

Energy poverty and skills related aspects of the just transition of European coal regions – overlaps and data gaps

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Abstract

Some regions in Europe are expected to be hit hard by the loss of coal sector jobs in the time period up to 2030, in the context of the green-digital transition. Reskilling and upskilling the workforce will be key in preventing net job losses. Some of these areas are simultaneously affected by energy poverty. The paper aims to explore the geographic overlaps and connections between energy poverty, level of digital skills and willingness to participate in adult learning, reskilling and upskilling programmes in the context of coal regions in transition in Europe. It does so by first identifying key energy poverty, digital skills and upskilling-reskilling potential related indicators. Then it will assess their availability at NUTS 2 level, highlighting potential gaps. The paper contributes to identifying areas most affected by the double challenge of potential job losses in the green-digital transition and energy poverty.

Introduction

The coal sector, including coal mines and power plants, is a traditionally important employer in many European regions. Coal related industrial activity is an important and sometimes founding element of local identity and culture. Skills profiles in terms of engineering, technical roles, manual occupations, including high-risk activities, as well as traditions of the local workforce are strongly connected to coal. The urban landscape can also be shaped by the presence of the industry in the form

of pre-fabricated multi-apartment buildings constructed for the large-scale inflow of workforce at the peak of economic activity connected to coal.

The just transition of coal and carbon intensive regions has been the focus of a number of studies in recent years (JRC 2018, JRC 2020, TRACER 2020, REKK 2020, Cambridge Econometrics 2020, Agora Energiewende 2019). These highlight the challenges as well as transformative opportunities related to the decline of coal related economic activities and transition towards other industries, including a move towards clean energy industries. From the policy side, the EU has launched the Just Transition Mechanism with funds to support the transition, and the Just Transition Platform to provide technical and advisory support to access these funds¹. Furthermore, in October 2020 the European Commission launched the Renovation wave². It aims to refurbish and improve the EU building stock, contributing to reducing the risk of energy poverty, as well as creating jobs along the way in the construction sector.

In the context of the clean energy transition, with the shifting of emphasis from carbon-intensive energy production, coal regions are also undergoing a transformation in terms of employment. Some former coal workers relying on their existing skills set can participate in reskilling programmes and find new jobs in other sectors. Some may benefit from early retirement schemes. At the same time, some former coal workers may become temporarily or long-term unemployed. Loss of employ-

1. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism/just-transition-platform_en

2. https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

ment is a source of social tension. This can be exacerbated by energy poverty in relation to income loss, and also in relation to the potentially deteriorating building stock. Both the physical and the human landscape may thus be in need of regeneration.

This paper takes a closer look at 35 regions in Europe with coal industry, impacted most by the combination of expected coal sector job losses until 2030, and already existing unemployment levels (as identified in Alves Dias et al., 2018). In order for a just transition to take place, workforce in declining sectors will need to transfer and build upon existing skill sets, parallel to gaining additional skills. The paper collects indicators relevant to skills transfer and reskilling in the context of lifelong learning in an increasingly digitalised learning environment, as well as poverty as a proxy for energy poverty. Table 1 provides an overview of selected indicators. The availability of these indicators at NUTS 2 level, also in the 35 regions in question is assessed and gaps are identified. Table 2 provides further detail on the selected indicators.

Based on the information available, the overlaps between learning potential and energy poverty are highlighted. Energy poverty is assessed indirectly, more generally through poverty-related indicators. The approach sheds light on the situation of regions hosting coal related industries: which regions in which countries perform already well; which regions need more support in terms of lifelong learning and digital access; where is vulnerability to energy poverty more or less likely to be a risk. This further highlights where adult education policy in combination with energy related social policy has the highest potential to make a positive impact. As a further step, a composite indicator allowing ranking according to learning potential and poverty at the same time could be developed in the future.

Skills development in a digitalising world

The paper aims to gather region-specific information relevant to skills development and energy poverty vulnerability risk, focusing on European regions where further job losses are expected due to declining coal industries (mining and power plants) until 2030, as defined in Alves Dias et al. (2018). The regions are found in Member States of the EU-27, including Bulgaria, Czechia, Finland, Germany, Greece, Hungary, Poland, Romania, Slovakia, Slovenia, Spain. From outside of the EU, the United Kingdom is also included.

Education, vocational training and lifelong learning play a vital role in the economic and social strategies of the European Union (EU). Education and Training 2020³ serves as the strategic framework for European cooperation in education and training, in the form of a forum for Member States. It pursues four common objectives: make lifelong learning and mobility a reality; improve the quality and efficiency of education and training; promote equity, social cohesion and active citizenship; enhance creativity and innovation, including entrepreneurship.

The European Skills Agenda⁴, a five-year plan launched in July 2020, provides a framework for skills development in the changing world of work, in the twin digital-green transition.

It answers the challenge to provide the right skills for jobs, the need to support people in lifelong learning, while providing a framework to unlock investments for skills.

In the context of declining industries, workers losing their jobs need to be willing to, as well as have the means to, participate in upskilling and reskilling programmes. In some countries and regions participation in lifelong learning and adult education programmes is more widespread than in others. This puts the former in a better position already at the outset of the regional transition process, in terms of the availability of human resource with required skills sets for potential new, incoming industries.

INDICATORS

The twin digital-green transitions, in the context of COVID-19, reinforce the skills development challenge of the European workforce. To provide a picture of the starting point in terms of reskilling of former coal workers in an increasingly digitalising world, taking into account also the spreading of remote education technologies, the following indicators provided by Eurostat are included:

- Households with broadband access, (%) – ICT usage in households and by individuals
- Individuals who have basic or above basic overall digital skills, age 16–74, (%) – ESS ICT Survey
- Participation in education and training, NUTS 2 level, age 25–64, (%) – Labour Force Survey
- Participation in education and training, NACE 2 activities, country level, age 25–64 (%) – Labour Force Survey
- Participation rate in job-related non-formal education and training, age 25–64, (%) – Adult Education Survey

Information at NUTS 2 region level on the existing unemployment rate, and rate of participation of the adult, working age population in education and training, is available from the Labour Force Survey. The latest year where data for most regions is available is 2019. The share of households with broadband access is also available at the NUTS 2 level for 2019 from data collection on ICT usage in households and by individuals. However, Spain, Poland, Germany and the UK only provide NUTS 1 level information as part of this survey.

The Adult Education Survey provides country level information on participation in job-related non-formal education and training, with 2016 being the latest year of data availability. Information on individuals who have basic or above basic overall digital skills is available also at the country level from the ESS ICT Survey, with good coverage for year 2019.

The Labour Force survey also includes adult education and training related information broken down by industry, at the country level. However, coal related activity specific breakdown within the mining and electricity supply sectors is not available.

The Continuing Vocational Training Survey is the third main element of EU statistics on lifelong learning. It collects information on enterprises' investment in the continuing vocational training of their staff. Continuing vocational training (CVT) refers to education or training measures or activities, which are financed in total or at least partly by the enterprise (directly or indirectly).

3. https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-framework_en

4. <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

Energy poverty

The concept of energy poverty is linked to consumer vulnerability on the one hand, and energy efficiency (of buildings as well as appliances) on the other hand. The EU is considered to be a global front-runner in the mainstreaming of energy poverty issues in energy and climate strategies (Fiorini et al. 2021). Despite this, energy poverty is often regarded simply as a socio-economic phenomenon, and has not been treated with the required level of complexity by some EU Member States.

Because of the poor income conditions, a high fraction of low-income population in Europe cannot afford to pay for their energy costs. Energy poverty is the situation in which 'a household lacks a socially and materially necessitated level of energy services in the home' (Bouzarovski, 2014). However, the complex issue of energy poverty has no existing uniform definition. There is a large range of different (imperfect) indicators, as listed by the European Energy Poverty Observatory (EPOV)⁵. It is commonly understood as the inability of a person or family to keep their dwelling adequately powered and warm during the winter or cool during the summer.

Energy poverty is affecting a substantial share of the population across the EU. It is estimated that more than 50 million households in the EU experience energy poverty as a result of energy inefficient buildings and appliances, high energy expenditures, low household incomes and specific household needs⁶. The share of housing, water, electricity, gas and other fuels in EU-27 final household consumption expenditure was 23.5 % in 2018 (which was slightly higher than 10 years earlier (22.6 % in 2008) or on average of EUR 4,020 on housing-related purposes. Also, 7.6 % of the EU-27 population in 2018 were unable to keep their home adequately warm; this share reached 19.0 % among people at risk of poverty⁷. It has a serious impact on the quality of life of Europeans ranging from health and indoor comfort to air quality, social attainment and others (Santamouris, 2016).

INDICATORS

The levels of energy poverty in the EU are not defined centrally by institutions and are usually estimated using a combination of several consensual parameters. The most direct indicators are the ones on the national level. Consensual indicators (based on self-reported living conditions or access to/use of energy services) from EU SILC Questionnaire on NUTS 1 are well established. The most commonly used ones are 1) share of households unable to keep home adequately warm; and 2) share of households with arrears on utility bills. These indicators are available for all Member States and can be aggregated by income decile, tenure, degree of urbanisation and dwelling type.

Another type of indicators is expenditure based. Household Budget Survey (HBS) has proved to be a well-established tool for providing consumption expenditure data, including the one

on 'Housing, water, electricity, gas and other fuels' and 'Furnishing, household equipment and maintenance of the house' which reveal the energy poverty related expenditure patterns. Two commonly used indicators are 1) high share of energy expenditure in income (2M) – the proportion of households spending twice the national median share of energy in income; and 2) low absolute energy expenditure (M/2) – the share of households spending less than half the national median in absolute energy expenses. HBS is another national survey, collecting information on Consumption Expenditure according to the Classification of Individual Consumption by Purpose (COICOP). The two last collection rounds (waves) were 2010 and 2015, and it can be aggregated by income decile and degree of urbanisation.

While these and additional energy poverty indicators contribute towards better understanding the energy poverty situation in the EU, there are more obstacles trying to grasp it on a regional level. Monitoring the regional energy poverty is of great importance in the context of green transition. There is a risk that some regions that are already burdened by energy poverty simultaneously fall in the category of being severely affected by the green transition, for instance in terms of initial job loss.

There are no adequate energy poverty indicators at the regional level. To provide a picture of indicators that are relevant on the broader scale of the issue and contain energy poverty as part of overall poverty, the following NUTS 2 indicators are included:

- People at risk of poverty or social exclusion (%)
- Severe material deprivation rate (%)
- At risk of poverty rate (%)
- People living in households with very low work intensity (% population aged 0 to 59 years)
- Disposable income of private households (Purchasing power standard (PPS, EU27 from 2020), per inhabitant)

The first four indicators are from Income and Living Conditions Survey (EU-SILC) provided by Eurostat and the last one is a Eurostat calculation of Purchasing power standard (PPS) based on final consumption by inhabitant.

Moreover, monitoring the energy performance of the building stock is crucial for depicting the severity of energy poverty when it comes to households' heating and cooling needs. In relation to the financial barrier to buildings refurbishment, Zangerhi et al. (2020) calculate a synthetic indicator of economic well-being covering the period 2018–2021, at the NUTS 2 level. The synthetic indicator suggests that financial barriers to buildings refurbishment (in relation to GDP per inhabitant, unemployment rate, net disposable income of households per inhabitant and net disposable income of households per inhabitant by 20 % of the population with the lowest income) are present throughout Europe and are most significant in the Southern part of Europe. Greece, Bulgaria, Spain and Romania face the biggest challenges with relevance to the financial ability of the population to refurbish buildings and benefit from resulting improvements in energy performance and reduction to vulnerability to fuel poverty.

5. <https://www.energypoverty.eu/indicators-data>

6. <https://www.energypoverty.eu/about/what-energy-poverty>

7. https://ec.europa.eu/eurostat/statistics-explained/index.php/Living_conditions_in_Europe_-_housing_quality

FINDINGS

Digital skills, digital access and lifelong learning related indicators across the observed 35 regions reveal differences in coping ability in relation to the decline of coal related activities.

The overview in Table 1 reveals that the regions located in the United Kingdom and Finland stand out both in terms of digital access, existing digital skills, as well as participation in adult learning. The relevant share of coal workforce that will aim to remain part of the active population will have a good starting point to reskill and find a new job in growing sectors in these countries.

The regions located in Greece, Romania and Bulgaria have the relatively least favourable starting points in terms of participation in adult and lifelong learning activities, digital access and existing digital skills, in order to successfully transfer their coal workforce to other sectors.

Regions located in Spain, Germany, Slovenia and Czechia perform in the higher middle range both in terms of household digital access, digital skill and adult learning. Poland, Slovakia and Hungary perform in the lower middle range in these respects.

Poverty, material deprivation, low work intensity and disposable income indicators reveal some important findings and help develop an overall picture of the regional situation when comparing these to unemployment, digital and lifelong learning indicators. The selected indicators for people at risk of poverty as well as poverty and social exclusion together show the biggest share of population affected in those regions that also have some of the highest unemployment rates. This is unsurprising as there is an expected link between unemployment leading to lower income and resulting in poverty as well as social exclusion of citizens. The indicator of people living in households with low work intensity followed a similar pattern.

Spanish and Czech regions had on average the lowest severe material deprivation rates, while Bulgarian regions were the most affected. The disposable income of private households' indicator did not show a very clear connection with the unemployment rate in the region. Households in the German regions in focus were characterised by the relatively highest level of disposable income at purchasing power standard, while regions in Romania, Bulgaria and Hungary by the lowest level.

However, it is extremely important to highlight the lack of data regarding all mentioned poverty indicators. Four indicators had no regional data for Poland, Germany and the UK, and the disposable income indicator had no data for the UK. It is possible that the overall regional data would have shaped out differently regarding these indicators if we had data for all analysed regions. It is crucial to fill these regional data gaps for these countries as some of their regions are expected to be strongly impacted by green transition regarding job loss and other aspects.

While coal related activities may play an important role in the economies of NUTS 2 regions, they only constitute a share both in terms of economic activity as well as geographical area coverage. Therefore, analysis at NUTS 2 level should be viewed with caution, refined by further local specifics.

Economies of wider regions might already be at different stages of economic diversification: they might already be on the way of successfully shifting away from coal with workplaces emerging in less carbon intensive sectors. External factors not

related to human resource, such as geographic proximity to key trading partners as well as to major transport routes and exiting infrastructure, are also supporting factors of successful regional and sub-regional transitions. The presence of coal region and wider NUTS 2 level strategic transition plans, related institutions and dedicated funding programmes, are further supporting factors.

Conclusion

This paper aimed to shed light on adaptability to expected decline in coal related activity in selected coal regions across Europe. It did so by identifying overlaps in reskilling potential related to participation in adult learning, and poverty related vulnerability to energy poverty. The approach allowed for gaining a comparative snapshot of the regions. It helped to identify those facing the biggest challenges at the outset in the wider socio-economic context, and the ones that have a better starting point in restructuring their economies, from the skills transferability perspective.

The existing level of unemployment in a specific region is connected to poverty, and in turn to vulnerability to energy poverty. The performance of regions within our sample regarding lifelong learning indicators is not connected tightly to the unemployment rate in the region. A reason for this could be the longer tradition of adult and vocational training related programmes in some countries.

Finland, Germany, Spain, Czechia, Slovenia and the UK have a good starting point in terms of reskilling through participation in adult learning. This supports the potential uptake of the workforce in other sectors, in view of potential further job losses in coal industry reliant regions. There is space for improvement in terms increasing the participation in adult learning in Poland, Hungary, Slovakia, Greece, Bulgaria and Romania. Regions in focus in the latter three EU Member States are also characterized by relatively lower performance in terms of poverty. Taking household disposable income at PPS in to account, it may be the case also for some of the Polish regions in focus. However, the relevant poverty related indicators are not communicated in the case of Poland.

Financial support mechanisms and policy instruments launched under the EU Green Deal, including the Just Transition Fund, the Renovation wave, as well as the Digital Action Plan will be crucial in supporting regions in transition away from coal related industrial activity. Those most affected by the combined challenges of coal sector job losses, existing unemployment, ability to reskill workers in declining sectors, as well as poverty and vulnerability to energy poverty will benefit the most.

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Table 1. Regions with expected job loss due to decline in coal activities in the context of skills development and poverty. Source: Eurostat.

NUTS 2 code	Name region	1 Unemployment rate, %	2 Household with broadband, %	3 Basic or above overall digital skills,	4 Adult education/training, NUTS 2, %	5 Adult education/training, NACE 2, %	6 Job-related non-formal education/training, %	7 Risk of poverty/social exclusion, %	8 Severe material deprivation, %	9 At risk of poverty, %	10 Very low work intensity, %	11 Disposable income, PPS
EL-53	Dytiki Makedonia	24.5	78.0	51.0	4.1	4.2	16.7	34.8	15.5	21.6	17	11,400
ES-61	Andalucia	21.2	89.0	57.0	9.6	11.2	42.6	37.7	5.9	31.3	18	12,200
EL-65	Peloponnisos	12.0	75.0	51.0	0.7	4.2	16.7	36.4	23.1	19.7	12.2	10,500
ES-11	Galicia	11.8	88.0	57.0	10.8	11.2	42.6	24.3	3.6	20	11.9	14,600
ES-41	Castilla y Leon	11.6	89.0	57.0	10.9	11.2	42.6	16.7	2.3	12.9	7.4	15,600
ES-24	Aragon	10.0	92.0	57.0	9.7	11.2	42.6	21.1	2.3	17.9	5.5	16,600
FI-19	Lansi-Suomi	6.4	92.0	76.0	28.5	31.3	51.4	18.5	3.2	14.5	10.6	16,100
RO-41	Sud-Vest Oltenia	5.3	83.0	31.0	0.7	1.4	5.8	38.9	14.9	31.6	8.5	9,000
SI-03	Vzhodna Slovenija	4.9	87.0	55.0	..	12.4	49.3	17	3.3	14.1	6.4	13,500
DEE-0	Sachsen-Anhalt	4.6	94.0	70.0	6.6	7.9	50.7	18.6	..	..	..	17,900
PL-92	Mazowieckie regionalny	4.6	85.0	44.0	2.4	6.1	27.5	..	..	..	..	12,200
HU-31	Eszak-Magyarország	4.5	81.0	49.0	4.5	6.7	49.1	23.9	15.3	14.3	7.5	8,900
BG-34	Yugoiztochen	4.0	75.0	29.0	1.2	1.5	31.1	22.7	25.8	14.4	5.4	7,800
SK-02	Zapadne Slovensko	4.0	81.0	54.0	2.6	4.1	53.4	11.3	5.6	7.4	3.4	10,800
DEA-5	Arnsberg	3.9	94.0	70.0	8.5	7.9	50.7	18.5	..	..	..	20,300
UKF-1	Derbyshire and Nottinghamshire	3.9	93.0	74.0	16.0	17.5	49.8	..	..	..	..	..
DEA-1	Dusseldorf	3.8	94.0	70.0	7.1	7.9	50.7	20.5	..	..	..	20,600
CZ-08	Moravskoslezsko	3.7	90.0	62.0	8.6	9.2	48.6	14.9	3.5	13	5.9	12,000
PL-71	Lodzkie	3.7	82.0	44.0	3.0	6.1	27.5	..	..	..	..	12,800
DED-2	Dresden	3.5	90.0	70.0	9.4	7.9	50.7	16.6	..	..	..	18,800
DE-40	Brandenburg	3.4	86.0	70.0	6.5	7.9	50.7	17	..	..	..	18,800
DEA-3	Munster	3.4	94.0	70.0	8.7	7.9	50.7	18.4	..	..	..	19,900
DEA-2	Koln	3.4	94.0	70.0	8.2	7.9	50.7	16.6	..	..	..	20,800
RO-42	Vest	3.4	87.0	31.0	2.0	1.4	5.8	21.9	7.4	14.7	9.4	12,100
UKM-2	Eastern Scotland	3.4	94.0	74.0	15.9	17.5	49.8	..	..	..	..	..
PL-51	Dolnoslaskie	3.3	85.0	44.0	6.1	6.1	27.5	..	..	..	..	13,100
PL-42	Zachodniopomorskie	3.2	85.0	44.0	3.2	6.1	27.5	..	..	..	..	12,100
CZ-04	Severozapad	3.0	79.0	62.0	5.1	9.2	48.6	21.5	7.8	16.9	8	11,700
PL-21	Malopolskie	2.8	83.0	44.0	5.4	6.1	27.5	..	..	..	..	11,900
UKE-2	North Yorkshire	2.7	95.0	74.0	15.2	17.5	49.8	..	..	..	..	..
PL-41	Wielkopolskie	2.6	82.0	44.0	3.8	6.1	27.5	..	..	..	..	12,800
PL-22	Slaskie	2.4	83.0	44.0	5.0	6.1	27.5	..	..	..	..	14,100
BG-41	Yugozapaden	2.3	78.0	29.0	3.4	1.5	31.1	22.7	25.8	14.4	5.4	13,200
CZ-02	Stredni Cechy	1.3	88.0	62.0	7.7	9.2	48.6	9.6	1.6	7.5	2.7	14,300
Legend		1.3-2.87	75-79	29-42	0.7-2.73	1.4-3.67	5.8-25.7	34.8-38.9	23.1-25.8	21.6-31.6	12.2-18	18,800-20,800
		2.87-3.4	79-82	42-50	2.73-4.37	3.67-5.47	25.7-38.77	24.3-34.8	15.5-23.1	20-21.6	8.5-12.2	17,900-18,800
		3.4-3.8	82-88	50-55	4.37-6.5	5.47-7.3	38.77-48.85	18.6-24.3	7.8-15.5	14.7-20	7.5-8.5	14,100-17,900
		3.8-4.53	88-89	55-59	6.5-8.53	7.3-9.87	48.85-49.47	17-18.6	3.6-7.8	13-14.7	5.9-7.5	12,100-14,100
		4.53-8.8	89-90	59-71	8.53-10.43	9.87-13.33	49.47-50.82	11.3-17	2.3-3.6	12.9-13	3.4-5.9	9,000-12,100
		8.8-	90-100	71-	10.43-	13.33-	50.82-	9.6-11.3	1.6-2.3	7.4-7.5	2.7-3.4	9,000-

Table 2. Indicator details. Source: Eurostat.

	Name	Code
1	Unemployment rate, 2019, %	[TGS00010]
2	Households with broadband access, 2019, %	[ISOC_R_BROAD_H]
3	Individuals who have basic or above basic overall digital skills, age 16-74, 2019, %	[TEPSR_SP410]
4	Participation rate in education and training, NUTS 2 regions, age 25-64, 2019, %	[TRNG_LFSE_04]
5	Participation rate in education and training, Total NACE 2 activity, age 25-64, 2019, %	[TRNG_LFS_08B]
6	Participation rate in job-related non-formal education and training by type and occupation, age 25-64, 2016, %	[TRNG_AES_124]
7	People at risk of poverty or social exclusion, NUTS 2 regions, %	[ILC_PEPS11]
8	Severe material deprivation rate, %	[ILC_MDDD21]
9	At risk of poverty, %	[ILC_LI41]
10	People living in households with very low work intensity, %	[ILC_lvhl21]
11	Disposable income of private households by NUTS 2 regions, PPS	[TGS00026]

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