

## LOW-CARBON ECONOMY PLANNING IN THE PUBLIC SECTOR

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### ABSTRACT

The article presents the results of analysis of low carbon economy planning in public administration, as well as technological and non-technological solutions present in Poland and the EU. The review of documentation, being a formal basis for dealing with problems by public administration and local authorities, and the analysis of sample programmes and plan indicate that the main determinant of low carbon economy development in Poland is the state of the natural environment, particularly air quality and availability of financial support for investments, which is dependent on the possession of specific planning documents. Technological solutions are economically verified as network parity, which indicates the importance of organizational, fiscal and financial solutions.

**Keywords:** general regional economics, alternative energy sources, government policy

**JEL codes:** R10, Q42, Q48

### INTRODUCTION

Low carbon economy, also called decarbonisation, assumes the use of low emission energy sources and the limitation of greenhouse gas emissions, CO<sub>2</sub> in particular, the reasonable management of resources, also in circular economies, and energy efficiency. The initial background for a low-carbon economy are climate changes (United Nations Framework Convention on Climate Change – UNFCCC) and the steady move away from use of traditional, fossil fuels to alternative fuels (OECD, 2010).

Low carbon economy also links to the concept of sustainable development, which is carried out by activities such as the improvement of air quality, the development of energy saving solutions and renewable energy technologies (RES), the promotion of material efficient manufacturing and industrial processes as well as ecological education, including professional

and social education (Bednarski et al., 2017). The European Commission claims that 'climate change has long been recognised as one long-term shaping factor where coherent EU action is needed, both inside the EU and internationally' (European Commission, 2011a).

The problem included in the article is low-carbon economy planning in public administration on regional (voivodship) and local (community) levels. The issue is important also from a pragmatic perspective, as it is related to eligibility criteria for funding investment in 2014–2020 from the Operational Programme Infrastructure and Environment, and the influence of clean air on health and life quality. The issue of low emission has a negative impact in this context.

The term low carbon emission pertains to emissions from transport as well as those caused by local coal-based heating systems and individual home boilers. It is assumed that low emission is caused by

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all chimneys up to 40 m of height, that is most building houses, communal and public buildings.

The financial perspective for 2014–2020 is the last Poland can use for supporting infrastructural investment. The role of emission criteria grows when selecting investment and technological solutions, and defining public investment policies. However, having the Low Emission Programme by a community is a required condition for funding investment in the Operational Programme Infrastructure and Environment 2014–2020 within priorities linked to climate protection<sup>2</sup>.

The article aims at reviewing and analysing issues linked to the low-carbon economy from the perspective of planning duties in public administration as well as technological and social challenges.

The scope of work includes the review of main EU strategies, national and regional (voivodeship) ones as well as an analysis of low-carbon technologies in the EU and Poland within sectors.

## **LOW CARBON ECONOMY IN STRATEGIES AND REGULATIONS**

The main EU strategic documents are: 'A Roadmap for moving to a competitive low carbon economy in 2050', 'Energy Efficiency Plan 2011'. From the financial perspective 2014–2020, according to rules by the European Regional Development Fund, member states are obliged to spend part of financial means on low-carbon projects. The quota for more developed regions has to be higher than 20%, for regions in transition – higher than 15%, and more than 12% for less developed regions<sup>3</sup>.

For respective voivodeships, the following national strategies have to be mentioned: Energy Policy Poland 2030 (Ministerstwo Energii, 2009), National Spatial Development Concept (Resolution No 239 of the Council of Ministers) and Regional Operational Programmes (RPO) 2014–2020.

The main national regulations refer to the legal functioning of communities: Act on local government, Environmental protection law, Act on access to information about the environment and its protection, public participation in environmental protection and environmental impact assessments, Act on spatial planning and development spatial planning and Construction Law. Issues linked with fuel and energy are: Energy Law, Act on Energy Efficiency, Act on renewable energy sources and Act on electromobility and alternative fuels. Moreover, local regulations as detailed by regional operational programmes<sup>4</sup>, local low-emission programmes (PGEs) and programmes for limiting low-emissions (PONES) are of significant importance.

## **TECHNOLOGIES IN A LOW-CARBON ECONOMY**

International Energy Agency prognosis (IEA, 2010, 2017a; b) indicates that among RES solutions currently available, only photovoltaic, on-shore wind and electric cars are technologically and commercially advanced enough to be used in energy transformation. By commercial maturity, we understand the ability to compete with conventional solutions as reaching grid parity, when commercialization is based on pure market rules, without subsidies and public subsidies.

Other low carbon technologies still need more research and development. Thus, non-technological

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<sup>2</sup> Sample investment of low-emission are thermo-modernization of buildings, development of utilization of RES and development of public transportation.

<sup>3</sup> Polish territory has a diversified state of regional development and the share of investment for low carbon economy applications is 12.5% from EUR 9,198,911,747.

<sup>4</sup> In Voivodeship Operational Programmes, low carbon economy is linked with the following actions: (1) support for generation and distribution of RES energy (15 voivodeships); (2) promotion of energy efficiency and using RES in companies (12 voivodeships); (3) support for energy efficiency, intelligent energy management systems and using RES in public buildings and private buildings (16 voivodeships); (4) promotion of low emission strategies for all territories, urban areas, including support for sustainable urban mobility and adaptation (16 voivodeships); (5) increase of energy from cogeneration (4 voivodeships). The Lower Silesia region has additional funding possibilities (Wysoglad, 2017).

solutions, resulting also indirectly in reducing emissions are more significant, e.g. outsourcing energy issues to specialized energy service companies, using energy performance contracts.

Sample organizational, fiscal and financial mechanisms, aimed at supporting the reduction of emissions and support decarbonisation are:

- Systems of fees to reduce traffic congestion and pollutants, fees for using transport infrastructure.
- Intelligent spatial planning and development of public transportation, limiting emissions from road transportation, rail and mainland water transportation.

- Emission limits of CO<sub>2</sub>.
- Taxation systems considering environmental issues.
- Introduction of legal requirements of energy standards for public buildings.
- Development of the international emission trade system (European Commission, 2011a; Bednarski et al., 2017).

Table 1 summarizes technological and non-technological solutions on a general EU level and detailed solutions customized for Poland (according to economic conditions, technical infrastructure and natural conditions), with sample applications.

**Table 1.** Innovative solutions in a low-carbon economy

European Union	Poland	
	solution	sample application
1	2	3
Sector: energy		
renewable energy sources (wind, Sun, biomass, heat pumps)  intelligent grid, carbon capture and sequestration	modernization of the National Energy System (refurbishment of 200 MW energy blocks modernization of transmission and distribution networks)  implementation of highly efficient CHP  development of RES  continuous improvement of energy efficiency	programme led by the National Center for Research and Development dedicated, particularly, to energy blocks of 200 MWe class  essential acts on RES and energy efficiency  project of the Act on the promotion of electricity generation in high-efficient CHP
Sector: transportation		
improvement of energy efficiency in the automotive industry  alternative fuels  alternative fuels for advanced powertrains (electric, hydrogen, fuel cells)	first generation biofuels  intermodal transportation  electromobility  urban Traffic management  development of infrastructure supplying electric cars	set of regulations dedicated to biofuels and alternative fuels  promotion of the smart city concept  low-carbon economy plans  the Act on Electromobility and Alternative Fuels

Table 1 – cont.

European Union	Poland	
	solution	sample application
1	2	3
Sector: industry		
application of advanced resource and energy efficient processes and machines in industry  recycling materials	limiting emission in the cement sector  energy efficiency in chemical and steel industries  development of auto-generations in energy-intensive enterprises	legal obligation for energy audits in companies  criteria for using best available technologies (BAT)
Sector: buildings		
Increasing energy performance standards for buildings  'intelligent' buildings with near zero-energy balance  using RES technologies integrated with buildings  implementing energy saving equipment and installations  local district heating	systematically increasing energy performance for buildings  new materials and construction technologies  new zero-energy buildings  Implementing RES	Promotion of Building Energy Management systems, optimizing energy utilization  Support for modernization the New Energy Efficient Act and its role for buildings
Sector: agriculture		
improvement of fertilising management  biogasification  improvement of feed  promotion of extensive agronomy and agriculture  sustainable improvement of productivity  carbon sequestration in soil and forest areas  production of liquid biofuels	low carbon agronomy methods  waste management including the development of biogas	dedicated support for agricultural biogas plants in the novelization of the RES act, including the implementation of a dedicated support scheme and preferences in the auction system

Source: own elaboration based on: European Commission (2011b); Mazurkiewicz and Pająk (2014); Ministerstwo Gospodarki (2015); Bednarski et al. (2017), IEA (2017c); Ministerstwo Energii (2017).

## CONCLUSIONS

National planning documents and legal regulations of a low-emission economy are convergent and closely related to EU policy. The programmes incorporated by public administration authorities in Poland refer to general regulations in the field of environmental protection, spatial planning, sharing information and domain areas. The basic planning documents for municipalities are Low-Emission Economy Plans, which complement other documents in the field of environmental protection (Air Protection Plans, Low Emission Reduction Plans).

Photovoltaic technologies, onshore wind energy and electric vehicles are considered to be the most developmental in the field of renewable energy sources. Organizational, financial and fiscal solutions, which limit emissions, include energy efficiency and financing mechanisms for low-emission investments. The significance of the maturity of RES technologies in terms of grid parity, economic competitiveness with conventional sources, achieved without subsidies and other forms of support, are also growing.

Regional Operational Programmes of voivode-  
ships provide investment support in the field of a low-emission economy in the financial perspective of 2014–2020 in the scope of: generation and distribution of energy from renewable sources, including high-efficiency cogeneration, energy efficiency in public buildings, the housing sector and enterprises. Local activities are recommended, which are decided on by local governments, especially in urban areas focused on mobility and adaptation activities.

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