E¹⁷, which includes mining and quarrying, production of electricity, manufacturing, and water and waste management. Yet, as mentioned above, detailed data at the regional level is lacking, which results in a picture of subregions that looks similar to Voivodeship levels or the national averages. This can be presented by, e.g., the sector “industry”, the largest economic sector in the subregion (30.7%).

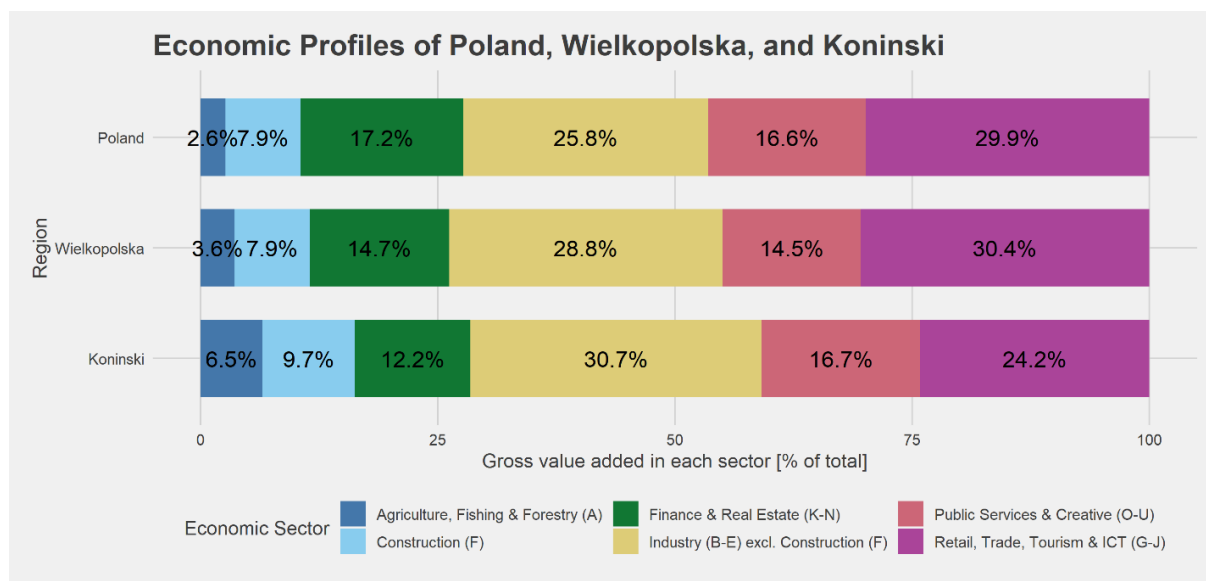


Figure 2: Economic profiles for Poland and Wielkopolskie Voivodeship in gross value added (GVA) [% of total]¹⁸

Poland’s largest privately-owned electric generation company, the energy utility “Zespół Elektrowni Pątnów-Adamów-Konin” SA (ZE PAK) has historically been the region’s main economic driver of growth through high salaries and tax payments. Wages are approximately 30% higher than the average in the Konin subregion or the Wielkopolskie Voivodeship and salaries are comparable to those achieved on average in the central capital of Poland, Warsaw, or Poznań, the Voivodeship capital of Wielkopolska.¹⁹

Konin power plant is the oldest lignite-fired power station in Poland, first commissioned in 1958. Since then, ZE PAK, albeit with changing ownership, has been responsible for conducting local mining and energy generation. In the 1960s-1980s, the subregion grew substantially as the socio-

¹⁷ 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.

¹⁸ 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.

¹⁹ Hetmański M., et al. (2021). Page 34.

economic development centred around mining, energy, and heavy industry with the exploitation of lignite developing in Konin, Turek and nearby. The centrally located lignite mines (PAK KWB) Konin and Adamów generate approximately 8.5% of Poland's electricity supply for the national energy system.²⁰ The strong mining industry and the power industry led Konin city – the subregion's informal capital – to become a thriving industrial centre. It grew from a small town, which had a population of several thousand before World War II, into a city of well over 80,000 by the start of the new millennium. Following the collapse of the communist bloc and the consequent economic crisis of the early 1990s, the deteriorating conditions of the national energy industry led to an unsuccessful introduction of the Polish mining sector into the international market. Under these new conditions, the sector proved to be highly inefficient, unprofitable, polluting, and uncompetitive.²¹ After administrative reform in Poland, Konin lost its status as a regional capital city, leading to local decline and requiring the first structural changes in Eastern Wielkopolska. ZE PAK and the power industry were also restructured. At the end of the 1980s, the number of workers employed in power stations and the mining sector declined significantly. While the number of miners in the PAK KWB Konin decreased by 86.8% from 8,335 (1989) to 1,104 (2017) and PAK KWB Adamów by 88.6% from 3,299 (1988) to 376 (2017)²², the number of employees in the ZE PAK Group dropped by 60% to the level of 4,000 over the years 2011-2020.²³

In October 2020, ZE PAK made national headlines when it said that it would shut down its three operational lignite power plants by 2030 due to their declining economic situation and to achieve climate neutrality in the region by 2040 (see Table 2).²⁴ This made ZE PAK the first fossil fuel company in the country to commit to a coal phase-out. It had already cancelled its Ościsłowo lignite mining project.²⁵ ZE PAK's decision came shortly after the Polish government announced its intention to subsidise the failing hard coal mining company "Polska Grupa Górnicza" (PGG) until

20 Institute for Structural Research, IBS Research Report 06/2018: Transformacja węglowa w subregionie konińskim. <https://ibs.org.pl/publications/transformacja-weglowa-w-subregionie-koninskim/> ; European Association for Coal and Lignite (2020, 7 Ed.). Coal industry across Europe. Page 43 <https://braunkohle.de/wp-content/uploads/2017/01/EURACOAL-2020-Coal-industry-across-Europe-7th.pdf>

21 Bradshaw, M. J. (2014, pp. 84–119). *Global energy dilemmas: Energy security, globalization, and climate change*. Cambridge, UK: Polity.

22 Institute for Structural Research, IBS (2018). Transformacja Wielkopolski Wschodniej. Ludzie – Gospodarka – Inwestycje: Transformacja społecznie sprawiedliwa – scenariusze transformacji społeczno-ekonomicznej i technologicznej w subregionie konińskim. <https://ibs.org.pl/app/uploads/2018/10/3.-Kiewra-Szpor-Wyzwania-spoeczno-ekonomiczne-subregionu-koninskiego.pdf>

23 Hetmański M., et al. (2021). Page 55.

24 "Coal Exit Tracker" (Europe Beyond Coal, 2021), <https://beyond-coal.eu/coal-exit-tracker/>.

25 ZE PAK (2020). Raport bieżący nr 45/2020. <https://ri.zepak.com.pl/pl/raporty/raporty-biezace/1465-informacja-o-zamiarze-ujecia-w-sprawozdaniach-finansowych-za-pierwsze-polrocz-2020-roku-odpisow-aktualizujacych-wartosc-aktywow-oraz-ich-szacunkowym-wplywie-na-wyniki-finansowe.html>.

2049 through state-aid. The state-owned hard coal mining company is in financial trouble as it reportedly lost more than EUR 107 million last year (2020), plus further losses of revenue since the COVID-19 pandemic began.²⁶ As such, for the first time in the country's history, in 2020 coal's share in the power generation mix dropped below 70%. Gas as well as renewable energy sources have slowly started to play a more important role in the mix, yet not enough to meet EU goals on time.²⁷ In light of these challenges and the ZE PAK's decision to end coal burning, regional and local authorities of Eastern Wielkopolska have also signed up to the Powering Past Coal Alliance (PPCA)²⁸ and confirmed that they are no longer waiting for the national government to make a decision to phase-out coal. The climate-sceptic PiS-government is even discussing the possibility of bringing new coal plants online and planning new lignite mines. As a result, the coal region has one of the most ambitious regional coal phase-out targets in the European Union, which is a market driven and not a politically enforced phase out.

ZE PAK is pledging to an investment strategy making use of over PLN 400 million to shift its current installed coal capacity into renewable energy generation, including biogas and biomass, photovoltaics, and onshore wind, but also emerging technological solutions such as hydrogen and energy storage.²⁹ In this effort, ZE PAK is cooperating with the provincial government, particularly through the Regional Development Agency in Konin. In various projects, the agency aims to bring together all interested parties to cooperate in working groups. These include representatives of NGOs, trade unions, local governments, entrepreneurs, ZE PAK, as well as representatives of national ministries. These activities are aligned with the so-called "Greater Poland Energy Valley" brand of the region.³⁰ The economic and investment plan encourages new economic development with the help of climate-neutral industrial development. The main effort is focused on using existing infrastructure (including transmission networks, power plants), human capital, natural conditions (the region has geothermal energy and good wind resources), redevelopment of available area (post-mining areas could be used as sites of wind farms and solar plants, though

26 AFP (2019). Hit by virus, Poland's top coal firm plans cuts, <https://energy.economictimes.indiatimes.com/news/coal/hit-by-virus-polands-top-coal-firm-plans-cuts/77232226>.

27 Forum Energii (2021). Energy transition in Poland Edition 2021. <https://www.forum-energii.eu/en/analizy/transformacja-2021>

28 Powering Past Coal Alliance (2021). Eastern Wielkopolska becomes first region in Poland to join PPCA. <https://www.poweringpastcoal.org/news/press-release/eastern-wielkopolska-becomes-first-region-in-poland-to-join-ppca>

29 Ciepiela, D. (2021). Wirtualny Nowy Przemysł. ZE PAK kończy inwestycje w OZE za ponad 400 mln zł, <https://www.wnp.pl/energetyka/ze-pak-konczy-inwestycje-w-oze-za-ponad-400-mln-zl,473073.htm> ; Nowak, T. (2021). Wielkopolska Wschodnia chce postawić na zielony wodór <https://biznesalert.pl/energetyka-innowacje-wodor-zielony-oze-wielkopolska/>

30 The Greater Poland Energy Valley: <https://www.wde.org.pl/en/>

these renewable energy sources (RES) cannot replace fossil fuel plants completely) as well as attracting new investors to the region (particularly in the field of electromobility) for future development.

Table 2: Summary of operational lignite-fired power plants in Eastern Wielkopolska

Power plant	Patnow I	Konin	Patnow II
Owner	ZE PAK SA		
Commissioning year of first unit	1967	1958	2008
(Announced) Retirement year of last unit	2024	2022	2029
Coal units operational	3	2	1
Power capacity operational [MW]	600 MW	78 MW	474 MW
CO ₂ emissions (2019) [Mt / year]	4.15 t	5,87 t	2.45 t

Since 55% of the employees of ZE PAK will acquire pension rights by 2030, there is a need to prepare programs that support the remaining 45% of employees (1,800 out of 4,000)³¹ to remain professionally active after the closure to maintain the socio-economic foundations of Eastern Wielkopolska. This workforce will require support to re-enter the job market in 2030 with potential investments in the renewable energy sector offering an employment opportunity. Analysis shows that the potential number of new jobs that can be created through investments in the energy sector in the region by 2030 varies between 12,000 (baseline scenario) to 22,000 (optimistic scenario).³² However, outgoing employees from the lignite sector need assistance in transitioning their skillset so that they can find employment in the renewable energy industry.³³ Supporting this development idea is the fact that the Wielkopolska Voivodeship has been classified as a region with a high decarbonising employment potential by the European Commission. Particularly wind (onshore) has a potential of 10.40 GW, though there currently are no enterprises operating along the value chain (nacelle assembly, blades, foundations) in the region or in the Voivodeship.³⁴ Solar photovoltaic (PV) also has great potential with ground-mounted PV up to 31.25 GW and rooftop up to 2.75 GW. Along this value chain, 34 factories exist with 2 materials; 2 components; 2 sellers; and 28 installers.³⁵ Concerning ground-mounted solar PV systems, Wielkopolska is among the top 5 regions with high potential next to Sud-Vest Oltenia in Romania, where Gorj is located. While the

31 Hetmański M., et al. (2021). Page 36.

32 Hetmański M., et al. (2021). Page 55.

33 Hetmański M., et al. (2021). Page 59ff.

34 Kapetaki, Z. et al. (2020). Clean energy technologies in coal regions. Luxembourg: Publications Office of the European Union, ISBN 978-92-76-12330-9. Page 131.

35 Ibid.

transition towards RES seems the most desirable process, it must, however, be considered that these RES cannot replace fossil fuel plants completely due to their decentralised character.

The investment and cooperation of companies for renewables under the “Greater Poland Energy Valley” brand tries to promote the economic potential of Eastern Wielkopolska as an attractive region for the implementation of joint projects in the renewable energy sector and smart specialisation.³⁶ It builds on the idea that one of the strengths of Eastern Wielkopolska is the energy industry, which must be preserved in a modified form in the post-carbon world of the energy transition. Yet, there are other potential focal points of economic activities to which future economic development can be linked. Figure 3 shows the Balassa-Hoover Index, which represents the degree of specialisation 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.³⁷

Figure 3 suggests that some sectors are underrepresented in Eastern Wielkopolska—including retail, trade, and tourism, whereas overrepresented sectors are agriculture, forestry, and fishing, and industry. Earlier analysis of Eastern Wielkopolska suggest similar conclusions as it is a region that has a strong industrial and agricultural profile, with an emphasis on the energy sector and mining, furniture production and freight transport.³⁸ When looking exclusively at Eastern Wielkopolska, however, one must exclude alternative economic potential like that of Gniezno county (with a well-developed agri-food sector and construction sector), and Września country (with an automotive industry).

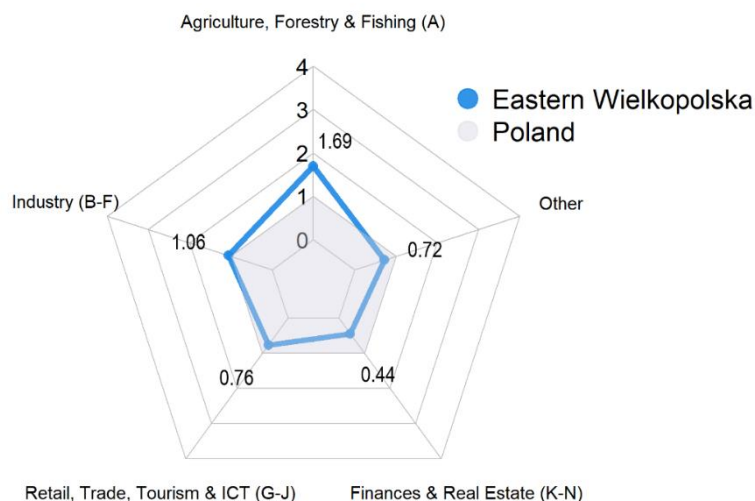
36 The Greater Poland Energy Valley: <https://www.wde.org.pl/en/>

37 Marius Nagel and Stefan Zundel, “‘Wat den Eenem 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-umweltökonomik/public/Schriftenreihe-pdf/sr01.pdf>.

38 Institute for Structural Research, IBS Research Report 06/2018: Transformacja energetyczna w subregionie konińskim. https://ibs.org.pl/app/uploads/2018/12/IBS_Research_Report_06_2018_PL.pdf; Churski P. et al. (2017) Towards Policy – Place-Based Policy and Smart Specialisation. In: *Measuring Regional Specialisation*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-51505-2_5

Figure 3: The Balassa-Hoover Index (BHI) for economic sectors within Eastern Wielkopolska in comparison with national reference levels (BHI = 1). Calculation based on 2019 employment data excluding economic entities employing more than 9 persons from the Local Data Bank of Statistics Poland

Balassa-Hoover Index for Economic Sectors in Eastern Wielkopolska



Being classified as a non-metropolitan RIS³⁹, detailed data on Eastern Wielkopolska's RIS is limited considering the indicators (see Table 3) as most data is not available for the subregional level.

39 Ciołek, D., Golejewska, A. & Zabłocka-Abi Yaghi, A. (2021). Regional Innovation Systems in Poland: How to classify them? *Economy of Region*, 17(3), 987–1003. <https://doi.org/10.17059/ekon.reg.2021-3-19>

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Table 3: Summary of indicators for Eastern Wielkopolska's and Wielkopolskie Voivodeship's RIS

Indicator		Konin city	Konin county	Turek county	Koło county	Słupca county	Eastern Wielkopolska	Konin subregion	Wielkopolskie Voivodeship	National
Intramural R&D expenditures in all sectors (2018) ⁴⁰	in millions of Euros	-	-	-	-	-	-	-	364.28	6,018.49
	as % of GDP ⁴¹	-	-	-	-	-	-	-	0.75	1.21
Total R&D personnel and researchers (2018) ⁴²	in full-time equivalent (FTE)	-	-	-	-	-	-	-	10,594	161,993
	as % of total employment in FTE	-	-	-	-	-	-	-	0.66	1
Patents granted ⁴³ (2020)	in number per 100,000 inhabitants	1.4	1.5	1.2	1.2	1.7	-	-	4.8	5.9

40 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.

41 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.

42 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.

43 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.

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Indicator		Konin city	Konin county	Turek county	Koło county	Słupca county	Eastern Wielkopolska	Konin subregion	Wielkopolskie Voivodeship	National
Enterprise birth (2018) ⁴⁴	in the sectors industry, construction, and services excluding insurance activities of holding companies (NACE Rev. 2 B-S_X_K642)	-	-	-	-	-	-	36,345	248,473	2,386,411
Enterprise numbers by size class in 2020 ⁴⁵ Excluding micro businesses (0-9 employees)	Small (10-49 employees)	291	315	223	188	176	1,193	1,984	14,463	13,4600
	Medium (50-249 employees)	80	43	40	41	31	235	389	2,773	27,381
	Large (250+ employees)	9	5	10	7	6	37	39	419	4,298

44 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.

45 BDL. Statistics Poland. G203, Entities of the National Economy entered in the REGON register. <https://bdl.stat.gov.pl/BDL/dane/podgrup/tablica>

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Indicator		Konin city	Konin county	Turek county	Koło county	Ślupca county	Eastern Wielkopolska	Konin subregion	Wielkopolskie Voivodeship	National
Staff employed in enterprises by size class in 2018 (as % share of total) Excluding micro-businesses (0-9 employees)	Small (9-49 employees)	-	-	-	-	-	-	-	121,391 (17.13%)	1,116,514 (18.55%)
	Medium (50-249 employees)	-	-	-	-	-	-	-	179,669 (25.35%)	1,612,608 (27.22%)
	Large (250+ employees)	-	-	-	-	-	-	-	407,746 (57.53%)	3,195,497 (53.94%)

Likewise, the organisational setting for Eastern Wielkopolska's RIS is quite thin as it hosts only a few (own) organisations resulting in the region displaying a general lack of research supply in terms of the number of academics, R&D employees, and knowledge transfer institutions. However, some business environment organisations are already in place that are fostering regional development by attracting investors to the region. In the future, they could act as a platform for exchange and play a significant role focusing upon transfer of knowledge between the business and science sectors, as well as civil society (see Table 4).

Table 4: List of key organisations underlying the RIS of Eastern Wielkopolska and its locations

Type	Organisation	Location
University of Applied Sciences	State University of Applied Sciences, Faculty of Economics and Technical Sciences	Konin city
	Higher School of Pedagogy and Technology	Konin city
	Higher School of Management Personnel specialised in Economics and Power Engineering	Konin city
Fab lab	Restart Lab	Konin city
Technology Parks / Business Incubator	Turek Entrepreneurship Incubator	Turek
	Turek Investment Zone	Turek
Business Environment Institutions	Chamber of Commerce Turek	Turek
	Regional Development Agency Konin	Konin
	Chamber of Commerce Konin	Konin
	Entrepreneurship Support Center Konin	Konin
	NUVARRO Innovation Centre	Kazimierz Biskupi (Konin county)
SEZ	Special Economic Zone Łódź	Konin city Konin county Turek county Koło county Śępca county

The small organisational setting of the RIS, however, offers opportunities to expand development by focusing on creating new settings for local knowledge transfer. This could be achieved through the establishment of (thus far non-existing) research organisations and centres that influence development in Eastern Wielkopolska and beyond. Thereby, the greater regional context of the

Wielkopolskie Voivodeship and its organisationally thicker RIS should be taken into consideration, as the RIS of Eastern Wielkopolska's is reliant on it.⁴⁶

A Starting Point for Innovation in Eastern Wielkopolska

Smart Specialisation of the Economic Profile

Eastern Wielkopolska's smart specialisation aims to play to the region's strengths by including a transformation of the energy sector by using existing infrastructure (including transmission networks, power plants) and redevelopment of the available area (post-mining areas), human capital as well as natural conditions.⁴⁷

For now, this idea manifests through the development of renewable energy generation. In October 2021, ZE PAK announced commercial operations of the country's largest solar power farm with 70 MW capacity in the Brudzew commune (Turek county).⁴⁸ In 2012, ZE PAK added a 55 MW biomass plant to the Konin power plant, signalling the beginning of the plant's transition from lignite to biomass. In March 2018, the biomass unit was adapted to heat production for Konin city.⁴⁹ ZE PAK has also put investments into the development of hydrogen technologies on the agenda. The "H2Lab – Hydrogen Application Centre" project has been officially introduced as an element of the efforts to build an incubation and support system for high-quality projects based on hydrogen technologies. Building on this, in July 2021, Konin secured a deal with Solaris Bus & Coach to be the first public transport operator in Poland to add a hydrogen bus to its fleet. The contract stipulates the four-year lease of a bus propelled with energy derived from hydrogen. The vehicle is set to be delivered to Konin in 2022.

Likewise, batteries are recognised as an enabling technology for decarbonisation of transport through electric vehicles. Li-ion batteries are presently the technology of choice and are quickly gaining ground in energy storage applications. The demand for batteries is therefore expected to

46 Samorząd Województwa Wielkopolskiego w Poznaniu (2020): Strategia rozwoju województwa wielkopolskiego do 2030 roku https://bip.umwww.pl/artykuly/2826147/pliki/20200716181034_strategiawielkopolska2030uchwaaswwnrxvi8720.pdf; Urząd Marszałkowski Województwa Wielkopolskiego w Poznaniu (2020): Regionalna Strategia Innowacji dla Wielkopolski 2030. https://markaw.pl/pl_PL/regionalna-strategia-innowacji-dla-wielkopolski-2030

47 Urząd Marszałkowski Województwa Wielkopolskiego w Poznaniu (2021). Regionalna Strategia Innowacji dla Wielkopolski 2030. https://markaw.pl/pl_PL/regionalna-strategia-innowacji-dla-wielkopolski-2030

48 Renewables Now (2021). ZE PAK switches on 70-MWp solar farm in Poland. <https://renewablesnow.com/news/ze-pak-switches-on-70-mwp-solar-farm-in-poland-759204/>.

49 Forum Energii and Agora Energiewende (2020) Modernising the European lignite triangle Towards a safe, cost-effective and sustainable energy transition. <https://www.forum-energii.eu/en/analizy/europejski-trojkat-wegla-brunatnego>

grow very rapidly in the coming years.⁵⁰ In Konin, the construction of a large factory for novel cathode materials (eLNO) for functional battery materials (cathode, anode, electrolyte, and separator) was announced by Johnson Matthey (Great Britain), with the start of manufacturing envisaged for 2021-2022. On a broader scale, the RIS should aim for the development of technology hubs and business incubators as well as improving the qualifications of employees in the fields of mining, fuel and energy, and support for entrepreneurs and young people.

Overall, the development of the Eastern Wielkopolska region should also cover areas of the economy that are not directly related to energy production and incentivise the wider economic development of the region. As such, an asset of Konin county is the “Wielkopolska Logistic Centre Konin- Stare Miasto”. It offers grounds for a concentrated location of capital with infrastructure available for the needs of logistic firms, importers distributing nationwide, and centres involved in the distributive supply network. This includes proximity to important infrastructure like highways (A1 and A2) or the airport in Łódź.

Finally, the region also offers a specialisation in the development field of (eco-)tourism, including in post-mining areas through recultivation of land. The region’s development strategy recognises the advantages of cultural heritage located in the region, especially those related to pilgrimage culture, natural environmental resources, and good communication resulting from the region’s location on transport routes of international importance. The main advantages are access to lakes, rich fauna and flora enhanced by the presence of a Natura 2000 area (a network of nature protection areas in the territory of the European Union), which opens the possibility of developing agritourism. The specific regional resources allow for hiking, cycling and horse riding. There is also an excellent base for water sports enthusiasts in Powidzkie Lake, the biggest lake in the Wielkopolska Voivodeship, Gośławskie Lake, Słupeckie Lake, Pątnowskie Lake, and others. Relatedly, the subregion Konin stands out for high activity in the field of cultural tourism like the salt mine in Kłodawa, Poland’s deepest underground tourist attraction, or sites like the Basilica of Our Lady in Licheń.

The EU’s ambition on decarbonisation can assist Eastern Wielkopolska in building up these smart specialisation projects as well as new institutions that support the regional innovation system (financially). Through the “Green Deal” along with the establishment of the “EU Platform for Coal Regions in Transition” as well as the “Just Transition Fund and Mechanism” the EU offers money to coal-dependent regions that assists in creating new jobs for people leaving the mining and mining-

50 Kapetaki, Z. et al. (2020). Clean energy technologies in coal regions. Luxembourg: Publications Office of the European Union. ISBN 978-92-76-12330-9.

related industries, to finance retraining programmes, to diversify the local economy, and to repair the environment.

Reshaping the Regional Innovation System

A key barrier in the peripheral RIS of Eastern Wielkopolska is the absence of pathways for knowledge exchange between academia or research organisations and industry. Hence, the development of smart specialisation in- and outside of the energy sector seemingly occurs on the side lines of the greater development of the Voivodeship. This translates in Eastern Wielkopolska to an organisationally thin RIS that has a shortage of research supply and requires reshaping by taking a targeted approach in strengthening existing organisations as well as initiating new research projects. To facilitate links between research or academia and industry, transfer offices and innovation hubs could be established, while also putting greater emphasis on establishing avenues of knowledge transfer. Likewise, the region should adopt some new approaches and concepts besides its existing ones to reshape its RIS.

One example of such a new approach would be the creation of innovation hubs with an emphasis on scouting. Scouting, as a concept, is a reaction to deficiencies in traditional transfer offices. Transfer offices function as “passive” intermediaries whose task it is to reduce typically high search and transaction costs by bringing (scientific) supply and (economic) demand for know-how together. Yet, in many cases, the employees of transfer offices act as a “Jack of all trades” resulting in a lack of technical competence in mediating between scientists and businesses. Scouts instead are professionally competent people who actively address companies in their field of expertise. Up until now, the region has one incubator addressing these topics, in Turek. The recently opened “fab lab” in Konin offers another opportunity to support entrepreneurship (skills) in the region. Fab labs are small-scale workshops offering (personal) digital fabrication equipment. They are typically equipped with an array of flexible computer-controlled tools that cover several different length scales and materials, with the aim of enabling making “almost anything”.

Likewise, to limit the outflow of people from the subregion, particularly young people, emphasis should be placed on the quality of secondary vocational education within the region, as it assists in improving competencies and skills including entrepreneurship. Expanding young people’s educational opportunities, which can include specialisations focused on new technologies for both the research-oriented organisations and businesses in the region’s industry could strengthen the RIS. School business incubators offer such a platform, while covering an array of tasks and

operations that are aimed at supporting the development of newly established companies and optimisation of the conditions required for transfer and technological commercialisation.

In that regard, in September 2019, the Centre for Craft Support, Dual Education and Vocational Training in cooperation with the State Higher Vocational School Konin, the Regional Development Agency Konin and the County Employment Office in Konin launched the project "School Incubators for Entrepreneurship"⁵¹ intended for students and graduates of the following secondary schools:

- Mining and Energy School Complex in Konin;
- Construction School Complex in Konin;
- Centre for Continuing Education Schools in Konin;
- Complex of General and Vocational Schools in Zagórz;
- Vocational Schools Complex in Słupca;
- Technical School Complex in Koło;
- Technical School Complex in Konin;
- Construction and Vocational School Complex in Konin.

This project has been implemented with very positive results in terms of the mission of school business incubators, requiring a coherent approach in solving matching problems that bring (young) people, enterprises, and research together in the region. The promotion of returnees' initiatives in the region could assist in reaching the goal.

Conclusions

As the first of Poland's six coal regions, Eastern Wielkopolska is starting a just energy transition process with the goal of a coal phase-out by 2030 and climate neutrality by 2040. As a result of this plan, with a local economy and workforce that historically is built around lignite mining and power generation, several thousand jobs and businesses will be lost, requiring an economic transformation of the region. To make this transition process as inclusive as possible, the existing infrastructure (transmission networks, power plants), human capital, natural conditions, as well as the redevelopment of the available area (post-mining areas) ought to be included.

While a credible discussion of a coal phase-out on the national level in Poland has yet to start, the region's "Greater Poland Energy Valley" brand offers a promotion plan of coordinating economic and investment projects to revitalise the local economy. Likewise, the plan to transition out of

51 Noga, M. & Brzeziński, A. M. (2021). *Economics, Education and Youth Entrepreneurship*. London: Routledge.

lignite and into renewables could be initiated with support from the European Just Transition Mechanism and its pillars. Additionally, this policy brief has shown that boosting innovation within Eastern Wielkopolska must take a targeted approach by examining possible avenues for smart specialisation. Based upon the analysis of this policy brief, the most promising projects that should aim for European funding include:

- limiting the outflow of young people from the region by emphasising quality of secondary vocational education as it assists in improving competencies and skills including entrepreneurship.
- strengthening the concept of the “H2Lab – Hydrogen Application Centre” project. This includes the deal with Solaris Bus & Coach to establish a fleet of public transport propelled with hydrogen energy in Konin.
- supporting the development of batteries as an enabling technology for decarbonisation of transport by electrifying the sector. The demand for batteries for use in electric vehicles and in energy storage is expected to grow in the coming years. In Konin Johnson Matthey announced new manufacturing sites, envisaged for 2021-2022.

Achieving these projects requires a regionally tailored approach; the few existing establishments should be strengthened to support the (co-)creation of new strategies and establishments that influence development beyond the region. This can be achieved by making use of the wider RIS of the Wielkopolskie Voivodeship.

To facilitate a wider learning process for the development of strategies and solutions, recommendations should be considered in comparison with other regions facing a similar situation and set of problems. Therefore, the next analytical step should include a comparative perspective between the three regions investigated in the scope of this series of policy briefs.