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LOW-EMISSION ECONOMY PLANS – PLANNING AND IMPLEMENTATION DILEMMAS. THE CASE OF CITIES IN THE LODZ METROPOLITAN AREA

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ABSTRACT: Undoubtedly, each city is an anthropogenic environment filled with multiple human activities and sometimes suffering from limitations resulting from them. In particular, the exacerbating problems of poor air quality pose serious risk to the quality of life in a city. Contemporary cities should be able to successfully face the challenge and stimulate the development of low-emission economy. Low-emission Economy Plan is an instrument addressed to local authorities expected to respond to problems and needs of cities with this respect. This paper compares methodologies of drafting Low-emission Economy Plans and identifies their role in developing contemporary cities. Towns of the Lodz Metropolitan Area have been selected for the case study as cities with industrial heritage mostly coping with environmental problems triggered by the stormy growth of textile industry in the 19th and 20th centuries as well as social and economic developments currently taking place in the Lodz Metropolitan Area (in Polish: Łódzki Obszar Metropolitalny).

KEY WORDS: low-emission economy, Low-emission Economy Plan, local development, metropolitan area

Introduction

Postulates advocating the stabilisation of air pollution and, above all, restrictive limitations of greenhouse gas emissions (*United Nations Framework Convention on Climate Change,* Rio de Janeiro 1992; *the Kyoto Protocol to the UN Framework Convention on Climate Change,* Kyoto 1997) have not produced expected results. Reduction of national emissions was interpreted as a way to ensure global "public good", a benefit that would be available to all countries with simultaneous strong temptations for free-riding (Falkner, 2016). As a result, the uncertainty of nations states as to the behaviour of other countries (emittents) and, in particular, the absence of mutual trust restricted ratification and execution of international regulations on climate change and limitation of air pollution.

Omnipresent climate and energy related postulates, which previously had not been universally approved by the nation states, brought about concrete initiatives at regional and local levels. Concrete measures were also taken by the European Union and by local authorities of the EU Member States. In the *EU "Europe 2020"* strategy, for smart, sustainable and inclusive growth one of the five principal goals deals with climate and energy. This goal has been reflected in a number of EU documents concerning the building of low-emission society (*Roadmap for moving to a competitive low-emission economy in 2050*), improving energy security (*Energy efficiency action plan*), and sustainable transport (*White Paper. Roadmap for a Single European Transport Area – Towards a competitive and resource efficient transport system*).

The above EU declarations and documents triggered practical measures undertaken by local authorities. In 2008 the European Commission initiated the Covenant of Mayors (CoM) initiative for local sustainable energy[1] whose goal was to stimulate voluntary measures aimed at reducing the CO_2 emissions by at least 20% until 2020 (compared to the level of emissions reported in 1990). Sustainable Energy Action Plan (SEAP) drafted by local authorities and delineating directions and priorities of activities was an instrument that operationalised the adopted assumptions but at the same time a formal requirement that had to be met to join the Covenant. In 2015 the Covenant of Mayors (whose name was changed to the Covenant of Mayors for Climate and Energy) adopted new goals, much more restrictive than the previous ones

1 Covenant of Mayors brings together local authorities. In 2009 five Polish cities joined the Covenant: Warsaw, Bielsko-Biała, Raciechowice, Niepołomice, and Lubianka. Today the Covenant consists of 74 units from Poland the total population of over 5 million. Currently over ca. 9 K cities/municipalities in Europe (as at 09.10.2019), https://www.porozumienieburmistrzow.eu/about-pl/cov-initative-pl/cov-figures-pl.html

(CO_2 emission (and perhaps also emissions of other greenhouse gases) lower by at least 40% by 2030). These goals are to be achieved through the implementation of the Sustainable Energy and Climate Action Plan 2030 (SECAP) which specifies actions required of stakeholders and is identical with the SEAP although its scope is much wider (e.g. climate change adaptation measures) (http://dev.eumayors.eu/IMG/pdf/ CoM_leaflet_pl_web.pdf).

EU initiatives have been approved and reinforced by the Paris Agreement (2015) which:

1. highlighted global emission reduction as well as the need to transform the energy sector,
2. provided the roadmap in which low-carbon economy has become a long-term growth strategy at transnational as well as local levels (Burchard-Dziubińska et. al., 2017, p. 16),
3. stressed that dynamic developments in the field of climate observed in many countries mobilise more countries and entities to collective international efforts even if the majority still opposes mandatory emission restrictions (Falkner, 2016).

Deepening air quality crisis and directly visible negative effects of climate change have mobilised societies to re-orientate their approaches towards making their economies more environmentally-friendly, especially to decarbonise them. In the EU programming period 2014-2020, low-carbon economy has been identified as one of four key areas to which the Member States and regions should direct their investment projects to carry out the currently binding cohesion policy. One of eleven priorities (the so called thematic objectives) of the cohesion policy for the period 2014-2020, goal 6 dealt with supporting the shift towards low-carbon economy in all sectors.

The development of low-carbon economy depends on the performance of instruments adopted to reduce energy consumption, improve energy efficiency, diversify energy sources, eliminate fossil fuels, promote public transport, etc. Measures in the field of energy, environmental protection, climate, as well as in-depth transformation of the economic system are still left without any credible response of public bodies, including local authorities. Low-emission Economy Plan (LEP) can be a breakthrough as it seeks to design complex interventions intended to reduce air pollution and its sources and direct the development of a municipality/city towards resource efficient and low-carbon economy. The LEP is a new instrument dedicated to the territorial self-government which may importantly stimulate, initiate, and support innovative measures.

The main goal of the paper is to compare the methodology of drafting the LEPs and their validation against the adopted assumptions (procedures), as well as identification of shortcomings and gaps in their preparation.

An important aspect includes specifying the role of LEPs in the shaping of urban policies in contemporary cities. Cities of the Lodz Metropolitan Area (Polish abbr. LOM) have been selected for the case study. LOM consists of 32 territorial units, including 12 cities. The Area struggles with serious environmental problems, in particular with air pollution, exposing major portion of its population to negative health effects of poor aero-sanitary condition of air, and the intensity of unfavourable occurrences stemming from the cumulation of air pollution in strongly urbanised areas (intensified emission of transport-borne pollution, big concentration of the sources of emission within a small area, poor ventilation in densely built-up areas). In addition, the study was motivated by the wish to double check how active the cities are in working for the low-carbon economy. In 2013 as few as 1/3rd of cities covered by the study reported such measures[2] while all of them declared they wanted to draft the LEP and most of them stressed they would need financial support. Importantly, 7 of the cities covered by the study planned to draw up a Plan for sustainable urban mobility or include references to mobility in the Low-emission Economy Plan, if a LEP was to be prepared.[3] Only a couple of years later the situation changed and in 2018 all cities within the LOM had adopted their own LEPs.

Towards low-carbon economy – An overview of literature

The robber economy in the 19th and 20th centuries, mass and irrational intake of raw materials and intensifying ecological threats (including pollution) imposed even more stringent environmental limitations on the social and economic development and forced out searches for new solutions and methods of limiting and neutralizing pollution. The literature on the subject writes about the ecologization of development, which consists in striving for structural changes in the whole economy and transformation of its individual sectors in order to reduce the consumption of energy, raw materials and water, reduce the amount of produced pollutants and their arduousness for the environment and society. The so-called ecological economics – a system that optimises the flow of goods and services in order to maximise the use of raw materials and reduce the amount of waste to a minimum – is gaining in importance (Famielec, 2015, p. 15). Nowadays, ecologization is a feature of

2 Although most probably LOM cities and towns had already conducted activities, such as, e.g., thermo-modernisation of public buildings, providing cycling infrastructure, etc. before.

3 Questionnaire-based studies were carried out in LOM municipalities over the period 2013-2014 as part of the exercise aimed at drafting the Development Strategy for the Lodz Metropolitan Area 2020+ [2014]. Studies based on a formalised questionnaire-based interview were conducted by M. Burchard-Dziubińska and A. Rzeńca.

market economy development, and its main attributes include: creation of markets, integration of activities with other policies, cooperation with other policies, observation of market formation, stimulation/support of pro-environmental market transformations, conscious abandonment of activities harmful to the environment (Graczyk, 2013, p. 376).

Seeking to ensure high environmental protection through ecologization of the economy is nothing new, nevertheless currently it takes on a new and a very deep meaning as a result of loudly voiced postulates of circular economy (OECD, 2011), low-carbon economy (*Budowa*..., 2016; Burchard-Dziubińska et al., 2017), or climate change adaptation (Adger et al., 2005). Characteristically, ecologization deals with economic processes (micro and macro), as well as social life at a local level where the users of the environment have direct impact upon the scope and scale of anthropopressure, where negative external effects of their activities emerge, such as: overproduction of waste, appropriation and degradation of space, as well as low-stack emission from, e.g.: expanding private transport and local furnaces.

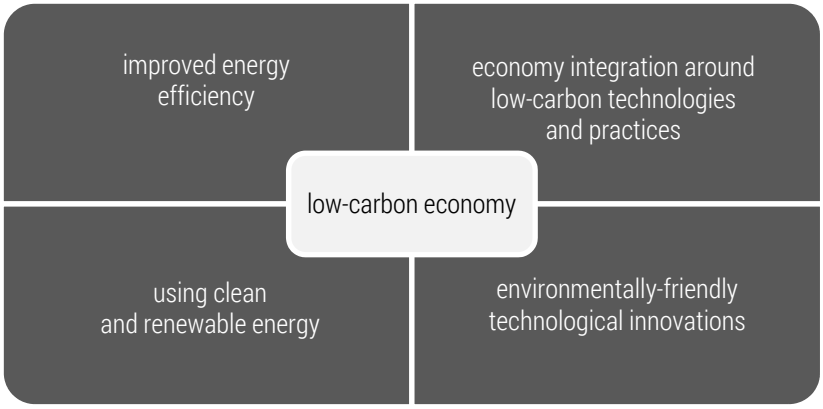

Figure 1. Key areas and goals of low-carbon economy

Source: author's own work.

Ecologization of development links, above all, with working out new economic and decision making criteria on the allocation of resources as well as consumer choices that would be rational from economic and environmental point of view. Low-carbon economy is a specific area, in which development takes place as a result of integration of all aspects of the economy around low-carbon technologies and practices, efficient energy solutions, clean and renewable energy, as well as environmentally-friendly technological innovation (*Budowa*..., 2011; Dzikuć, 2017). It deals with aspects of energy efficiency, sustainable transport, diversification of heat energy and electricity

sources, reducing sources of low-stack emission, environmental awareness but also changing habits in households, public institutions, and businesses (figure 1).

Low-emission Economy Plan: origins, substance, and functions

The EU engagement into the development of low-carbon economy and counteracting climate change coupled with intensified research dealing with air quality in Polish cities triggered some activities in this field in Poland. Impulse towards them and an undisputed argument for Polish local authorities to develop interest in low-carbon economy came from concentrating funds on measures designed to improve energy efficiency and launching support for drawing up a planning instrument called Low-emission Economy Plan (LEP). LEP's history as an instrument targeting local authorities (but also unions, associations or agreements of several units of territorial self-government) is rather short and its drafting is not required by law but is one of the requirements specified by the National Fund for Environmental Protection and Water Management (Polish abbr. NFOŚiGW)[4] in its calls for proposals. The goal of the plan is to examine the scope of feasible undertakings which, if implemented, would change the structure of energy sources and reduce energy consumption leading to gradual reduction of CO2 emissions (one of major greenhouse gases) within a municipality/city. Its main objective is to direct the intervention to low-carbon measures, efficient use of resources, and creating "zero-emission" economy. Having a LEP is a pre-condition for applying for the EU subsidies, as well as for national or regional funds in the financial perspective 2014-2020.

A LEP covers the entire territory of a municipality/municipalities (special attention should be paid to areas earmarked for intensive use which will impact the increase in energy consumption). In its construction and methodology LEP makes references to the SEAP; according to guidelines for the call of proposals it is a document consisting of 4 elements:

4 In 2013, the NFOŚiGW announced call for proposals for municipalities concerning the drawing up of low-carbon economy plans for which they could get subsidies from the Cohesion Fund (85% of eligible costs). Annex 9 to the rules of the Call for Proposals No. 2/PO IiŚ/9.3/2013 under priority axis 9 of the Operational Programme Infrastructure and Environment for the period 2007-2013 "Environmentally Friendly Energy Infrastructure and Energy Efficiency", measure 9.3. "Thermo-modernisation of public buildings and low-emission economy plans", http://pois.nfosigw.gov.pl/pois-9-priorytet/ogloszenie-o-naborze-wnioskow/w-ramach-dzialania-93-konkurs-2/. In this call for proposals, eligible costs were those incurred after 1.01. 2013 in relation with: drawing up new or updating the already existing low-emission economy plans, creating databases for baseline inventory of CO_2 emissions and training courses for municipality officials in supervision and delivery of measures in the area of energy efficiency.

1. Summary.
2. General strategy (strategic and detailed goals, current state of affairs, identification of problem areas, organisational and financial aspects (organisational structures, human resources, engaged parties, budget, sources of investment financing, financial resources for monitoring and evaluation).
3. Results of the baseline inventory of CO_2 emissions (BEI).
4. Measures/tasks and resources planned for the period covered by the plan (long-term strategy, objectives and obligations, short-/medium-term measures/tasks (description, bodies responsible for the implementation, timetable, costs, indicators) (Annex 9 to the rules of the Call of Proposals No. 2/PO IiŚ/9.3/2013).

The LEP is viewed as a confirmation that a municipality is aware of its energy situation and has planned adequate actions for some years to come. Database about energy consumption and CO_2 emissions across a municipality, its public and private sectors, is crucial for planning actions for the future (*Poradnik*..., 2003). The database should include: final heat energy and electricity consumption in municipal buildings, service and industrial facilities, houses (municipal and private), municipal street and road lighting and final energy consumption in transport (municipal transport stock (e.g. company cars, garbage trucks, police vehicles and other vehicles), public transport, private and commercial transport on municipal roads, local ferries, off-road transport (e.g. agricultural and construction machinery)[5].

An answer to the above-mentioned inventory comes in a long-term strategy and identification of complementary short/medium-term tasks (figure 2). In plans local authorities may outline the scope of operating activities covering the nearest 3-4 years following the adoption of the plan. Nevertheless, it is advisable to take account of the long-term perspective, in particular in the context of suburbanisation and new planned investment projects. However, a LEP should not be seen as a finite document. It evolves over time, the database should be updated at least twice a year and activities need to be examined on a continuous basis. The plan should also be monitored and updated against identified needs.

5 On 18.03.2015 Annex 9 to the rules of the Call for Proposals "Detailed recommendations on the structure of low-emission economy plan" was changed by deleting provisions concerning the exemption of entities engaged in the delivery of low-emission economy plan installations covered by the EU ETS system. This change enabled installations covered by the EU ETS system and entities responsible for them can be taken into account in low-emission economy plans. The structure of LEP remained unchanged.

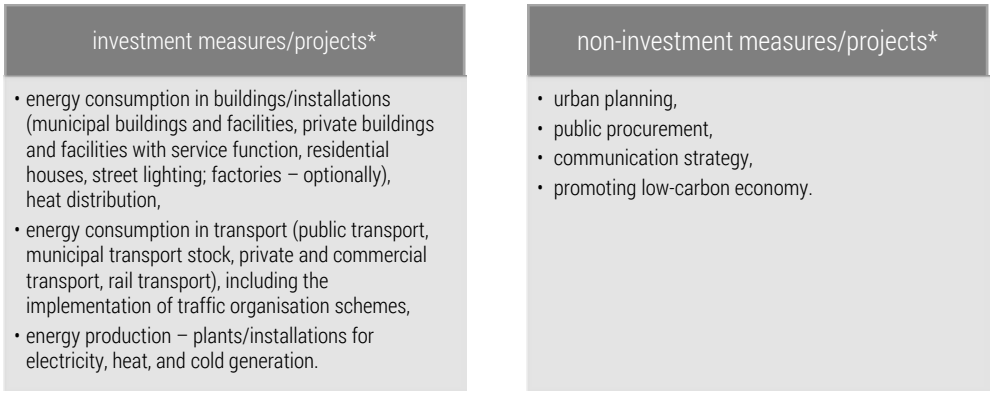

Figure 2. Scope of potential measures identified in LEP in LOM cities

*A municipality which plans pro-energy measures to be put in place in waste management or water-sewage management should include them in the LEP.

Source: author's own work based on Annex 9 to the rules.

Research methods

Spatial scope of the studies covers towns and cities within the Lodz Metropolitan Area (Polish abbr. LOM), i.e., Aleksandrów Łódzki, Brzeziny, Głowno, Koluszki, Konstantynów Łódzki, Łódź, Ozorków, Pabianice, Rzgów, Stryków, Tuszyn, and Zgierz linked by the history and tradition of the textile industry and sharing today's environmental problems (All of them are members of the Lodz Metropolitan Area Association). The timeline of the research covers LEP drawn up and adopted in the period 2015-2018.

To accomplish the research goal, we compared drawn up and adopted LEPs. They were compared against border conditions for the LEP which are decisive for its substance, i.e.:

1. Substantive scope taking account of the complexity of the plan assessed through the lenses of the complementarity of investment and non-investment tasks (measures/projects).
2. Scope and correctness of the baseline CO_2 emission inventory (BEI) and performance indicators (monitoring indicators; for instance, CO_2 reduction compared to previous years (1990 or any other for which an inventory could be carried out), reduction in final energy consumption compared to the base year, proposed monitoring of indicators based on the methodology corked out by the Joint Research Centre (JRC) of the European Commission in cooperation with the DG ENER and the Office of the Covenant of Mayors included in the guide "How to develop a Sustainable Energy Action Plan (SEAP)".

3. Stakeholder engagement at the stage of preparation and implementation (engaging energy producers and/or consumers in particular in activities within the public but also private sector).
4. Coherence between actions included in the LEP and Air Protection Programme (APP) and Short-Term Action Plan (STAP).

Results of the research

By the end of 2018, twelve towns and cities of the LOM worked out their LEPs in accordance with the guidelines for the call of proposals. Technically, LEPs have a similar structure. No city decided to draw up a LEP in cooperation with another city. In the majority of cases (7 cities) plans were developed by external companies.

With reference to the comparison criteria, below we present crucial results of the studies:

1. Substantively, the thematic scope of plans, their complexity and level of details are highly diverse. We need to bear in mind that it is not the effect of individual circumstances in each town or city but a derivative of how the plan was drawn up in its individual parts, i.e., the diagnosis of the present situation, baseline emissions inventory, and measures adopted to reduce emissions. Measures included in the operational part of the plans can be divided in two groups: common and incidental. Common measures are mostly short-term hard investment projects (planned for a particular period), mainly public. Most of them deal with thermo-modernisation of houses and public buildings, extension of cycling infrastructure, installing solar panels on public and private buildings, as well as investments in urban supply networks. There is a small group of innovative measures, such as, green public procurement, installing dust sensors, smart energy management systems in buildings or managing street lighting. Much less frequently cities plan soft projects and even if they are proposed they are usually presented as demonstration/pilot projects (e.g., carpooling and carsharing). Financing formats are described at different level of detail, e.g., Brzeziny and Aleksandrów Łódzki prepared a financial forecast earmarking funds for individual tasks while Głowno identified only tasks and sources of funding without specifying the amounts. The LEP completely ignores the private sector (cooperation, support, disseminating best practices).
2. From the viewpoint of the dynamics of low-carbon economy development, baseline inventory of emissions is crucial for drafting a LEP and identifying a package of corrective actions. Unfortunately, the commis-

sioning of LEP to external companies unaware of local circumstances brings about incomplete and often contradictory outcomes. Each of LOM towns and cities followed a different research methodology and adopted a different base year. The scope of BEI study differs with respect to detail and the form of data presentation. Towns and cities described their CO2 emissions in great detail (e.g., Aleksandrów Łódzki, Konstantynów Łódzkie, Pabianice, Łódź, Zgierz, and Stryków) broken down by sectors: transport, public buildings, private buildings, street lighting, and businesses and/or by types of fuel. Other towns and cities (e.g., Tuszyn, Koluszki, and Brzeziny) provided very fragmented and incomplete data which is why we cannot consider them reliable. For instance, in Brzeziny, where air quality is very poor (Polish Smog Alarm), CO_2 emission is the lowest. That is because when the plan had been drafted, emissions from transport and industry were ignored since they were considered little relevant and having minor impact on air quality. In general, the lack of standard inventory in many towns and cities resulted in the absence of CO2 emission forecast in many plans which adversely affected the estimates of future emissions and, consequently, prevents their monitoring.

3. Unfortunately, a weak point of LEP lies in the lack of stakeholder engagement. Even if we have been told about social consultations, e.g., in the form of questionnaire-based studies, we have not been informed about certain data concerning the number of filled questionnaires or the dates of consultations. While when plans are being drawn up participatory measures are considered, the final plan misses provisions (solutions) on co-participation or cooperation, e.g., with the private sector in the execution of the plan.
4. All LEPs highlight cohesion with other documents, among others, APPs and STAPs, unfortunately, not all solutions and instruments have been transferred to the LEPs. Thus, the cohesion concerns only the goals not the undertaken activities. The lack of synchronisation between these documents hinders their effectiveness.

Conclusions

Development towards low-carbon economy is an opportunity for the local population and economy in particular in the context of the quality of life, building a competitive position, and creating the image of a city/town. One may expect that the LEPs will be important documents testifying to the innovative approach of local authorities to development, as well as an expression of care for the environment in which their residents live. Conducted studies identified a number of LEP shortcomings at the stage of planning.

In the light of these studies, attention should be drawn to low quality of prepared documents and narrow approach to the subject at hand. LEPs are not a multi-platform for action for the development of low-carbon economy at local and supra-local scale. Local authorities exhibit an instrumental approach to plans, viewing them through the lenses of acquiring funds for concrete investment projects. LEPs neither identify nor recommend solutions that would support the triggering of market processes leading to the low-carbon economy. The absence of a comprehensive approach, reliable studies on the inventory of pollution, and actions that would be adequate to them reduces the efficiency of the plan. The omission of participation and private sector stakeholder and residents' engagement weaken the position of the document. Benefits resulting from LEPs are limited to necessary albeit standard investments while the LEP potential is much bigger and deals with the overcoming of information, technological or awareness barriers, as well as stimulating the low-carbon economy at local level.

The contribution of the authors

Agnieszka Rzeńca – 70% (concept, research method, literature review, analysis and conclusions).

Rafał Mysiala – 30% (literature review, data analysis and conclusions).

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