

Cohesion policy and the EU's response to climate change challenges

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Abstract

The aim of this article is to analyse the role of European cohesion policy (ECP) in tackling the negative effects of climate change, and to answer the research question of whether a just transition towards climate neutrality is possible. The study comprised an analysis of data about ECP spending, literature review of relevant regulatory documents, studies and reports. The results of this research suggest that the issue of climate change mitigation has been placed among key priorities of ECP since 2014. This conclusion is supported by a comprehensive set of data. The results confirm that the EU funds constitute an important source of climate related investments in Poland. The design of ECP and its instruments, if used appropriately, can help to make the "green transition" more fair.

Keywords: European cohesion policy, climate change, low carbon economy

Polityka spójności i odpowiedź UE na wyzwania związane ze zmianą klimatu

Streszczenie

Celem artykułu jest analiza roli europejskiej polityki spójności w przeciwdziałaniu negatywnym skutkom zmian klimatu oraz próba odpowiedzi na pytanie badawcze, czy możliwe jest sprawiedliwe przejście w kierunku neutralności klimatycznej. Badanie obejmuje analizę danych dotyczących wydatków w ramach europejskiej polityki spójności, przegląd odpowiednich dokumentów regulacyjnych, studiów i raportów. Wyniki badania sugerują, że od 2014 r. kwestia łagodzenia skutków zmian klimatu znajduje się wśród kluczowych priorytetów polityki spójności UE. Wniosek ten jest poparty obszernym zestawem danych. Wyniki potwierdzają, że fundusze unijne stanowią ważne źródło inwestycji związanych z klimatem w Polsce. Zasady polityki spójności i jej instrumenty, jeśli zostaną odpowiednio wykorzystane, mogą przyczynić się do bardziej sprawiedliwej „zielonej transformacji”.

Słowa kluczowe: Europejska polityka spójności, zmiany klimatu, gospodarka niskoemisyjna

There is widespread agreement that a joint, internationally coordinated response to the threat of climate change is needed. Taking into account the importance of combating climate change, the EU's institutions are setting ambitious targets, such as reducing greenhouse gas emissions "by at least 55% by 2030, and becoming the first carbon neutral continent by 2050" (Ciffolilli et al. 2011: p. 2). The European Union stresses the key role of cohesion policy in achieving these objectives, as well as the role of regional and local authorities in these processes. These policy measures are intended to help the Member States and regions to develop risk assessments and increase overall EU's efforts to adapt to climate change. Furthermore, they are intended to help ensure a fair transition for all territories and citizens, leaving no one behind. The EU's regional policy is particularly important for mobilisation of the potential of European regions to decouple growth from overuse of resources, and it can play a significant role in this process (Murzyn 2020). This is an essential topic both in the current debate about new challenges (such as climate change) and as a potential capacity to support environmental action.

The aim of this article is to analyse the role of European cohesion policy in counteracting the negative effects of climate change and to answer the research question of whether a just transition towards climate neutrality is possible. The **hypothesis** posed by the author of this article relies upon the statement that cohesion policy can help to ensure such transition.

The objectives of this study are:

- 1) to provide a summary overview of all climate related projects co-financed by the EU cohesion policy funds in Poland between 2014–2020;
- 2) to define the share of projects devoted to climate change mitigation among all cohesion policy projects;
- 3) to assess the total value of the EU's contribution to climate change related investments in comparison to national public funds (central government budget).

Materials and methods

The study included the analysis of data about cohesion policy expenditure, literature review of relevant regulatory documents, studies and reports, over the 2014–2020 programming period. The research includes the analysis of primary sources (desk research), such as EU legislation and policy documents. Data about projects co-financed by the EU cohesion policy has been retrieved from the *Kohesio* project database (maintained by the European Commission) in April 2022. The data covers all projects implemented within the financial perspective 2014–2020. The classification of a project as "climate-related" was done according to the type of specific priority/task, under which the project was implemented (i.e. thematic objectives: climate change adaptation and risk prevention, low-carbon economy, environment protection and resource efficiency). For each project, the following information was retrieved: project duration (years), total value of the project,

value of the EU's contribution, name of beneficiary, overview of the project. The analysis was carried out for 27 Member States of the European Union.

Moreover, the total value of the EU contribution to environment and climate change related investments was compared with public budget spending on the same purposes in Poland (Poland is the biggest beneficiary of EU cohesion policy and therefore can be a "laboratory" for further analysis). The budgetary data was retrieved from the Polish Ministry of Finance's website in April 2022. The analysis timeframe was 2014–2020.

Research results

Climate change related issues in European cohesion policy 2014–2020

In implementing its policies, the European Union is looking for effective ways to make the European economy more climate-friendly and less energy-intensive. This is in line with the principle of sustainable development embedded in the Treaty on European Union (TEU: art 3). Sustainable development is an overarching objective of the European Union, to ensure economic growth, the well-being of the Union's citizens, and a higher quality of life for present and future generations (Murzyn 2018). Sustainable development goals are most often reduced to three categories: environmental, economic and social (socio-cultural). At the same time, the indicated objectives should be integrated, i.e. the measures taken should contribute to the achievement of all the objectives at the same time, and should be implemented taking into account strong interdependencies.

When analysing various definitions of sustainable development in the scientific literature, it is clear that the concept is imbued with multiple goals and components, complex interdependencies and a moral burden. Gladwin, Kennelly and Krause (1995) identify five principles of sustainable development: *inclusiveness*, *connectivity*, *prudence*, *equity* and *security*. When analysing these characteristics, we can see their particular relationship with climate change challenges. "*Inclusiveness* implies human development over time and space". *Connectivity* includes "ecological, social and economic interdependence". *Equity* suggests "intergenerational, intra-generational and interspecies fairness". *Prudence* means "duties of care and prevention: scientifically, technologically, and politically". *Security* requires protection from long-lasting threats and harmful disruptions (and climate change as such threat). (Gladwin et al. 1995: p. 878, qtd. in: Ricart et al. 2004: p. 4).

Sustainable development was one of the priorities of *Europe 2020* – the European Union's long-term socio-economic development strategy for the period 2010–2020. In this document, *sustainable growth* was understood as growth that promotes a more resource-efficient economy, which should be greener and more competitive (European Commission 2010). With *growth* defined in this way, eco-efficiency is important; it can be interpreted as the relationship between the economic cost or value creation and

the added environmental impact (Huppel, Ishikawa 2005). Such development is also associated with the idea of the transition to low-carbon economy. "Carbon intensive fuels generate a significant negative externality which is quite relevant for climate change mitigation policy" (Nyambuu, Semmler 2020).

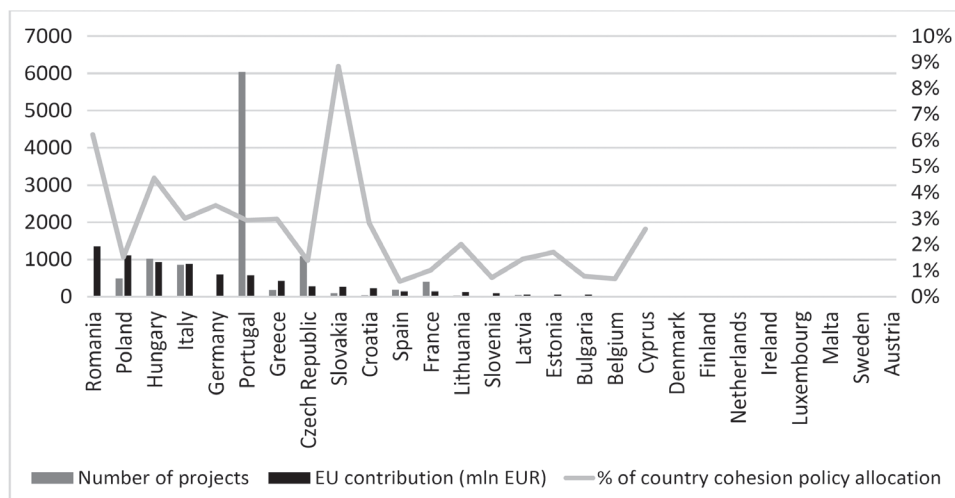
In order to achieve the objectives of the strategy *Europe 2020*, the European Union has aligned its budget to it. Cohesion policy was the most important investment policy of the EU in this respect. Cohesion policy priorities include promoting environmental technologies, sustainable transport and energy systems, as well as investment projects that improve water, air and soil quality, and tackle climate change. Since the 2000–2006 period, cohesion policy has increasingly integrated environmental aspects into its framework, which has become particularly evident in the 2014–2020 period.

European cohesion policy has set 11 thematic objectives for 2014–2020, three of which are related to climate change issues: supporting the shift towards a low-carbon economy; promoting climate change adaptation, risk prevention and management; preserving and protecting the environment and promoting resource efficiency (Regulation (EU) 1303/2013: art. 9). The European Regional Development Fund's investment was concentrated on four key priorities (so-called "thematic concentration"): (1) research and innovation, (2) the digital agenda, (3) support for small and medium-sized enterprises, and (4) the low-carbon economy. Each region, depending on the category of region, had to allocate an appropriate percentage of its allocation to these objectives – less developed: 50%, in transition: 60% and more developed: 80% (Regulation (EU) 1301/2013: art. 4; see also: Murzyn 2018: p. 38). Moreover, a part of the ERDF funds had to be specifically directed to low-carbon projects (less developed regions – 12%, transition regions – 15%, and more developed regions – 20%). Funding for cohesion policy in the 2014–2020 period amounts to EUR 351.8 billion, from which approximately EUR 56.5 billion were assigned for climate action, 15.9% of total planned cohesion policy funds (Ciffolilli et al. 2021: p. 2; see also: Murzyn 2018: p. 39). This should help the Member States and their regions to make much-needed investments in renewable energy, energy efficiency in buildings, sustainable urban transport, as well as in research and innovation in these areas.

General overview of climate related projects co-financed by EU cohesion policy funds between 2014–2020

Under the financial perspective of 2014–2020, more than 11000 projects in the area of "climate change adaptation and risk prevention" were implemented in the EU, with a total value of EUR 10.7 billion, including EU contributions of EUR 6.9 billion (64.5%). This is approximately 2% of cohesion policy resources for the whole period. The distribution of funds for climate actions varies across the EU Member States. The situation in individual countries is presented in the *Figure 1*.

Figure 1: Number of projects, EU's contribution (left-hand side on axis) and percentage of country cohesion policy allocation (right-hand side axis) in the area of "climate change adaptation and risk prevention" in the EU.¹



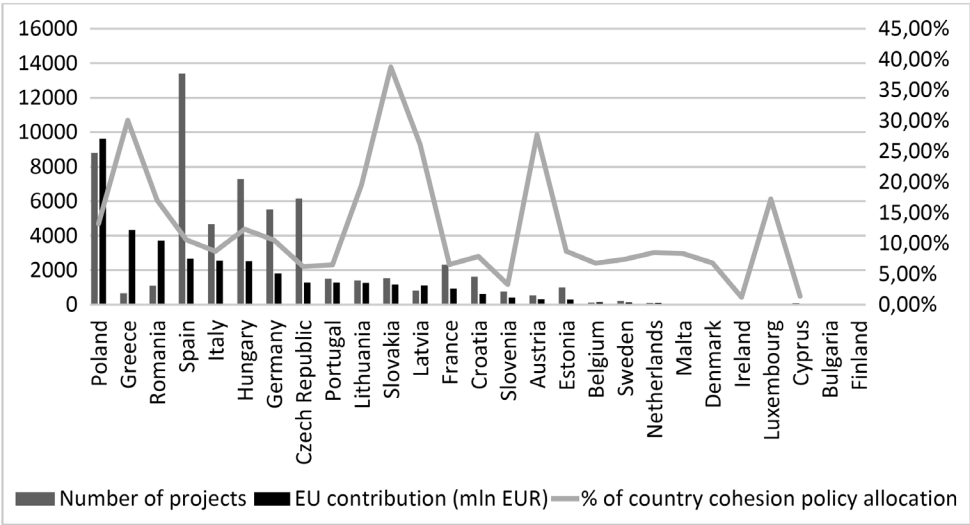
Source: own elaboration based on data retrieved from <https://kohesio.ec.europa.eu> (15.04.2022).

Portugal was the country with the highest number of projects in this area (over 6 thousands, of which over 4,5 thousands in Madeira region); Romania spent the most EU's money (in nominal terms) – EUR 1.36 billion; and Slovakia allocated the highest percentage of its cohesion policy allocation – 9%. In Poland, 493 projects with a total value of EUR 1.5 billion were implemented between 2014 and 2020, of which EUR 1.1 billion was the EU's contribution. Several countries did not implement any projects in this area.

Significantly more projects, and of higher value, were implemented in the area of "low-carbon economy". More than 60 thousands projects were implemented with EU's co-financing of almost EUR 36.5 billion. Poland was the country with the most cohesion policy funds spent on this objective (over EUR 9.6 billion, 13.2% of country allocation), with over 8,7 thousands projects. Slovakia has again allocated the largest share of its cohesion policy funding (38.8%) to this objective (see: *Figure 2*).

¹ Countries have been sorted according to the size of the EU's co-financing for the projects.

Figure 2: Number of projects, EU's contribution (left-hand side on axis) and percentage of country cohesion policy allocation (right-hand side axis) in the area of "low-carbon economy" in the EU.²



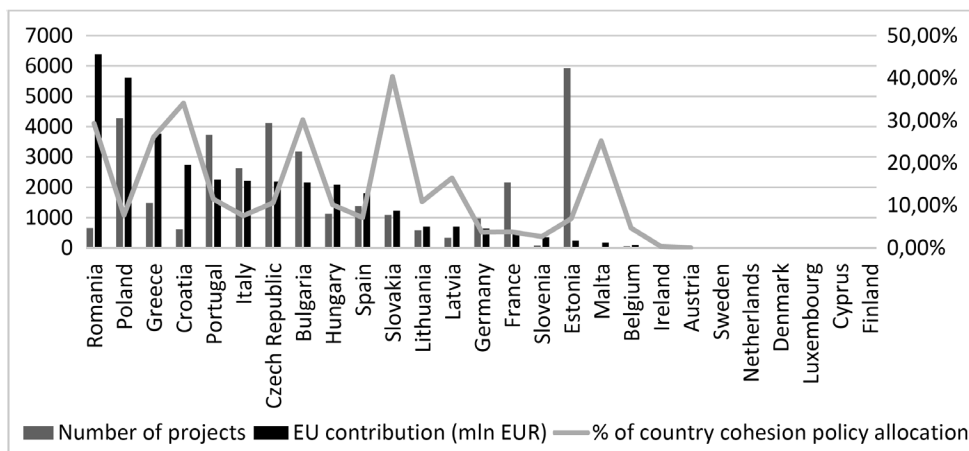
Source: own elaboration based on data retrieved from <https://kohesio.ec.europa.eu> (15.04.2022).

In the framework of the policy objective "greener, carbon-free Europe", over 34 thousand projects were also implemented in the category "environment protection & resource efficiency", with over EUR 35.9 billion of EU contribution. Slovakia has again allocated the largest share of its cohesion policy funds (40.4%) to this objective, while Romania spent the most EU money on it in nominal terms (over EUR 6 billion) (see: Figure 3).

The funds actually spent on climate related projects were even higher than planned. Particularly large amounts of cohesion policy resources have been committed to these objectives in central and eastern European countries. On the one hand, this is due to the fact that these countries are the biggest beneficiaries of the cohesion policy, but on the other hand, it means that the support from this policy can be a significant source of funding for public investment in the area of adapting to climate change in these countries.

² In the case of Bulgaria, it was not possible to distinguish projects implemented in this area due to their assignment to different categories at the same time.

Figure 3: Number of projects, EU contribution (left-hand side on axis) and percentage of country cohesion policy allocation (right-hand side axis) in the area of “environment protection & resource efficiency”.



Source: own elaboration based on data retrieved from <https://kohesio.ec.europa.eu> (15.04.2022).

To see how large these expenditures are compared to national public expenditure on environment and climate change related investments, Poland was taken as an example. Poland is the largest beneficiary of cohesion policy funds among the Member States. For the period 2014–2020, Poland has been allocated approximately EUR 77.6 billion (in current prices), which is more than 20% of all cohesion policy funds (Murzyn 2020). Central government devotes a relatively small share of its total budget to environment – 1.05% (the average between 2014 and 2020). Environmental and water protection and management issues fall under this category, including measures concerning the waste management system, treatment plants and sewerage systems, biodiversity-oriented measures, air protection and the fight against climate change, water protection, water resources management. On average, the expenditures on air protection and tackling climate change constitute only approximately 1.67% of the total environmental expenditures. The share of European funds in co-financing environmental policy is very high – 58.67% on average, in the case of spending for air protection and tackling climate change even higher – 64.32% (in 2016 and 2017 – over 80%) (see: *Table 1*).

This is information of the state budget only, at the local government level the percentage may be even higher. Cohesion policy funds are therefore the main source of funding for investments related to combating climate change and the low-carbon economy in Poland. Such significant resources have also mobilised regional authorities towards low-carbon activities. The best example are municipalities' plans in low-carbon economy. Although there was no statutory obligation to create such plans, most Polish municipalities have prepared them. "Even if the quality of these plans varies, they still are an important precondition for building low-carbon economy and improving the air quality in Poland" (Murzyn 2018: p. 46).

Table 1: Central budget environmental expenditures between 2014 and 2020 in Poland, million PLN.

	(0)	(1)	(2)	(3)	(4)	(5)	Share (%)				
Year	Total budget	Including European funds budget	Including Budget for Environment	Incl. Budget for air protection and tackling climate change	European funds budget for Environment	European funds budget for air protection and tackling climate change	Share of (1) in (0)	Share of (2) in (0)	Share of (3) in (2)	Share of (4) in (2)	Share of (5) in (3)
2014	380 925.18	68 405.66	6 039.44	11.74	4 286.70	0	17.96	1.59	0.19	70.98	0
2015	399 438.88	67 695.45	6 340.83	13.82	4 455.21	0	16.95	1.59	0.22	70.26	0
2016	412 543.84	51 700.72	3 274.81	176.34	1 460.34	141.34	12.53	0.79	5.38	44.59	80.15
2017	423 770.67	48 002.22	2 731.70	245.72	1 037.46	207.24	11.33	0.64	9.00	37.98	84.34
2018	457 307.13	66 852.78	4 244.56	49.22	2 212.41	4.75	14.62	0.93	1.16	52.12	9.65
2019	485 179.61	70 906.60	5 278.36	24.47	2 830.14	0	14.61	1.09	0.46	53.62	0
2020	585 586.59	80 809.98	4 999.94	27.99	3 026.46	0	13.80	0.85	0.56	60.53	0
SUM	3 144 751.90	454 373.41	32 909.64	549.30	19 308.72	353.33	14.45	1.05	1.67	58.67	64.32

Source: author's own elaboration based on Polish Ministry of Finance's data, <https://www.gov.pl/web/finanse/budzet-panstwa> (15.04.2022).

It is worth looking at the breakdown of cohesion policy funds by expenditure category (see: *Table 2*). Most projects were implemented in the area of energy efficiency renovation of public infrastructure, demonstration projects and supporting measures – 2948; a large number of projects also concerned solar energy – 2464. In terms of the value of the EU's contribution, the most resources were committed in the area of clean urban transport infrastructure and promotion (including equipment and rolling stock) – over EUR 4.1 billion, and waste water treatment – over EUR 2.6 billion.

Table 2: Cohesion policy expenditure in Poland in the area of "greener, carbon-free Europe" broken down by specific expenditure categories.

Thematic objective / Category	Number of projects	Total expenditure (mln EUR)	EU contribution (mln EUR)
Climate Change Adaptation & Risk Prevention:	493	1 524.85	1 108.70
Adaptation to climate change measures and prevention and management of climate related risks e.g. erosion, fires, flooding, storms and drought, including awareness raising, civil protection and disaster management systems and infrastructures	468	1 433.04	1 032.85
Risk prevention and management of non-climate related natural risks (i.e. earthquakes) and risks linked to human activities (e.g. technological accidents), including awareness raising, civil protection and disaster management systems and infrastructures	25	91.81	75.84
Low carbon economy:	8 790	13 240.65	9 619.38
Clean urban transport infrastructure and promotion (including equipment and rolling stock)	532	5 738.27	4 132.94

Cycle tracks and footpaths	347	565.40	430.28
Electricity (storage and transmission)	118	700.18	592.13
Energy efficiency and demonstration projects in SMEs and supporting measures	646	283.94	209.00
Energy efficiency renovation of existing housing stock, demonstration projects and supporting measures	683	552.10	429.80
Energy efficiency renovation of public infrastructure, demonstration projects and supporting measures	2 948	2 409.83	1 943.12
High efficiency co-generation and district heating	416	1 159.19	587.36
Intelligent Energy Distribution Systems at medium and low voltage levels (including smart grids and ICT systems)	32	141.58	104.54
Promotion of energy efficiency in large enterprises	21	57.24	42.46
Support to environmentally-friendly production processes and resource efficiency in SMEs	346	108.47	58.61
Renewable energy: biomass	64	98.27	52.47
Renewable energy: solar	2 464	1 291.81	954.96
Renewable energy: wind	11	22.93	12.59
Other renewable energy (including hydroelectric, geothermal and marine energy) and renewable energy integration (including storage, power to gas and renewable hydrogen infrastructure)	162	111.43	69.10
Environment Protection & Resource Efficiency:	4 278	7 065.65	5 614.27
Air quality measures	459	505.03	344.86
Commercial, industrial or hazardous waste management	129	42.55	32.58
Household waste management (including minimisation, sorting, recycling measures)	373	273.63	224.92
Household waste management (including mechanical biological treatment, thermal treatment, incineration and landfill measures)	52	343.64	248.14
Waste water treatment	983	3 153.93	2 605.49
Water management and drinking water conservation (including river basin management, water supply, specific climate change adaptation measures, district and consumer metering, charging systems and leak reduction)	13	54.49	46.00
Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure)	197	120.83	92.62
Development and promotion of public cultural and heritage services	118	124.93	92.50
Development and promotion of public tourism services	71	99.32	76.39
Development and promotion of the tourism potential of natural areas	88	75.39	57.49
Protection and enhancement of biodiversity, nature protection and green infrastructure	632	623.34	516.08
Protection, development and promotion of public cultural and heritage assets	863	1 250.67	978.46
Protection, development and promotion of public tourism assets	207	187.44	135.98
Protection, restoration and sustainable use of Natura 2000 sites	50	48.99	41.64
Rehabilitation of industrial sites and contaminated land	43	161.47	121.12
TOTAL	27 122	43 662.29	32 684.67

Source: author's own elaboration based on data retrieved from <https://kohesio.ec.europa.eu> (15.04.2022).

Climate change related issues in EU cohesion policy 2021–2027

Responding to the challenges related to environmental degradation and global warming, the European Union has developed an action plan – the *European Green Deal* (see: European Commission 2019). Its aim is “to help transform the EU into a modern, resource-efficient and competitive economy that to achieve zero net greenhouse gas emissions by 2050” (Šlimko et al. 2021: p. 4). The aims of the *European Green Deal* are the following: to increase resource efficiency through a transition to a clean, circular economy and to tackle climate change, reverse biodiversity loss and reduce pollution. It outlines the necessary investments and available financing tools “and explains how to ensure a just and inclusive transition” (*The European Green Deal...* 2020).

The entire EU financial system has been adapted to finance green transition objectives, including the Union's most important investment policy – the cohesion policy. The EU cohesion policy has five policy objectives in 2021–2027:

- 1) “a more competitive and smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity;
- 2) a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility;
- 3) a more connected Europe by enhancing mobility;
- 4) a more social and inclusive Europe implementing the European Pillar of Social Rights;
- 5) a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives” (Regulation (EU) 2021/1060: art. 5).

The first two of these objectives are the subject of the thematic concentration under the European Regional Development Fund (ERDF). All regions and Member States should concentrate at least 30% of their allocation to policy objective related to green and low-carbon transition (Regulation (EU) 2021/1058: art. 4). Therefore, ERDF should “contribute to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions, while delivering on the Union's political priorities through thematic concentration of resources” (European Commission 2021). Moreover, the Member States and the Commission shall regularly monitor respect of the climate contribution targets.

Climate change issues have been included in EU cohesion policy for years (Thoidou 2013), but in the last programming period they were given even greater importance and financial allocation. “In 2021–2027, the amount planned for climate change is expected to increase to at least EUR 77.2 billion” (or 83.7 billion, if REACT-EU is considered – a component of *Next Generation EU*, which tops up ERDF and ESF until 2023). “This is roughly 25% of total Cohesion Policy, a significantly higher share than previously, which should ensure a stronger contribution to the delivery of climate policy outcomes” (Ciffolilli et al. 2021: p. 2).

"The unevenness and unpredictability of how climate change will impact any specific community means there is no top-down, one-size-fits-all recipe for preparedness. Instead, community resilience depends on residents' active involvement in building capacity to collectively and creatively respond to adversity" (Phadke et al. 2015: p. 63; see also: Moser, Boykoff 2013). The same can be applied to the green transformation process. Cohesion policy has been supporting regions in a more difficult socio-economic situation for years. Since 2009, it has also had a strong territorial focus (place-based policy), with an approach based on the concept of supporting specific territories and assisting the areas concerned according to their specific characteristics and needs (Barca 2009). Moreover, the *European Green Deal* assumes that no region will be left without support in the process of green transformation. These are, particularly, coal areas, where communities will be most affected by the process of moving away from coal. This is to be achieved through the Mechanism for Fair Transition, thanks to which the most affected regions in Europe are to receive at least EUR 65–75 billion in the years 2021–2027. One of the pillars of this mechanism is the new Just Transition Fund, which completes the set of cohesion policy funds, with an overall budget of EUR 19.2 billion. Its aim is to mitigate the social and economic costs of the transition to a climate-neutral economy, through a wide range of measures mainly aimed "at diversifying the economic activity and helping people adapt in a changing labour market" (European Commission 2021). In order to unlock and implement its resources, EU Member States must "prepare strategic Territorial Just Transition Plans (TJTP) – identifying the eligible territories that are expected to be the most negatively impacted by the climate transition" (European Commission 2021).

Conclusions and discussion

The European Union started the transition to a low-carbon and resource-efficient economy already in 2014–2020 by allocating cohesion policy funds for this purpose. The *European Green Deal* launches a new phase of green and digital transformation and mobilises even more funding, not only for 2021–2027, but planning a perspective to 2030 and 2050. The results of this research suggest that the issue of climate change mitigation has been placed among key priorities of cohesion policy since the past programming period (2014–2020). This conclusion is supported by a comprehensive set of data on thematic concentration. Moreover, the contribution of cohesion policy to the *Green Deal* can have an important catalytic effect, particularly in those Member States, where it is a major source of public investment.

This study provides an overview of how EU cohesion policy currently contributes and can contribute in the future to the attainment of the goals of EU climate policy. Achieving climate targets is a major challenge, and it involves huge efforts by all Member States. Cohesion policy, as the EU's main investment policy, is one of the most important tools in achieving the EU's goals. It allows the Member States and regions to use European funds to combat climate change; this involves both large projects and innovative local solutions. Cohesion policy can therefore make a significant contribution to achieving the EU's climate priorities.

The research also assesses the cohesion policy's role in financing climate-related projects in Poland since 2014. Between 2014 and 2020, more than 27 thousands climate related projects were implemented, with a total value of EUR 43.7 billion, including EU's contribution of EUR 32.7 billion. Although projects focused on energy efficiency and renewable energy prevailed in terms of their total number, the infrastructural projects (clean urban transport and waste water treatment) consumed the vast majority of funds. The research results confirm that the EU cohesion policy funds constitute an important source of environmental investments in Poland. In the analysed period, the total value of European funds' contribution was higher than the total capital expenditure from central national budget, and the share of EU funds in co-financing environmental policy was 58.67% on average, in the case of spending for air protection and tackling climate change even higher – 64.32%. The role of cohesion policy in climate action is essential.

Poland's transition from coal-based production to a renewable-oriented society is particularly challenging. It faces a particular challenge in reducing CO₂ emissions due to its dependence on domestic coal resources. Moreover, despite the progress made over the past two decades, Poland's economy remains twice as energy-intensive as the EU average. However, climate change is not only a threat, but also an opportunity to do some green modernisation and develop a more low-carbon economy. EU cohesion policy contributes to wider EU's objectives also through leveraging public and private investment. The EU climate and energy policy can be an important step towards modernising the energy sector in Poland, but the transformation should be fair. A just transition also means implementing strong economic policies to develop and diversify regional economies that have historically relied on fossil fuels for growth and employment. The investments supported by cohesion policy requires conjunction and cooperation from different financial instruments and sources as well as the implementation of non-economic policies (regulation, partnership, etc.).

There are several limitations to be noted. First of all, the statistics concerning the number and value of projects should be treated with caution. Estimates relating to the value of total capital investment include only EU cohesion policy funds and public budgets. Thus, private sources are omitted, as well as other external sources, such as the *European Economic Area Financial Mechanism* and the *Norwegian Financial Mechanism* (so-called Norway Grants), the Swiss-Polish Cooperation Programme and capital investments made under EU's research and innovation programmes such as *Horizon 2020*. Consequently, the results provide rough estimates rather than exact calculations, and they are focused on a limited number of external sources of climate-related investment funding. In addition, the 2014–2020 programmes are still in progress, and proper conclusions can only be drawn when they have been completed (after 2023). Due to this peculiarity, further cases of climate-related implementations in both Poland and other EU Member States should be investigated before abandoning the level of speculation.

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