

Bottom-up Efforts for a Low-Carbon Economy: Examples of Local Action Groups Activities in Poland and the Czech Republic

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Abstract: Actions to counteract and adapt to rapid climate change caused by human activity require large-scale initiatives undertaken by international agencies and central governments as well as changes in the functioning of local economies and communities. In this article, we analyze the possibilities of involving rural territorial partnerships (so-called Local Action Groups; LAGs) in supporting the transformation of the EU local socio-economic systems towards a low-carbon economy (LCE). LAGs operate as associations of local stakeholders from the public, business, social and voluntary sectors and work for local socio-economic development. They can implement projects supporting energy transformation at three levels: as cooperation projects between LAGs and external institutions, as individual (own) projects, and by supporting grassroots initiatives of local stakeholders. In this paper we present examples of such activities, based on content analysis of LAGs strategic documents and websites. We point out that the potential of LAGs in supporting initiatives towards LCE is currently underused, which may be due to the low social awareness and low financial resources of local communities. However, LAGs have significant potential to support local pro-environmental initiatives using neo-endogenous development mechanisms, in which voluntary local actions are stimulated by external support.

Keywords: low-carbon economy; circular economy; local action groups; bottom-up actions; Poland; Czech Republic

JEL Classification: Q01; Q05; P25

1. Introduction

The implementation of an economy with low- or zero- greenhouse gas emissions is an important global goal, postulated primarily by scientists and pro-climate non-governmental organizations (Sengupta et al., 2020). Rapid anthropogenically-driven climate change is expected to have serious negative impacts on the economy and living conditions of people in many countries (OECD, 2015). According to climate scientists, slowing down global warming and supporting a rapid energy transition will be less costly than subsequent adaptation to the effects of catastrophic climate change, such as flooding of coastal cities,

rapid changes in agricultural zones, desertification of new areas, and drinking water deficits (Köberle et al., 2021; Mendelsohn, 2009). Efforts to reduce emissions of various types of greenhouse gases, especially carbon dioxide from the combustion of fossil fuels are therefore needed across all sectors of the global economy. This implies broad transformation of energy policy at the national level (Piwowar et al., 2017), as well as changes in the economies and population habits at the local level in rural and urban areas (Bedsworth & Hanak, 2013; Belčáková et al., 2019; Campbell et al., 2016).

The European Union (EU) attaches great importance to the issue of climate change and the need to transform energy systems to support a low (or zero-) carbon economy (LCE) (Maris & Flouros, 2021). The advancement of the energy transition is highly dependent on public subsidy (Kazak et al., 2020; Kozera et al., 2022). However, funding is mainly directed towards the public sector and entrepreneurs, and to a lesser extent to investments in individual farms or private households (Kata et al., 2022). Both governmental and non-governmental organizations can play an important role in investing in energy efficiency and local renewable energy (RE) sources, as well as educating the population and promoting climate-neutral behavior. Pan-European efforts to promote policies favoring the development of LCE are often referred to as "Europeanization", due to the need to adopt similar legal and economic solutions in all EU member states (Strunz et al., 2015).

Various types of cross-sectoral partnerships in the EU can play an important role in educating local communities, and promoting and supporting investments beneficial for the shift towards LCE (Chatterton & Style, 2001), including Local Action Groups (LAGs) (Furmankiewicz & Janc, 2011; Kola-Bezka, 2023). LAGs operate mostly as associations for the sustainable socio-economic development of territorially compact areas, usually smaller than administrative regions, and group together local stakeholders representing the public, business, social and voluntary sectors. LAGs create local development strategies (action plans) and redistribute a specific pool of financial resources from EU funds for projects prepared by local NGOs, small entrepreneurs, farmers and public entities (Kola-Bezka, 2020; Konečný et al., 2020). LAGs can also support local activities related to ecological education and small investments supporting energy transformation (Ministry of Agriculture and Rural Development, 2012). However, literature on the role of LAGs in the development of LCE (including RE) in rural areas is relatively scarce (Furmankiewicz, Hewitt, et al., 2021; Kola-Bezka, 2023; Olar & Jitea, 2020), hence we decided to explore and develop the discussion on this topic.

In this paper, we present the results of our preliminary research on the LAGs activities in Poland and the Czech Republic, both of which have supported the energy transformation through activities like the promotion and development of distributed renewable sources of electricity and heat, as well as energy saving measures. As part of our research, we posed the following two research questions (RQ):

- (RQ1) Based on the analysis of the literature and published reports (pre-analysis): what main types of projects related to the implementation of LCE can potentially be

implemented by LAGs, due to the source and organization of financing for local activities?

- (RQ2) Based on our own research of LAG websites and documents (main research): what types of activities do LAGs actually undertake in these types of projects, i.e. whether they are investment projects, analytical services, or promotional and educational activities?

Due to the fact that LAGs in Poland and the Czech Republic are relatively small local associations (Zajda, 2014), the starting assumption for our research is that LAGs will not be active in the implementation of large investment projects, but will rather undertake service activities typical for the third sector - educational and analytical.

We discuss the results of our research in the context of the concept of LCE (Dzikuć & Dzikuć, 2020; Kazak et al., 2023; Sengupta et al., 2020), with particular emphasis on the conditions and policies of the EU (European Commission, 2019a; Lucas, 2008). Our analysis may be useful for policymakers preparing programs to support local communities financially, as well as for local communities and LAGs managers looking to implement local projects related to LCE.

2. The Importance of Low-Carbon and Circular Economy

Two broad terms are associated with the energy transition: low-carbon economy (LCE) and circular economy (CE), which are closely related (Xie et al., 2023). LCE (also called decarbonized or zero-carbon economy) implies the generation and use of energy and raw materials in ways designed to avoid or minimize emissions of greenhouse gases. Currently, the greatest attention is paid to reducing the burning of fossil fuels that emit carbon dioxide. CE is a broader concept. It focuses on the principle of circulating material flows within product and material systems with the minimization of resource depletion, waste, and emissions (Munzarová et al., 2023).

Both energy saving (increasing the efficiency of energy use) and changing energy sources and technologies for the production of goods and services to those that do not emit greenhouse gases can help transform energy production and use to support LCE (Kazak et al., 2023; OECD/IEA/NEA/ITF, 2015). These goals can be achieved by, for example, abandoning technologies based on the combustion of fossil fuels containing the element carbon, or by introducing a circular economy in which all resources are to be used more efficiently by sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible.

The LCE concept includes energy production systems based on non-renewable fuels that do not emit greenhouse gases (e.g. nuclear energy). However, the CE concept introduces stricter transformation requirements. Under CE, virtually all non-renewable fuels (including radioactive materials) would be eliminated and the extraction of all types of non-renewable raw materials is to be reduced. CE requires the full use of RE and maximizing the level of recycling of all types of raw materials used by humans, with particular support for the use of biodegradable raw materials. However, while CE is more

difficult to achieve, in the long term it is necessary due to limited resources of many types of raw materials. LCE and CE are relevant to the concept of sustainable development (SD) (Geissdoerfer et al., 2017) and can be seen as promising strategies for achieving it (Schroeder et al., 2018).

LCE and CE concepts are important in the European Union (Kola-Bezka, 2024), of which Poland and the Czech Republic have been members since 2004. The key document setting the goals of the EU's energy transformation is currently "The European Green Deal", released by the European Commission in 2019 (European Commission, 2019a). It provides a roadmap for making the EU's economy modern, resource-efficient and competitive, while preserving Europe's natural environment, tackling climate change and making Europe carbon-neutral by 2050 (Maris & Flouros, 2021). The EU has the ambition to carry out the transition in compliance with the 17 Sustainable Development Goals designated in the United Nations 2030 Agenda, and LAGs can participate in this process (Vávra et al., 2022).

Since 2019 the Commission has worked on specific policy developments to put the Deal into action. One area embraced the new EU action plan for the CE (CEAP II) adopted in March 2020 (European Commission, 2020). Building on previous work undertaken on CE since 2015, the CEAP II focuses on resource intensive sectors where the potential for circularity is high. The aim of the plan is to keep resources in economic cycles as long as possible. The aim should be implemented through just transition policies and processes, to avoid that economic changes do not increase social inequality or civil unrest or reduce business competitiveness in the sectors affected (European Commission, 2019b).

Actions supported by the EU funds should be consistent with the EU strategic objectives and documents. In this sense, LAGs are also required to demonstrate compliance of local goals with higher-level documents (national and EU) in one subsection of their strategy (action plan) document (Furmankiewicz, Janc, et al., 2021).

LAGs can play an important role in promoting the energy transition at the local level through a range of different activities and initiatives, e.g. information campaigns, workshops and training sessions on LCE, RE and energy saving (Kis et al., 2012; Kola-Bezka, 2023). They can also work as platforms for exchanging knowledge and experiences among key local stakeholders to increase public awareness of the benefits of RE and the efficient use of energy, including through social media (Foronda-Robles & Galindo-Pérez-de-Azpillaga, 2021). LAGs enable cooperation between various local entities to develop and implement projects that are related to a modern LCE concept (Furmankiewicz, Hewitt, et al., 2021). These LAGs initiatives can support the introduction of LCE practices on local level and the efficiency of sustainable policy of local governments (Babczuk et al. 2017; Vávra et al., 2022).

3. Methodology

The subjects of this research were initiatives developed by LAGs operating in Poland and the Czech Republic related to LCE, and especially to energy transformation. LAGs are relatively small associations with three main kinds of revenues: regular small membership fees within the association, private donations and funds for administrative support of the

office under contracts for the implementation of the CLLD approach in the 7-year budget perspectives of the EU support (Chmieliński, 2011).

We took into consideration mainly projects implemented in the frame of EU 2014-2020 financial perspective ("Programming Period"). In practice, the activities were carried out in the years 2015-2023, as the implementation and settlement time of the EU projects was extended due to the COVID-19 pandemic. In the analyzed period, there were 324 LAGs in Poland and 180 in the Czech Republic (Furmankiewicz & Campbell, 2019; Vávra et al., 2022).

In the first stage of the research (January-June 2023), considered as pre-analysis in qualitative research (Piñeiro & Rosenblatt, 2016), we collected literature, published reports and documents on LAGs and support programs that were used by LAGs to determine the general types of projects they could implement. On this basis, we distinguished the general types of projects described in section 4.1. and we have prepared a list of keywords for further webometric analyses.

In the second, main stage of research (September-November 2023), we used text mining methods (Gaikwad et al. 2014). They consisted of finding keywords using an Internet search engine, using logical functions, in order to find information about projects implemented by the LAGs related to LCE (Table 1). In a similar way, we searched available LAG development strategies in which such activities could be planned. Webometric methods, including searching for information using keywords and qualitative analyzes of the content of the surveyed organization websites, are currently used in scientific research (Bachmann, 2012; Foronda-Robles & Galindo-Pérez-de-Azpillaga, 2021; Furmankiewicz, Janc, et al., 2021; Munzarová et al., 2023).

Table 1. Keywords used in the webometric logical procedure for searching for information about LAG projects related to LCE, using logical functions "AND" and "OR"

Key words in Polish:	"projekt" AND "lokalna grupa działania"	AND	"niskowęglowa" OR "energia odnawialna" OR "energooszczędność" OR "energetyczna" OR "gospodarka cyrkulacyjna" OR "gospodarka o obiegu zamkniętym"
Key words in Czech:	"projekt" AND "místní akční skupina"	AND	„nízkouhlíkové“ OR „obnovitelná energie“ OR „úspora energie“ OR "energie" OR „oběhové hospodářství“
Translation to English:	"project" AND "local action group"	AND	"low carbon" OR "renewable energy" OR "energy saving" OR "energy" OR "circular economy"

After searching for records using the described text mining procedures, we qualitatively analyzed the first 50 records to confirm whether they referred to a specific project implemented with the participation of LAGs and to exclude repetitions. The search procedures were the only way to gather information on projects that have been funded from different sources. The collected records included information on LAG websites, fragments of their strategies published in PDF format and information from other sources. Ultimately, we selected descriptions of 6 projects implemented in the Czech Republic and 10 projects implemented in Poland for detailed qualitative analyzes in this article. We then used qualitative document content analysis (Sandelowski, 2000). We focused on the project objectives and the scope of the works completed (if they are services, education or

investment activities). We paid no attention to financial issues due to limited access to comparable statistical data.

The main limitation of our research is that it is based on text mining and case studies which were selected on the basis of researchers' prior knowledge, rather than complete cases or a statistically random sample. Our research was exploratory in nature, consisting of collecting preliminary information about a phenomenon that is not yet well developed in the literature. In such a case, it is permissible to use a trial based on data availability, rather than randomized one (Babbie, 2011).

4. Results

Section 4.1. contains the results of our pre-analysis, i.e. the identification of three main types of LAGs actions. In the next sections we analyze examples of these actions: cooperation projects (type 1, section 4.2), LAGs' own (individual) projects (type 2, section 4.3) and support for other beneficiaries' projects by LAGs (types 3A and 3B, section 4.4).

4.1. Pre-Analysis: Identification of the Main Types of Projects Which Can Be Conducted by LAGs

From the point of view of possibilities for the LCE implementation, in literature, reports and the documents cited in our paper related to EU funds spending, we identified three main possible types of projects related to LAGs activity:

1. Cooperation projects, i.e. projects carried out by LAGs in cooperation with other LAGs or other entities at national and international level (see e.g. Chmieliński, 2011; Epa-Pikuła et al., 2019; Furmankiewicz & Trnková, 2022; Ministerstwo Rolnictwa i Rozwoju Wsi, 2019; NSMAS, 2015; Pisani & Burighel, 2014; Zajda, 2013),
2. Individual LAG projects financed from funds obtained from supra-local sources, in which the LAG is a main contractor (see e.g. European LEADER Association for Rural Development, 2016; European LEADER Association for Rural Development, 2019; Ministry of Agriculture and Rural Development, 2012),
3. Supporting and/or advising bottom-up projects of local stakeholders. In this case, LAGs are intermediary organizations that either: A) fund local projects by redistributing external grants accessed from EU funds through the Community Led Local Development (CLLD) approach (see e.g. Cejudo-García et al., 2022; Chmieliński, 2011; Ministerstwo Rolnictwa i Rozwoju Wsi, 2019; NSMAS, 2015), or B) support local societies in preparing projects to other external institutions, so supra-local funds (see e.g. European LEADER Association for Rural Development, 2019; Ministry of Agriculture and Rural Development, 2012; Novák 2022). In these both cases, local stakeholders in the LAG's area of operation are the main final contractors.

In the next stage of our research, we searched for examples of projects in the text mining procedures. The case studies are analyzed in the following sub-sections.

4.2. Cooperation Projects between LAGs and with the Supra-Local Partners

Examples of LAGs actions for cooperation projects financed under the CLLD approach are dominated by soft projects involving the exchange of knowledge and information, implemented both with domestic and foreign partners. The cooperation projects were popular especially between LAGs operating in Poland. In international projects, Polish LAGs most often became familiar with new ideas and technologies in countries and regions that are leaders in energy transformation. Most of the cooperation projects were financed from national Rural Development Programme 2014-2020 (sub-measure 19.3) and from EU Interreg support program in border regions.

One example is the international cooperation project entitled "Renewable energy sources – the future of the area of local action groups", implemented by the LAG "Biebrzański Dar Natury", the LAG "Kraina Mlekiem Płynąca" (Poland) and association Energievision Frankenwald e.V. (Germany). The representatives of Polish LAGs took part in a study trip to Germany, to learn about technical solutions for distributed, local RE.

Another example is the ECO-North project, led by a LAG from Finland, partnered by LAGs from Latvia, and Poland and a non-governmental organization from Estonia. As part of the project, educational youth camps were held about ecology and environmentally friendly solutions. The participants practiced, among other things, preparation of a model ecological enterprise. A study trip for representatives of LAGs from post-socialist countries to Finland was also important, in order to become acquainted with modern solutions related to circular economy.

Investment activities were carried out less frequently under national cooperation projects and rather as complementary elements of soft actions. For instance, in the EKO LAG project developed by three LAGs from Poland ("Krajna nad Notecią", "Czarnoziem na Soli" and "Dolina Wełny"), in addition to educational activities, eight so-called "eco-points" were created. At each eco-point air quality sensors were installed to make residents aware of the harmful effects of emissions from the burning of fossil fuels in domestic stoves. Another example is the project developed by two LAGs "Między Prosną a Wartą" and "Długosz Królewski" (both from Poland) entitled "Ecological land of the area of active and creative countrywomen", which included both educational actions and the purchase of hybrid street lamps powered by a photovoltaic panel and a small wind turbine.

LAG "Opavsko" (Czech Republic), Municipality of Lisková (Slovakia) and LAG "Dolný Liptov" (Slovakia) implemented project "Vision of an energy-saving region on the territory of the municipalities of MAS Dolný Liptov". It was financially supported by EU Interreg V-A Slovak Republic–Czech Republic program (Small Projects Fund). The goal of the project was the transfer and application of knowledge in the implementation of energy-saving technologies in the municipal economy. Another example is the cross-border project of the association "Krajské sdružení MAS Jihočeského kraje" (covering 16 LAGs from Jihočeský region in Czech Republic), Energy Center "České Budějovice (Czech Republic) and LEADER-Region Mühlviertler Kernland (Austria) entitled: "Energy for communities - solutions for the future" financed under the EU Interreg V-A Austria–Czech Republic

program. As part of the project, "Ambassadors for community energy" (local advisors) were trained and educational brochures "Community energy for municipalities" on RE development in Czech and German were published (Novák, 2022).

4.3. Individual LAG Projects Financed from Supra-Local Sources

LAGs operate as associations that are legal entities and can individually apply for additional funds from various public and private institutions. Most of the identified projects related to LCE concerned educational, training and consulting activities, typical for NGOs. For instance, LAG "Svatojiráský Les" (Czech Republic) participated in the "EnKO" project financed by the Next Generation EU fund. The project involved providing free consultations for local communities about increasing energy efficiency and promoting energy-saving, by trained staff.

Another interesting case is the completed project "Mobile autonomous resilience container" carried out by the "Opavsko" LAG from the Czech Republic. This project included an energetically self-sufficient mobile exhibition presenting to local society technologies that can be used in adapting to and mitigating climate change. This project was supported by European Environment Agency and Norway Grants, financed from Iceland, Liechtenstein and Norway.

LAG "Kłodzka Wstęga Sudetów" (Poland) won external financial resources for the project entitled "Active citizens" from the Active Citizens National Fund program, funded by the Financial Mechanism of the European Economic Area and the Norwegian Financial Mechanism. As part of the project, five "Citizens' Meetings" were organized, including: topics of climate neutrality, energy poverty, energy transformation and circular economy in the LAG area of operation. Similarly, the "ECO LEADER" project implemented by LAG "Owocowy Szlak" (Poland) was an example of promotion and education about ecology among children and youth. The goal of the project was to raise knowledge and awareness of ecology, environmental protection and counteracting climate change.

4.4. Local Projects Selected or Supported by LAGs

LAGs act as intermediaries in the distribution of public funds for bottom-up projects submitted by local stakeholders with headquarters inside LAG territories. The most commonly identified local projects were those financed by the EU funds under the CLLD approach. Each LAG has a Decision-making (project selection) Council (as it is called) composed of representatives of various economic sectors, which evaluates and ranks submitted applications. The best projects receive funding successively according to their rank until funds are exhausted.

Some LAGs specified preferences for RE or energy savings in their regulations for assessing project proposals of local entities—for example, proposals that include the use of renewable energy sources (RES) in the form of micro-installations and activities related to improving the energy efficiency of facilities (e.g. "Nasze Roztocze" LAG from Poland). One successful action case is the project "RES micro-installations in the Brańsk commune - Grant project from LAG", submitted by the local commune (rural municipality) to a grant

competition held by LAG "Brama na Podlasie" (Poland) and chosen for implementation by the LAG's Decision-making Council. In this project, individuals with the right to use a residential building located in the commune could apply for subsidies for the installation of photovoltaic cells for their own needs. Similar grant competition "Investments for ecology and renewable energy in households" was announced by LAG "N.A.R.E.W. " (Poland). Under this grant scheme, local communities applied for money for the construction of new solar thermal energy units (water heating) on residential buildings, including single-family private buildings. A further valuable example is the LAG "Turystyczna Podkowa" (Poland) project supporting local RE installations, co-financed through EU structural funds under the Regional Operational Program of the Małopolska Voivodship for 2014-2020.

Another way in which LAGs can carry out activities related to LCE development is by using their own staff to assist with the preparation and implementation of local inhabitants' projects under national or regional support programs. One such case is the involvement of LAGs in the Czech Republic in the New Green Savings ("Nová zelená úsporám") Light subsidy program of the Czech Ministry of the Environment, focused on energy savings in buildings. The program focuses on reducing the energy consumption of residential buildings (through insulation), construction or purchase of houses with very low energy consumption, environmentally friendly heating methods, RES, and adaptation and mitigation measures in response to ongoing climate change. The LAGs help applicants from vulnerable groups (the elderly, people at risk of energy poverty) to prepare a submission.

LAGs in the Czech Republic also play an important role in supporting the development of energy communities. As of 2023, about 17 community energy associations have been established in the Czech Republic, thanks to the activities of LAGs. This type of activity was much rarer in Poland. For example, the LAG "Zielony Wierchołek Śląska" was involved in the creation of an Energy Cluster "Green Energy of the Forest Land" within its area of operation. Its main goals are the development of RE to counteract emissions from local solid fuel boilers and stoves.

5. Discussion and Conclusions

In our analysis we found that LAGs can engage in implementation of LCE actions at three levels: as cooperation projects between LAGs and external institutions, as individual (own) projects, and by supporting grassroots initiatives of local stakeholders (answer to RQ1). They were active primarily in popularizing the ideas of LCE among local communities (educational activities and consulting) especially in relation to dispersed, local RE development and energy savings. They were less involved in the implementation of infrastructural investments supporting the implementation of LCE goals (answer to RQ2). We confirmed our starting assumption that LAGs, being associations, conduct mainly educational and service activities typical for the third sector, which was also visible in research in other countries (Cejudo-Garcia et al., 2021).

Our research suggests that LAGs relatively rarely engaged in or supported projects related to the implementation of LCE. In our webometric search procedure, we found only a dozen or so examples of projects described by LAGs, related to LCE issues (between 324

existing LAGs in Poland and 178 in Czech Republic). The relatively weak interest of local communities in investments in RE for the elimination of fossil fuels has already been described in the literature (Navrátil et al., 2021). In many EU countries, local communities operating through LAGs participated to a relatively small extent in counteracting climate change (Furmankiewicz, Hewitt, et al., 2021; Olar & Jitea, 2020). This may be because, in rural areas, LCE and global climate change issues were not at the forefront of local stakeholders' interests. For these stakeholders, local environmental impacts like visible emissions from local fossil fuel combustion, had a higher priority (Šťastná & Vaishar, 2023). This is not only because of the low level of social awareness of the importance of energy transformation, but also because of the scarce financial resources of the rural population in post-socialist countries in Central and Eastern Europe (Soloviy et al., 2019). Barriers to transformation at local level include both the reluctance of residents to change their traditional behavior (Feuer et al., 2020), as well as energy poverty - understood not only as the lack of resources of individual households to meet basic energy needs, but also as the lack of funds to invest in modern technologies related to RE production and energy-saving infrastructure (Piwowar, 2020). It is an unfortunate paradox that despite the extensive opportunities present in many rural areas (i.e. abundance of renewable natural resources), the social, economic and political disadvantages they suffer make it difficult to engage rural communities in energy transition (O'Sullivan et al., 2020). As a result, energy transitions in Europe are mostly led by richer countries, e.g. Norway, Finland, Denmark. Their societies can afford to finance technical innovations in the field of LCE (e.g. investments in thermal modernization of buildings, heat pumps, electric cars) (Eikeland & Inderberg, 2016).

However, as case studies show, LAGs can be an important driver for local energy transition. This finding is supported by other analyzes of LAG initiatives in RE and energy efficiency throughout Europe, including in Eastern Europe (Pechancová et al., 2022; Kola-Bezka, 2023). The project examples we have highlighted here show that LAGs have the potential to promote LCE in rural areas. The key issues therefore are how to increase the interest of local communities in behaviors and investments that support LCE, and how to reduce local socio-cultural and economic barriers to their development. These are valuable topics for further research.

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