

Silesia

GENERAL INFORMATION

Country: Poland

Region Name: Silesia

Region NUTS2 code*: PL22 - Silesia

Region NUTS3 code

PL22A - Katowicki / PL228 Bytomski

PL229 - Gliwicki / PL227 - Rybnicki

PL22B - Sosnowiecki / PL22C - Tyski

Main urban centres in the region (by population):

Katowice - 294,510 / Częstochowa - 222,292

Sosnowiec - 202,036 / Gliwice - 179,806

Zabrze - 173,374 / Bielsko-Biała - 171,259

Bytom - 166,795 / Rybnik - 138,696

Ruda Śląska - 138,000 / Tychy - 127,831

*NUTS: Nomenclature of Territorial Units for Statistics



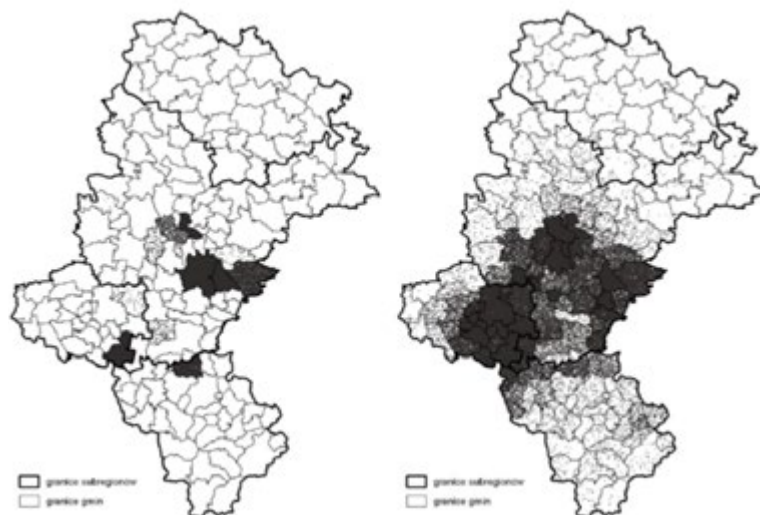
NOTICE ON COVID-19

The data contained within this regional profile was primarily gathered prior to the COVID-19 pandemic. It is recognised that the pandemic has had an adverse impact on energy demand. Although the consequences and implications are significant, they remain emergent and dynamic. An update to this document should be considered, once these consequences and implications are clearer and more quantifiable.

Overview

Silesia is the most populated and urbanised region in Poland with over 4.5 million inhabitants. 78% of its population live in cities and its population density is 370 people/km². The region comprises of eight NUTS-3 subregions, out of which six are notably affected by coal mining and related industries. The communities where the majority of the miners live are located in central and western subregions - namely Katowicki subregion, Bytomski subregion, Gliwicki subregion, Rybnicki subregion, Sosnowiecki subregion, and Tyski subregion.

Silesia is the most coal-dependent region in Poland with mining playing an important role in the regional economy. However, its gradual decline in recent years is also apparent as production is declining in view of falling productivity and low profitability. The mining industry's share of Silesia's GVA was 6.9% in 2017 (a decrease from 9.8% in 2000). At the same time, the sector still employs around 73,000 people, which represented 4.2% of total employment in the region in 2019.



LEFT: LOCATION OF COAL MINES EMPLOYERS

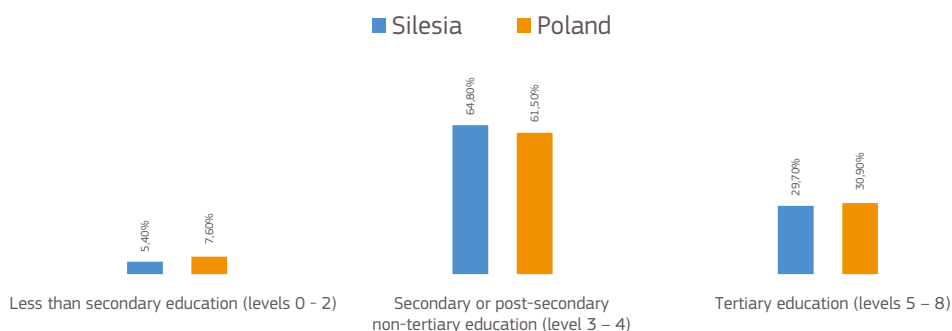
RIGHT: PLACE OF RESIDENCE OF THE EMPLOYED IN COAL MINES

Source: PLAN DZIAŁAŃ TRANSFORMACJI REGIONU, Załącznik nr 1 do Uchwały Zarządu Województwa Śląskiego nr 2392/VI/2019 z dnia 23.10.2019

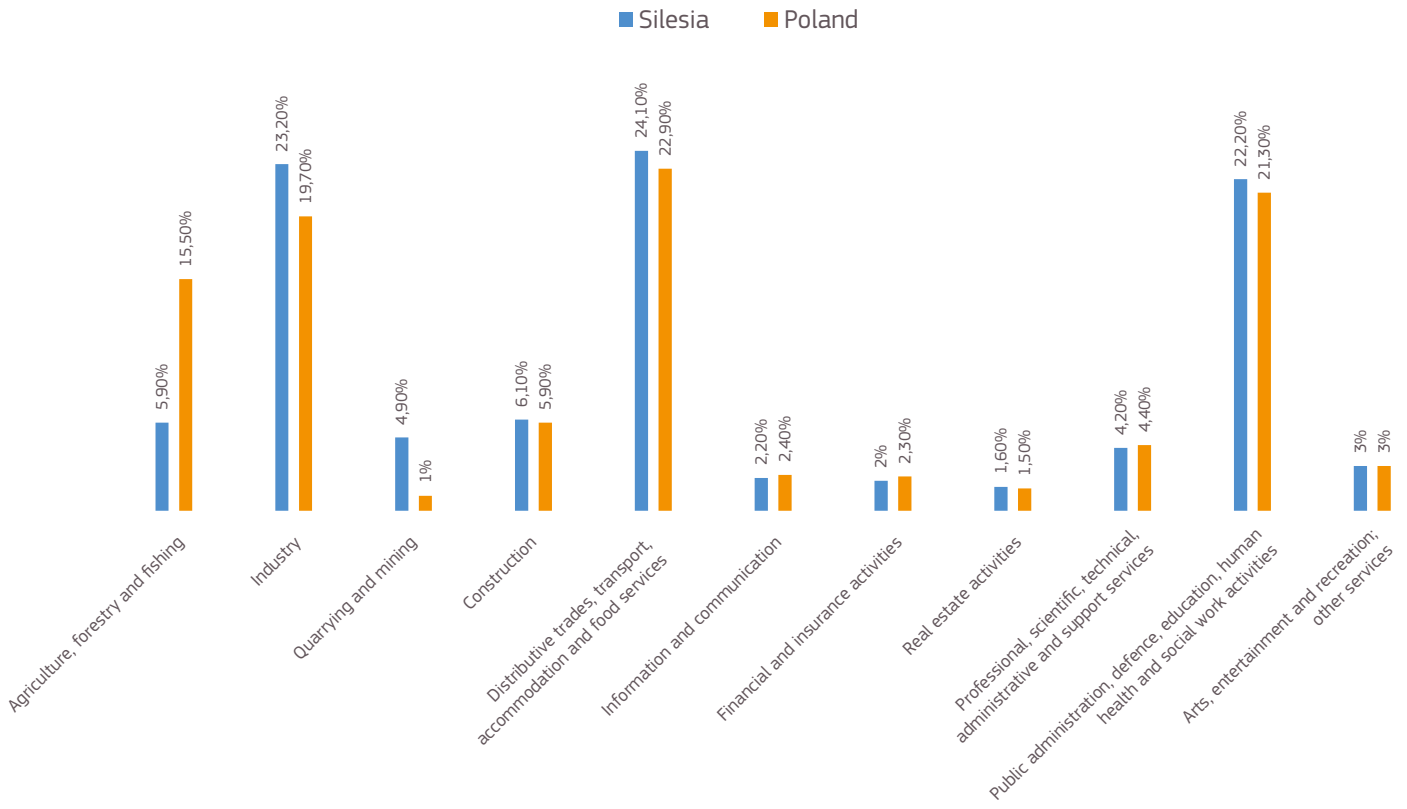
Regional socio-economic profile

| | Silesia (NUTS 2) | Poland (NUTS 0) | Date / Source |
|--|---------------------|--------------------|------------------|
| Population [persons] | 4,533,565 | 38,411,148 | GUS 2018 |
| Population density [persons/km ²] | 368 | 123 | |
| Employment [No. persons employed] | 1,843,700 | 16,133,400 | |
| Employment rate [% share of population aged 15 and above] | 69.4% | 72.2% | |
| Unemployment rate [% share of labour force aged 15-74] | 3.4% | 3.9% | |
| GDP per person [€1 = zł4.47] | €12,600 | €12,200 | GUS 2017 |

Educational attainment

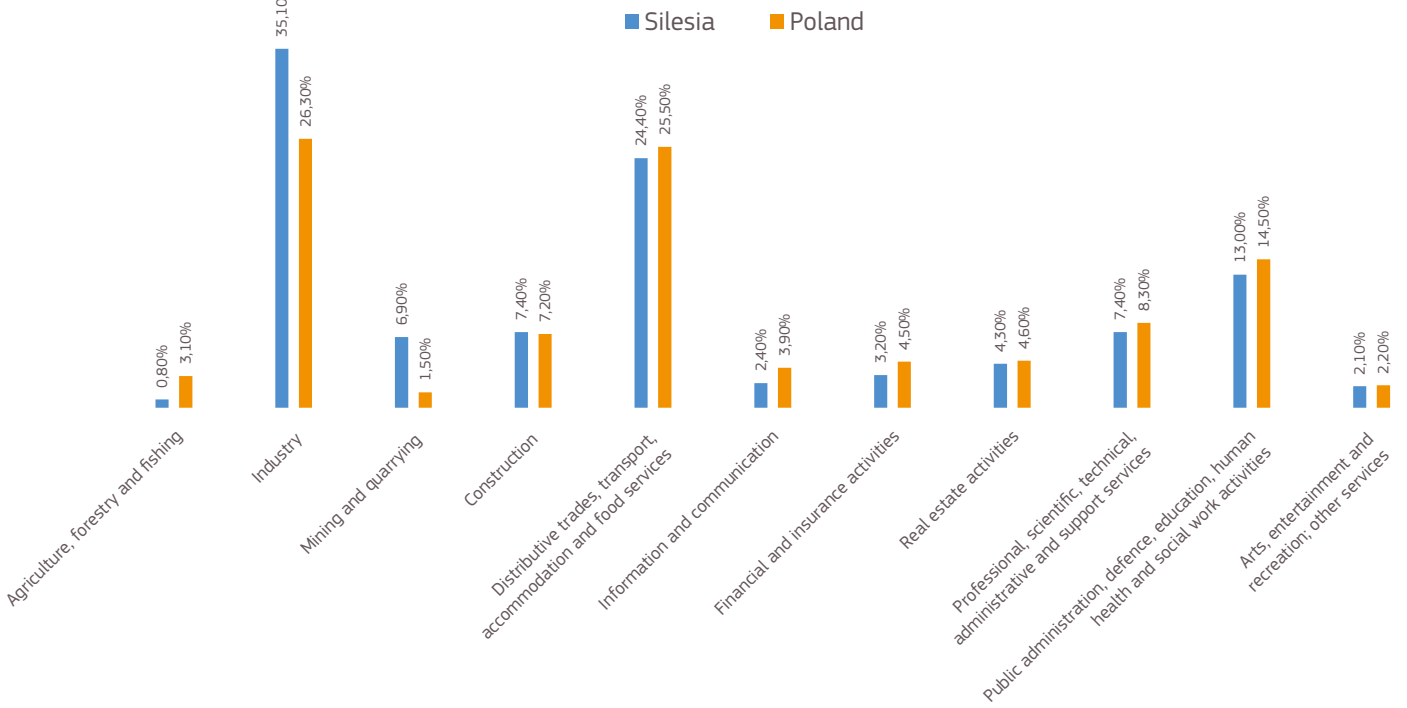


Employment by sector



Data / Source: GUS 2017

GVA per sector



Data / Source: GUS 2017

| Regional coal industry and coal power plant profile | | | | |
|--|-----------------------------|--|------------|------|
| Coal mining | | | | Date |
| Type of coal | Hard coal | | | |
| Type of coal extraction | Underground mining | | | |
| Number of coal mines | 17 | | | 2020 |
| Annual production of coal | 59 million tons | | | 2017 |
| Main (largest) coal mining enterprises | | | | |
| Name | Ownership | Number of employees | Date | |
| KWK ROW | Polska Grupa Górnicza (PGG) | circa 42,000 | 2019 | |
| KWK Ruda | | | | |
| KWK Piast-Ziemowit | | | | |
| KWK Bolesław Śmiały | | | | |
| KWK Sośnica | | | | |
| KWK Murcki-Staszic | | | | |
| KWK Mysłowice-Wesoła | | | | |
| KWK Wujek | | | | |
| KWK Borynia-Zofiówka-Jastrzębie | Jastrzębska Spółka Węglowa | 22,038 | 2019 | |
| KWK Budryk | | | | |
| KWK Knurów-Szczygłowice | | | | |
| KWK Pniówek | | | | |
| ZG Sobieski | Tauron Wydobycie | circa 2,700 | 2019 | |
| KWK Bobrek-Piekary | Węglokoks | 2,800 | 2019 | |
| KWK Silesia | Private | circa 1,600 | 2018 | |
| ZG Eko- Plus | Private | 300 | 2019 | |
| ZG Siltech | Private | N/A | N/A | |
| Coal power plants | | | | |
| Number of coal power plants | | 4 | 2019 | |
| Installed capacity [MW] | | 6,344 | 2018 | |
| Share of coal in regional power generation mix [%] | | 85% | 2017 | |
| Main (largest) coal power plant operators | | | | |
| Name | Ownership | Number of employees | | |
| Coal Power Plant Rybnik | PGE | N/A | | |
| Coal Power Plant Łaziska | Tauron Wytwarzanie S.A. | | | |
| Coal Power Plant Łagisza | Tauron Wytwarzanie S.A. | | | |
| Coal Power Plant Jaworzno III | Tauron Wytwarzanie S.A. | | | |
| Regional employment in coal mining and coal power plants | | | | |
| Employment | Number | Share of total regional employment [%] | | Date |
| Coal mining (direct employment) | circa 73,000 | 4.2% | | 2019 |
| Coal power plants (direct employment) | 2,911 | 0.15% | | 2017 |
| Other coal-related activities | 22,106 | 1.2% | | 2017 |
| Employment by age group [% of total employment] | < 30 years | 30-44 years | > 45 years | Date |
| Coal mining (direct employment) | 20% | 48% | 32% | 2017 |

General description of the economic and demographic profile of the region including notable trends and projections

Silesia is located in south-western Poland, bordering with Slovakia and Czechia. Silesia is the most populated and urbanised region in Poland with over 4.5 million inhabitants. 78% of its population live in cities and its population density is 370 people/km² (compared to a national average of 123.6 people/km²). The high population density relates to its long history as a major centre for mining and metalwork since the 19th century, which induced an early process of urbanisation and industrialisation due to its large deposits of coal and lignite, as well as zinc, lead, iron and other ores. While densely populated, the population of Silesia has been decreasing. Between 2000 and 2017, the population of Silesia decreased by 4.4% (in the same period the overall population in Poland increased by 0.5%).

With €57.2bn Silesia had the second highest gross domestic product in Poland in 2017 after Warszawski Stoleczny region. Silesia's GDP accounted for 12.2% of the national GDP and the GDP per capita was €21,600 (PPS) in 2017, which was equivalent to 72% of the EU average and above the national average of €20,900 in the same year.

Unemployment rates have been decreasing in the region and in 2018, it reached 3.4%, below the national average of 3.9% and the EU average of 6.3% in the same year. There are however regional differences with regard to economic activity and employment: Tyski, Katowicki, Bielski, and Gliwicki sub-regions have low levels of unemployment, while Bytomski sub-region has the worst labour market conditions and the highest unemployment rates.

In 2017, the highest employment rates were registered in the industry and mining sector (28.1%), followed by the distributive trades, transport, accommodation and food services (24.4%) and public administration, education, health and other social work activities sector (22.2%). In terms of productivity, the industry sector had the highest share in the regional GVA at 35.1%, compared to the national share of 26.3%. This is followed by a contribution of 24.4% of GVA in distributive trades, transport, accommodation and food services.

Educational attainment levels in Silesia are among the highest in the country, with only 5.4% of the population aged 15 – 64 having lower secondary education level, 64.8% having attained secondary education and 29.7% tertiary education.

Overview and general characteristics of coal-related industry

Silesia has rich coal deposits and the Upper Silesian Coal Basin is the most important coal basin in Poland and one of the EU's largest mining regions. The area of the basin is estimated at approximately 5,600 km². In terms of type of coal deposits, thermal coal dominates (two-thirds of total balance sheet resources), followed by coking coal with other types of coal accounting for the remainder.

Mining has been a defining feature of Silesia since the 18th century when the region became an important mining and industrial hub and consequently an important urban centre. During the Communist era and until 1989 coal industry was a major source of regional employment and a crucial pillar of the economy. Since 1990s, the mining in the region has been undergoing significant changes: mines were modernised to improve their productivity, the least unproductive mines were closed, and employment fell from 388,000 in 1990 to 98,000 in 2015. In the 2000s the changes in employment in hard coal mining were less significant. However, in recent years employment reduction has accelerated again as the government adopted new restructuring programme for the hard coal mining sector incentivising miners to voluntarily leave the sector.

Mining communities are concentrated in central and western subregions. The hard coal is extracted in 17 mines with a total annual production of over 59 million tons/yr. The four main coal power plants (there are also numerous heat and coal power plants in Silesia) are located in the vicinity of Katowice. Coal Power Plant Jaworzno III is located 20 km east of Katowice, Coal Power Plant Łaziska is located 30 km south of Katowice, Coal Power Plant Łagisza is located 15km north of Katowice. Coal Power Plant Rybnik is located outside Rybnik and 50 km south-west of Katowice.

Socio-economic characteristics of coal-related industry

Coal production in Silesia has more than halved from its peak in 1978 with 128 Mtoe to 59 Mtoe in 2017 and is declining due to a lack of profitability. Excess employment and high personnel costs are among the factors that are frequently mentioned as obstacles to higher profitability for coal mines. Due to collective wage agreements, it is difficult to reduce wages and labour force reduction is a means of reducing costs. The other factors that contribute to the financial problems of the hard coal sector include high fixed costs; excessive production and increased competition from coal imports, mainly from Russia, which cause low-quality coal from Poland to remain unsold; and high production costs resulting from the unfavourable

geological characteristics of deposits. In the future, the geological conditions could become even more problematic as more accessible deposits are depleted, and deeper pits need to be dug.

Mining jobs are characterised by a large geographical concentration as they are located in only a few municipalities (gminas) in Silesia. The area of influence of the mining industry can be accurately analysed by observing the distribution of employees' places of residence which are concentrated in the central and western parts of the Silesia (see the map on page 2), in particular in the areas of the Upper Silesian and Zagłębie Metropolis and the Rybnik Agglomeration together with the functional surroundings of these areas. These are large clusters of medium-sized cities, one of the most strongly urbanised and most densely populated areas in the country. Mines and other plants related to the coal industry are located in close proximity to city centres and are directly adjacent to housing estates.

Coal mining is the most unionised sector of the Polish economy. In 2015, the unionisation rate for the coal mining sector was 72%, compared to only 11% for the total economy. Employment in mining and quarrying in Silesia is dominated by male workers (90% of employees are male). There is also an overrepresentation of middle-aged people in the employment structure in comparison to other sectors - around half of workers in mining and quarrying are aged 30–44, compared to 43% in other sectors. Thirdly, people working in the mining and quarrying sector are generally less qualified than people working in other sectors - around 40% of employees in mining and quarrying have attained only primary, lower secondary or basic vocational level of education.

Characteristics, trends and challenges of coal-related locations and communities

Silesia is the most coal-dependent region in Poland where mining plays an important role in the regional economy. High geographical concentration of mining areas means that a number of sub-regions will bear most of the costs of hard coal phase-out. Moreover, a large share of miners has a low educational attainment level and tend to be the sole earner in their household. There is also a significant pay gap between the mining sector and other sectors where miners could potentially find employment with workers in the coal mining sector enjoying a significant wage premium compared to workers in the manufacturing sector, which makes voluntary outflow of workers to other sectors unattractive. Individuals who leave the mining sector are likely (more than individuals who leave the manufacturing sector) to end up in inactivity than in employment or unemployment. This is explained by an ability to take an early retirement and availability of other social benefits. The educational structure in the mining sector resembles

the structures in construction and manufacturing. Hence, workers who leave mining tend to be more likely to find jobs in these two sectors than in other sectors where they would face education and skill gaps.

Coal transition strategies, plans and projects

Current status and timeline of coal transition

The Polish government remains committed to coal and, accordingly, plans for an energy transition are only slowly being developed, with limited national level discussion on coal phase-out. Nonetheless, although no timeline yet exists for the coal phase-out, strategies and plans regarding energy, climate and air quality have been developed at the national and regional level (see section on current strategies).

At the same time, mining restructuring activities have been taking place in recent years. In 2016 and 2018 agreements between the European Commission and the Polish government were reached to use state aid to mitigate the effects of decommissioning of uncompetitive coal mines. Overall, 14 Silesian mines or parts of mines were scheduled for liquidation by 2023 by the Mining Restructuring Company (Spółka Restrukturyzacji Kopalń). These are the mines where mining has ended or is scheduled to end soon.

Current strategies and plans for economic diversification / development and decarbonisation

At national level:

In 2019, Poland submitted its *National Energy and Climate Plan for years 2021–2030* (NECP) in which it stipulate its objectives related to increased energy efficiency and decarbonisation (see next section on KPIs of strategies and plans). The comprehensive analysis of the impact of energy transformation on mining areas (including on society, employment and skills) was not possible within the time required for submission of the NECP. Such analysis will be carried out as part of the restructuring plan for hard coal and lignite mining regions envisaged in 2020.

In 2018, Poland has adopted its *Strategy for the coal sector in Poland until 2030*. The stated main objective of the Program is creating conditions conducive to building a more economic, effective and modern hard coal mining sector, based on cooperation, knowledge and innovation, which allows for more efficient use of resources and social and economic capital.

By 2020, a new, comprehensive *Act on the functioning of hard coal mining* will be adopted, which will determine the financing in this sector and it will include legal provisions enabling, among others, the development of a model for the functioning of the hard coal mining sector, limiting hard coal imports, securing strategic deposits and revitalisation provisions for post-mining areas.

In 2019, the Ministry of Energy prepared a draft of *Energy Policy of Poland until 2040* in which it commits to reduction of coal in electricity generation by 2030, an increase in renewable energy in final gross energy consumption, implementation of nuclear energy in 2033, improvement in energy efficiency and a reduction in CO₂ emissions.

The *Strategy for Responsible Development until 2020 (with a perspective until 2030)* was adopted in 2017. The strategy, in the part regarding hard coal mining, plans to: increase the efficiency of mines, adjust extraction to market needs, and where possible, to increase the share of higher value added products in the extraction structure and ensure an adequate level of investments.

At regional level:

Silesia dedicates 22% of the funds in the Regional Operational Programme for low-emission economy. Its *Strategy of Economic Development*, which will include a fair transition context according to the needs of regional economic development, the *Regional Revitalisation Policy* and *Low-carbon economy policy* for Silesia are currently being developed.

The *Regional Innovation Strategy for Silesia for Years 2013-2020* focuses on the areas of: energy, medicine, information and communication technologies, green economy and emerging industries (e.g. eco-industries, creative industries, maritime industry, mobility industries), mobile services, personalized medicine.

The *Regional Transformation Action Plan* was adopted in 2019. It contains a diagnosis of challenges and problems. It has also identified 3 operational goals:

1. High quality of life in the region:
 - reducing low emissions and the consumption of environmental and energy resources in enterprises, households, facilities and public spaces;
 - increasing the quality and attractiveness of degraded buildings;
 - support for education offer and infrastructure, development of qualifications and competences necessary for the economy;
 - improving the quality of prevention and healthcare.

2. Competitiveness of the economy based on modern environmental technologies:

- support for raising the capacity of the region's companies to implement innovations and modern technological solutions;
- strengthening the innovative potential of universities and R&D sector entities;
- increasing the efficiency and use of modern technologies in the processes of restructuring of traditional sectors;
- counteracting the effects and limiting the negative impact of mining on the environment and urban space.

3. Development of creative industries and free time

- creating and developing metropolitan areas of culture, science and business;
- revitalisation and reclamation of degraded areas, including for purposes related to the development of leisure industries;
- support for creating infrastructure that increases the social activity of residents, including the development of recreational infrastructure;
- networking of cultural and leisure facilities in the field of management and development coordination;
- development and networking of infrastructure and partnerships in the field of recreational and cultural activities.

The Technology Development Program of Silesia for 2019-2030 is a strategic plan adopted in 2018 for the technological development of the region, the general objective of which is to identify the potential of the region, taking into account the future programming period. The strategic technological areas were identified for: medicine sector, energy sector, environment protection, ITC, production and processing of materials, logistics and transport, machine and automotive industry, nanomaterials and nanotechnologies, air and airspace technologies, and technologies for raw material industry.

Principal KPIs of strategies and plans

In the *National Energy and Climate Plan for years 2021-2030* (NECP), the following goals related to increased energy efficiency and decarbonisation were stipulated:

- 21%-23% of RES gross final energy consumption by 2030. The 23% target is conditional, i.e. that its implementation at the level of 23% will be possible if additional EU funds are granted, including those addressed to a just transition. RES represented 13% of the gross final energy consumption in 2018.
- The national target for improving energy efficiency by 2030 was set at the level of 23% reduction of primary energy consumption comparing to the PRIMES 2007 forecast.
- The reduction target for Poland in terms of greenhouse gas emissions in sectors not covered by the ETS system was set at -7% in 2030 compared to the level in 2005.

In the draft *Energy Policy of Poland until 2040*, the following indicators were adopted as a global measure of the achievement of the Polish Energy Policy goals:

- 60% share of coal in electricity generation in 2030 (it currently stands at 78%);
- 21% renewable energy in final gross energy consumption in 2030;
- implementation of nuclear energy in 2033;
- 23% improvement in energy efficiency by 2030 compared to 2007 forecasts;
- 30% reduction in CO₂ emissions by 2030 (compared to 1990).

Regional strategies KPI:

- GDP per capita (NUTS2, NUTS3) in relation to the EU average;
- GDP per capita in relation to national average;
- share of R&D expenditures in GDP (NUTS2);
- employment rate in population aged 15-24 /55-64;
- average annual concentration of suspended dust PM 2,5 in Upper Silesian Agglomeration (mg/m³);
- share of degraded and devastated areas requiring re-cultivation in the total area.

Principal actors in development and implementation of transition strategies and plans

Major hard coal companies are partially or fully state-owned and the decision-making processes in coal and energy producing companies are heavily influenced by the central government. Coal mining trade unions are one of the strongest labour organisations in Poland. They have traditionally been very powerful and played a key role in maintaining the status quo. They have large mobilisation potential as unionisation among coal miners is high. At the regional level, in March 2019, the Management Board of the Silesian Voivodeship appointed a Regional Team for the Coal Regions in Transition Initiative and other initiatives of mining regions, whose task is to democratise the process of preparing new projects, coordinate the activities of the Management Board and other partners, as well as monitor the progress of project implementation. The team has currently 42 members from different backgrounds who represent different perspectives on the transformation process. Among them are representatives of the national government, local governments, business organisations, non-governmental organisations, as well as trade and scientific organisations.

Role of civil society

The NGO community is well-established but relatively small. Notable organisations actively participating in low carbon transition in Silesia include WWF, Greenpeace Poland and Polish Green Network. In addition, local community support for ending coal activities is slowly growing and leads to more vocal demands for planning of the transition. In recent years, the inhabitants of Rybnik and Imielin supported by local organisations (e.g. "Green Imielin" Association) have protested against the establishment of the new mines in their municipalities. On the 1 June 2020, 36 municipalities from Silesia, Lower Silesia and Greater Poland region as well as civil society groups have signed a letter addressed to the Polish government asking to be included in the process of just transition planning and the future of their regions. In particular, the signatories of the letter appealed to the government to carry out broad public consultations including social partners such as social organisations, industry organisations and local government units below the NUTS2 level and thus actively involve them in the process of preparing Territorial Just Transition Plans.

Principal legislative drivers of transition

The mining industry is affected by:

- *The Environmental Protection Law* of April 27, 2001 (Revised October 16, 2019) which sets out the principals governing environmental protection and the use of environmental resources with regard to sustainable development requirements;
- *The Act on the function of hard coal mining* of September 7, 2007 which sets out the principles for financial restructuring of mining enterprises, rules for liquidation of mines, rules for employment restructuring in liquidated mines, conditions for obtaining initial investment subsidies, and principles of corporate governance. By 2020, a new, comprehensive *Act on the functioning of hard coal mining* will be adopted, which will determine the financing in this sector and it will include legal provisions enabling, among others, development of the model of functioning of the hard coal mining sector, limitation of hard coal imports, securing strategic deposits and revitalisation of post-mining areas;
- *National Energy and Climate Plan for years 2021-2030*, which presents the objectives, targets, policies and measures in five dimensions of the Energy Union: decarbonisation, energy efficiency, energy security, internal energy market, research, innovation and competitiveness.

The following legal regulations impact the transition process:

- Public aid (Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty – and its amendments).

- Revitalisation (operator of revitalisation), (Act of 9 October 2015 on revitalisation (consolidated text: Journal of Laws of 2020, item 802).
- Regulations regarding the RES investment process (Act of 10 April 1997. Energy Law (consolidated text, Journal of Laws of 2020), Act of 20 February 2015 on renewable energy sources (consolidated text, Journal of Laws of 2020).
- Land ownership issues.

Transition challenges

Nature and scale of transition challenges

Silesia is a region with strong industrial roots, for which coal has been the greatest wealth over the past few decades. This sector provided work to a significant number of inhabitants, and the industry's contribution to the economy of the region was very high. The key challenge for the region will be to find a solution that would make it independent of coal and to find an alternative that ensures economic development and is acceptable to everyone.

Climate change and progressive degradation of the natural environment means that radical steps related to achieving the assumed objectives of the environmental policy will be necessary. In addition, any changes in the economic structure will affect the inhabitants of the region, forcing them to adapt the acquired skills and qualifications to the new reality or acquire new skills. It will also require an appropriate response to emerging social problems. The abandonment of traditional industry means that many plants from the region's leading industries (mining, metallurgy, energy) have been closed, and others are facing

| Current or expected transition challenges facing the region | High (priority) importance | Moderate importance | Minimal importance | Not important |
|--|----------------------------|---------------------|--------------------|---------------|
| Air quality | x | | | |
| Environmental degradation of land | x | | | |
| Demographic change (e.g. population ageing, outward migration) | x | | | |
| Narrow / concentrated industrial structure | | x | | |
| Modernisation of industry / re-industrialisation | x | | | |
| Employment creation | | x | | |
| Reskilling | | x | | |
| Transport infrastructure and mobility | | | x | |
| Social cohesion | | x | | |
| Limited partnerships and consensus | | x | | |

or soon will face this challenge. Reclamation of the post-industrial areas and adaptation to new types of economic activities, as well as creation of new jobs pose important challenges to Silesia.

Skills weaknesses

- Low quality of vocational training, spatial inadequacy of the network of educational institutions to the needs of residents.
- Weak correlation between fields of study offered by the educational institutions and the needs of employers.
- Low level of cooperation and weak links between the R&D sector and other sectors.
- Low level of research spending and insufficient level of enterprise innovation.
- High dependence of local labour markets on traditional industries (mining industry).

Infrastructure weaknesses

- Insufficient water resources and lack of coherent water supply policy for the region.
- Existence of areas with high flood risk and deficiencies in flood control infrastructure.
- Unsatisfactory condition of rail and road infrastructure in the cross-border area.
- Inefficient public transport system and low level of public transport accessibility outside agglomerations.
- The need to continue and intensify revitalisation activities in the degraded areas.
- Improving accessibility to municipal infrastructure, including the elimination of white spots in territorially marginalised areas.
- Underdeveloped infrastructure for intermodal transport.

| Transition opportunities where the region is already active or where there is interest to develop activities | High (priority) interest | Moderate interest | Minimal interest | Not interest |
|--|--------------------------|-------------------|------------------|--------------|
| Reconversion of coal-related sites / locations for renewable / alternate energy | | | | |
| • Biomass | | x | | |
| • Energy storage | x | | | |
| • Gas | | x | | |
| • Geothermal | | | x | |
| • Hydro power and pumped hydro-storage | | x | | |
| • Hydrogen | | x | | |
| • Solar | x | | | |
| • Wind | | x | | |
| Other energy | | | | |
| Reconversion of coal-related sites for new economic and social activities | x | | | |
| Repurposing of coal-related industrial infrastructure | | x | | |
| Heritage, culture and tourism | | x | | |
| Low carbon mobility and transport | | x | | |
| Diversification of coal-related supply chain and service activities | | x | | |

Weakness in other industries and economic activities

- High number of economically inactive persons.
- Internal disproportions in terms of economic potential of the region and the actual economic activity.
- Low level of innovativeness of enterprises.
- Considerable emigration of young and well-educated people from the region.

Transition opportunities

Notable research capabilities and facilities

Silesia is Poland's second research and development centre (after Warszawski Stołeczny region), which includes scientific and research units and institutes as well as universities conducting research independently or in cooperation with business. Their activity is primarily focused on environmental protection, energy, automation, electronics and construction. At the same time, the region has one of the lowest levels of R&D expenditure in relation to GDP in Poland.

The *Network of Regional Specialist Observatories* was established in March 2013. An important element of the Network's operation is development of an integrated network model of specialist observatories' cooperation with both local government units and the sphere of business and science. The network is operating in broad partnership connecting many institutions such as the Central Mining Institute, TECHNOPARK Gliwice Science and Technology Park, a consortium composed of the Upper Silesian Agency of Entrepreneurship and Development, the Prof. Z. Religa Foundation for Cardiac Surgery, the Institute of Medical Technology and Equipment and the Science Park -Technology Euro-Centrum or the Medical University of Silesia in Katowice.

The network is a space for communication and cooperation, as well as data exchange between business environments and the scientific and research community, business environment institutions and local government units. The aim is to develop the technological and innovative potential of the region by building competitive advantage. There are numerous Specialist Observatories in different areas, such as: Power engineering, Medicine, ICT, Environment, Material industry, Transport, Machine Industry and Nanotechnology.

In 2018, there were 622 R&D units in Silesia (10.8% of all such units in Poland). R&D expenditure per inhabitant in 2018 reached almost EUR 100 compared to the national average of EUR 157. In 2018 innovative enterprises constituted 20.6% of all enterprises in the region, (1.2 percentage point less than the national average).

Notable labour force skills and knowledge

Silesia's labour force is notable for its skills in automotive sector (in particular, specialised in air bag and safety belts). The regional workforce has also knowledge in design of aviation engine components, manufacturing of machinery and equipment used for underground mining operations, energy industry related engineering and manufacturing.

Sectors with a high level of innovation in manufacturing technologies should be the key factor of change. It is therefore assumed that the demand for highly qualified staff will increase. Links between the R&D sector and enterprises will also be strengthened. Transport and forwarding are also an important development factor. It can be assumed that the importance of intermodal transport and logistics centres will increase, which will result in the demand for employees in this sector. Finally, development of the energy industry related to green technologies has been observed in recent years, which may suggest that the industry will continue to generate jobs, which will entail the demand for skills and qualifications relevant to this sector.

Notable infrastructure

Transport infrastructure:

- Katowice-Airport (in Pyrzowice).
- Silesia has the highest density of highways and expressways network in Poland. Highways: A4 (W-E).
- A1 (N-S) (last part at north end under construction); expressways: S1 (some parts to be constructed), S86; S52 (east part to be constructed).
- Rail infrastructure.

Investment sites:

- High concentration of developed investment areas.
- Second largest warehouse space market in Poland.
- Over 500,000 m² of office space in the capital of the region (Katowice) and dynamically developing co-working space market.
- Katowice Special Economic Zone - the most dynamic economic zone operating in Poland.

ICT infrastructure:

The "Silesian Regional Backbone Network" (ŚRSS) project was implemented as part of the Regional Operational Program of the Silesian Voivodship for 2007-2013. The aim of the project was to cover digitally excluded areas (so-called white and grey spots) with the telecommunication infrastructure.

Notable non-coal economic activities, industries and inward investments

There are numerous well-known automotive companies, such as General Motors Manufacturing Poland, FCA Powertrain Polska, and Lear Corporation Polska. There is also a large number of companies operating in the business process outsourcing and logistics sectors including an engineering centre, known as Avio, specialised in the design of aviation engine components, and TRW Poland, a producer of car airbags and safety belts, which opened a research centre in Częstochowa. Other strategic investors include FAMUR (manufacturers of machinery and equipment used for underground mining operations) and Tauron Polska Energia (operating in the energy industry). Notable foreign investors include IBM, Unilever, Rockwell, Capgemini, Deloitte, Vattenfall and ABB.

Transition actions

Current partnerships for economic development and decarbonisation

The *Program for Silesia* is one of the key strategic projects implemented under the Strategy for Responsible Development. It was announced by Prime Minister Mateusz Morawiecki in December 2017. The Ministry of Funds and Regional Policy is responsible for coordinating the implementation of the Program. At the regional level, the "Program for Silesia" Steering Committee of the Silesian Voivodship is responsible for coordinating activities. The tasks of the Committee include preparing quarterly monitoring reports.

The Regional Team for the initiative of mining communities in Silesia has been operating since March 2019. The main task of this team is to socialise the process of preparing new projects, coordinating the activities of the Management Board of the Silesian Voivodeship and other partners, as well as monitoring the progress of project implementation. The team currently has 42 members from very different backgrounds who represent different perspectives of looking at the transformation process. Among them are representatives of the government, local governments, business, non-government organisations, as well as trade and scientific organisations.

Central Mining Institute in cooperation with the Marshall Office of Silesian Voivodeship is currently implementing project on "Development of post-mining area management system in the Silesian Voivodeship". The aim of the project is to implement a new, publicly available e-service in the form of a database of post-mining areas in the Silesia along with valorisation of these areas, to support the process of their transformation and revitalisation.

Recent and ongoing regional and local transition actions

The Catching Up Regions Initiative - part of the broader action launched by the European Commission in cooperation with the World Bank experts, local and national authorities in four countries – Poland, Romania, Croatia and Slovakia. Its aim is to examine of the factors that hold back growth and investments in regions that are lagging behind despite having benefited heavily from Cohesion Policy funds. In the case of Malopolska and Silesia, the aim of the project was to increase the energy efficiency of single-family buildings and improve air quality.

Silesia will also receive the World Bank technical support in preparation of the region's transformation process. The World Bank on behalf of the European Commission's Directorate General for Energy (DG ENER) is involved in technical support for the transformation of mining regions in Poland (Silesia, Lower Silesia, Greater Poland). The aim of the support is to prepare the government and the mining regions in Poland for socio-economic and energy transformation and for applying for funds under the Just Transition Fund. The support will be delivered between July 2020 and December 2021. The exact content of the World Bank support is under negotiation and may be subject to minor changes, but it will focus on the following areas:

- preparation of the process and institutional recommendations to better coordinate the transformation process;
- estimating the number of jobs directly and indirectly related to the mining sector, with an emphasis on the youth education system tailored to future labour market needs;
- external review of the Information platform for post-industrial and degraded areas in Silesia (OPI-TPP) database, including development of a methodology for alternative land use planning. Analysis of the possibilities of linking to the GIS-based system that will be developed at the national level.

Projects from the Action Plan for Transformation

1. „Silesia. Professionals” („Śląskie. Zawodowcy”)

Beneficiary /Implementing entity: Self-government of the Silesian Voivodeship / ESF Department

Scope of the project: The undertaking consists of better adaptation of educational offer of vocational schools to the key needs of the economy, by developing and building lasting mechanisms and networks of cooperation between schools and employers, as well as increasing students' access

to internships and apprenticeships in Silesia as well as activities creating a positive image of vocational education in the region.

Estimated value: 20 mln PLN

2. Development of post-mining area management system in the Silesian Voivodeship (Rozbudowa systemu zarządzania terenami pogórnictwami na terenie województwa śląskiego)

Beneficiary /Implementing entity: Central Mining Institute / Silesian Voivodeship

Scope of the project: Development and implementation of an IT support system for management of transformation and economic activation of post-mining areas.

Estimated value: 5.8 mln PLN

3. KSENON business accelerator - construction of a regional centre for creativity, innovation and entrepreneurship in Żory (Akcelerator biznesowy KSENON - budowa regionalnego centrum kreatywności, innowacyjności oraz przedsiębiorczości w Żorach)

Beneficiary /Implementing entity: Katowice Special Economic Zone

Scope of the project: Construction and equipment of a centre for creativity, innovation and entrepreneurship in Żory along with the purchase of necessary equipment for its operation.

Estimated value: 50 mln PLN

4. Inter Silesia – SMEs sector internationalisation (Inter Silesia - internacjonalizacja sektora MŚP)

Beneficiary /Implementing entity: Upper Silesian Fund

Scope of the project: The subject of the project are activities related to the promotion of export activity among SMEs. It consists of development of regional business models along with their testing.

Estimated initial value: 24 mln PLN

5. Modernisation of the Silesian Park (Modernizacja Parku Śląskiego)

Beneficiary /Implementing entity: Voivodeship Park of Culture and Recreation

Scope of the project: The investment activities aimed at modernisation of the Silesian Park's

infrastructure (primarily revitalising the Silesian Park and restoring its cultural, educational, sport and recreation function and unifying the region's community). Under this project, 20 related investment tasks will be implemented.

Estimated value: 277 mln PLN

Notable planned coal transition / economic diversification projects and initiatives

Strategic ventures in the project of actualisation of the *Strategy for the development of Silesia*:

1. Re-industrial Silesia

- Monitoring conditions and potential of industrial and post-industrial areas.
- Management and coordination of areas requiring transformation and already transformed areas.
- Investment activities related to the transformation of areas and giving them new functions.
- Acquiring and servicing investors in the post-industrial areas.

2. Innovative Silesia, Highway of Companies of the Future

- Investments in highly specialised, integrated industrial and research centres (technology parks in the area of regional and smart specialisations - regional network).
- Support for the development and cooperation of companies operating in particular in the areas of regional smart specialisations.
- Support for companies in the field of export activity.
- Development of financial and organisational instruments for companies implementing new technologies and high-risk companies.
- Development and comprehensive support for the patent process and implementations.

3. Low-emission Silesia

- Investments related to reduction of emissions, including comprehensive thermal modernisation.
- Development of renewable energy sources, including distributed energy, prosumer energy and energy clusters.
- Development of low-emission transport, in particular public transport.
- Education in the field of pro-environmental attitudes.

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START application form

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Initiative for coal regions in transition

The Initiative for coal regions in transition is an initiative by the European Commission.

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