Low-emission economy plans as a chance for sustainable development of municipalities in Poland

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Abstract. Adequate low-emission policy should activate society to take action to achieve the benefits of improving the environment. According to the National Programme for the Development of Low-emission Economy, low-emission transformation is a direction for changes of Polish economic model, which could solve the problem of natural resources depletion. The document, that determines the direction of economic transformation, is the Low-emission Economy Plan (LeEP). It is a derivative of the commitments it has made by Poland in the framework of international agreements to reduce emissions. The results of the study will be presented, which include the analysis of the plans of low emission economy for municipalities from Wielkopolska region, which has been developed in order to meet the requirements of the Ministry of Economy and will be used to develop model guidelines on the preparation of such documents. The municipalities have potential to improve energy efficiency and use of resources of local energy sources, as well as the opportunities associated with the management of public and private transport, especially in urban areas. Low-emission economy plan has to be a document that will allow local governments to establish the right direction to a low-emission economy transformation.

1 Introduction

Climate change, rational management of environment and its efficient use are global problems, considered at all levels of management - regional, national and international. The undertaken actions of reducing the harmful substances emissions and stimulating energy efficiency increase, have specially dedicated documents specifying the action in this direction at all levels of coordination. Low-emission policies implemented at the local level should activate citizens to take action to achieve the benefits of improving the environment. On the 10th of January 2007 the European Commission presented energy and climate package, which has set targets for the member states of European Union. The so-called "3x20" package indicates a reduction in greenhouse gas emissions by 20% to 2020 (compared to the base year 1990), increasing the share of renewable energy in final energy consumption to 20% (including a 10% share of biofuels in transport) and increasing energy efficiency by 20% [1, 2].

2 Low emission and low-emission economy

The society is becoming increasingly aware of environmental protection need and to prevent its further contamination. The two definitions of "low emission" and "low-emission economy" became very popular nowadays, but they are often confused, especially in terms of emissions reduction [3, 4, 5, 6].

The concept of "low emission" is usually associated with inefficient combustion, accompanied by the release of large amounts of dust and gases. The term "low-emission economy" is usually linked to concepts such as energy efficient buildings, thermo-modernization, energy efficient transportation and progress in emissions reduction resulting from implementation of the BAT technology to convert fossil fuels to electricity or heat. Implementation of low-emission policy in the municipality has to favourably affect on functioning and actions of community [3, 4, 5, 6].

In majority of Polish municipalities "low emission" is associated with emissions of particulates and noxious gases coming mainly from individual heating systems based on coal derivatives in which coal combustion often takes place in an inefficient manner. A large number of low heights stacks emitters causes great nuisance for population. Contamination accumulates around the site of emission, usually in areas with dense housing development. This process has the highest density during a heating season [1].

3 Sources of international law

Climate change and continuous growth of air pollution has forced the world's leading economies to take actions that are intended to improve the state of the atmosphere and the reduction of greenhouse gas concentration.

The first international convention regarding problems of environment protection and human impact on its

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transformation was organized in 1972 Stockholm Conference. The second conference of the environment, and the first, which shown an increase of greenhouse gases in the atmosphere as one of the causes of these changes was conference organized in Rio de Janeiro in 1992. The Framework Convention on Climate Change, adopted within the framework of this meeting, imposed an obligation to stabilize greenhouse gases concentrations in the atmosphere at not threatening levels. Then the Framework Convention has been ratified by the European Community by decision 94/69/EC in 15th in December 1993. This decision came into force a year later. During another conference in 1997 in Kyoto detailed arrangements were taken by the United Nations on the elimination of greenhouse gases from the atmosphere. The Kyoto Protocol introduced greenhouse gas emission limits for individual countries.

The European Union conducts a relatively strict environment and climate policy. One of the main objectives set out in the Functioning of the European Union Treaty in article no. 191 is the protection and improvement of the environment, as well as problem-solving nature of the global and regional, especially related to climate change. In the "Europe 2020" document quantitative targets which should be achieved by 2020 has been established.

In 2014 at the European Union climate summit further quantitative targets were presented with the perspective of 2030. These are: reducing carbon dioxide emissions by 40% to 2030 (compared to 1990) and increasing the share of renewable energy sources in the energy balance by 27%. There are also a lot of directives aimed at controlling and regulating the provisions related to the protection of air, climate change and energy saving [2, 7].

4 Sources of national law

Polish law contains a lot of acts governing energy planning and management of pollution produced in the process of energy production. General issues are regulated by the Environmental Protection Law act of the 27th of April 2001. The Act contains general rules and guidelines for air quality, among other things, requiring the maintenance of substances in the air below the permissible levels.

Another source of law is the Act of 15th of April 2011 Energy Efficiency. It was implementation of Directive 2006/32/EC on energy end-use efficiency and energy services into Polish law. The main objective of the Act is the cost of energy, indicating that for 2016 final energy savings will be not less than 9%. It also determines the tasks of the public sector in energy efficiency and introduces a system of energy efficiency certificates.

The Act of 20th of February 2015 Renewable Energy Sources defines a number of objectives, such as increased energy security, effective and rational use of renewable energy sources. It identifies international obligations in the field related to renewable energy sources and their participation in the country's energy balance.

A several national strategic documents related to the subject of low-emission were also created. The main of them is the National Programme for the Low-Emission Economy Development (NPRGN) adopted on the 4th of August 2015. The main objective is the development of

low-emission economy while ensuring sustainable development of the country. The Programme has been prepared to transform current economy to a low-emission economy. It is mainly to create optimal model of modern material- and energy-saving economy which is oriented towards innovation and competitive on the European and global market by 2050. One of the measurable effects of this transformation will achieve reducing greenhouse gas emissions and other harmful substances.

The Programme should enable Poland active role in the process of determining the European and global targets to reduce emissions of greenhouse gases and other substances, as well as achieving a comparable level of energy efficiency per unit of GDP to developed countries in Europe. The essence of the program is to achieve economic, social and environmental impacts of actions. Its establishment and implementation is necessary because of the reduction commitments specified in the Kyoto Protocol and the European Union climate-energy package.

The NPRGN target are entrepreneurs of all economy sectors, local authorities, as well as non-governmental organizations and the business environment. Its implementation will facilitate adaptation to the requirements of all low-emission economy industries. The program provides for specific objectives, such as:

- low-emission energy, which addresses such issues as: network modernization and expansion of the power grid, the development of renewable energy, dissemination of alternative ways of generating energy;
- improving the efficiency of materials management (including waste), which focuses on optimizing the use of raw materials and the development of low-emission waste management;
- sustainable production in industry, construction and agriculture with the dissemination of low-emission production technology and improve energy standards in existing buildings (thermal efficiency improvement);
- low-emission transformation in the distribution and mobility, including the development of intermodal transport, support for public and non-motorized transport and introduction of low-emission fuels;
- promotion of sustainable consumption patterns with particular emphasis on educational campaigns on this subject [8, 9, 10].

5 Low-emission Economy Plan (LeEP)

Low-emission Economy Plan is document which determines the direction of the economy transformation. According to the financial perspective for 2014-2020, municipalities which will develop and implement a low-emission economy plans will be able to apply for external sources of financing for tasks related to air protection, energy efficiency and renewable energy [2]. The Low-emission Economy Plan is not formally required by law. It is a result of commitment that Poland has made in conjunction with its international agreements to reduce emissions [10, 11].

Low-emission Economy Plan is a document that use the information about the size of energy consumption and carbon dioxide emissions in the municipality, to achieve the objectives of increasing energy efficiency, reducing greenhouse gas emissions and increasing the share of renewable energy in overall energy consumption. Baseline emission inventory is the first step of the LeEP development. This will help to determine problem areas in the municipality and choose the appropriate action to prevent the emissions. Creating action plan for a low-emission economy requires a constant vision of the municipality development, which includes investment and non-investment activities, spatial planning, green public procurement, education and information. LeEP cannot be treated as a finished document. It changes over time, requires at least once a year to supplement the database and continuous analysis of the municipality operations and development. LeEP must be monitored and if necessary, updated.

Low-emission Economy Plan suggests action in the field of energy management, aimed at reducing emissions and optimum use of available resources. A result of planned actions is to reduce emissions into atmosphere, including carbon dioxide, sulphur compounds, nitrogen oxides and particulates. In the long term LeEP involves action to promote energy efficient products and services, and affecting the change in attitudes of local energy consumers initiatives [12].

The general obligation to reduce CO₂ emissions must be translated into concrete actions and measures, together with the associated reduction in CO₂ emissions by 2020. LeEP is referred to as "equivalent document" in relation to the Sustainable Energy Action Plan (SEAP) by local governments for national and regional regulations on financial support for investments to improve energy efficiency.

LeEP key objectives are:

- inventory of the greenhouse gas emissions sources located within the municipality,
- thermo-modernization of public and private buildings,
- reduction of energy consumption for heating in buildings,
- reduction of energy consumption in public buildings,
- connecting new customers to the gas network leading to progressive gasification of municipality,
- replacement of heat sources for new low-emission,
- increase the share of energy from renewable sources in the overall energy balance,
- construction of the community platform structure for information exchange to improve energy efficiency and installations of renewable energy sources.

The scheme of Low-emission Economy Plan includes:

- summary;
- overall strategy, describing the strategic goals, current state, identify problem areas, organizational and financial aspects (organizational structure, human resources, stakeholders, budget, sources of financing, financial resources for monitoring and evaluation);
- the results of the carbon emissions base inventory;

- actions / tasks and measures planned for the entire period covered by the plan, including long-term strategy, objectives and commitments; short / medium term actions and targets (description, entities responsible for the implementation, schedule, costs, indicators) [7].

6 Purpose of research and preliminary results

The aim of the launched studies is to determine the effectiveness of energy planning with usage of the new tools - low-emission economy plans - in selected municipalities of Wielkopolska region. The analysis will be made using Sectional Evaluation Plans Method (SEPM). SEPM is an original method proposed to evaluate the implementation of municipal waste management plans. For the purpose of this studies Method will be modified in the range of indicators used in the development and implementation of low-emission economy plans. Method is rapid, measurable and representative of municipal LeEPs. On the one hand it has to give the ability to self-esteem municipalities, on the other hand facilitate the control authorities work. The method will also allow to compare the effects of energy planning in the individual municipalities. The most of municipalities in Wielkopolska region have developed LeEP (several documents are just being completed or updated). Still there are 30 municipalities that do not have this document (about 15%). Some of municipalities has received funding from the National Fund for Environmental Protection and Water Management or Regional Fund for Environmental Protection and Water Management in Poznań to develop that document. Currently, existing low-emission economy plans for municipalities from the Wielkopolska region are reviewed for compliance with the requirements of the Ministry. Research will develop future guidelines for the preparation of such documents, as well as demonstrate the necessary of additional components and allows for more efficient energy planning at the level of local government [13].

The previous analysis gives conclusion that low-emission economy plan has to be a document showing the direction of development of the municipality in terms of sustainable energy planning, in fact the content value and the municipalities involvement are unsatisfactory. Documents are drawn up by an external contractor, and the responsible for implementing the tasks personnel do not have the proper knowledge and preparation. It is necessary to engage municipal power engineer, which will be responsible for the assumptions implementation made in the LeEP. There are no adequate and uniform guidelines, the methodology used for estimating CO₂ emissions is not the same and correct in all documents.

As part of the doctoral dissertation arise guidelines for developing a standard LeEP and effective methods of implementation tasks planned in the document in the field of low-emission economy in the municipality.

7 Summary

The municipalities have huge potential to improve energy efficiency and usage of local energy sources, as well as opportunities associated with the management of public and private transport, especially in urban areas. Local governments are the basic units in the implementation of energy policy and climate and energy package guidelines, as well as the objectives of the National Programme for the Low-emission Economy Development. Low-emission economy plan has to be a document that will allow local governments to choose the right direction in transformation towards a low-emission economy terms [12].

Low-emission policies, implemented at the local level, should generate strong incentives to encourage citizens to take action to achieve the benefits of improving the environment. They are connected with reduction of emission nuisance accompanying the combustion of fuels and help the local community to achieve a higher level of awareness in subject of air protection and effective response to observed side effects.

One of the elements of this policy is to effectively obtain financing and overcome barriers related to limitations of information access on the opportunities for reducing low emissions. LeEP have to help in sustainable development of the municipality, also through implementation of the concept "the exemplary role of the public sector" for the coming years [14].

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