

**INDIVIDUAL REGIONAL BASELINE REPORTS  
ON LOW CARBON INVESTMENTS FUNDING**

**MAZOVIA REGION**

## Preface

Present Individual Regional Baseline Reports on Low Carbon Investments Funding is a strategic document to be delivered for seven Partner Regions under the Project entitled “PROmoting regional Sustainable Policies on Energy and Climate change mitigation Towards 2030” funded by the Interreg CENTRAL EUROPE Programme.

Partner Region: Mazovia Region

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Appendix 2.: Fact sheet(s) to decentralised regional operative programmes

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## 1. Background

The Data Collection and Reporting Guide (D.T1.1.1) is the initial task foreseen under the Work Package “T1 Assessment of availability and use of public funds supporting climate change mitigation”. The aim of T1 is to assess the use of public funds dedicated to climate change mitigation in the 2014-20 period with particular focus on development of RES. The overall objective of T1 is to deliver policy recommendations targeting mainly the macro-regional strategies (EUSDR, EUSAIR, EUSBSR, EUSALP) developed in CE.

The starting point of T1 is a baseline assessment of the use of available funding for low-carbon investments in the participating regions from 2014 onwards. The funding schemes to oversee include the followings in particular:

- Decentralised funds made available from the ESI Funds through the Partnership Agreements (national, sectoral or regional operative programmes);
- EU low-carbon initiatives (H2020, LIFE, EFSI, ELENA, Jessica, SEFF schemes);
- National/federal funding schemes (grants, subsidized loans, feed in tariffs, building integrated RES schemes); and
- Cooperation with private stakeholders (EPC, ESCO schemes, crowdfunding, venture capital, etc.).

The analysis, carried out by all Project Partners (PP) in the coordination of PP8, will assess the appropriateness of funding policies, administrative procedures, planning and implementation structures, dedicated resources and impacts in environmental and economical terms. Where relevant, the environmental impacts will address the whole lifecycle of the supported RES projects. The economic analysis should particularly focus on the cost-effectiveness of the use grants and exploring best practices concerning innovative low-carbon financing solution leveraging to maximum extent private financial resources.

The participating regions and the PP responsible for the elaboration of the reports are given in the table below.

Region	PP	Abbreviated name of PP	Deliverable ID
Piemonte Region	LP	REGPIE	D.T2.2.1
Friuli Energy	PP6	RAFVG	D.T2.2.2
EcoEnergyland	PP7	EEE	D.T2.2.3
Saxony-Anhalt	PP9	HSDM	D.T2.2.4
Split and Dalmatia County	PP4	EIHP	D.T2.2.5
Mazovia Region	PP3	MAE	D.T2.2.6
Southern Great Plain Region	PP8	AACM	D.T2.2.7

The data collection for the individual regional baseline reports will base on publicly available data and interviews. Compliance with the GDPR rules will remain the responsibility of each Project Partner (PP) involved.

## 2. Presentation of the target region

### 2.1. General presentation of the target region

Mazovian Voivodeship is the largest of the sixteen Polish voivodeships (regions). It is located in the central and eastern part of Poland. It is bordered by six other voivodeships: Warmian-Masurian to the north, Podlaskie to the north-east, Lubelskie to the south-east, Świętokrzyskie to the south, Łódzkie to the south-west, and Kuyavian-Pomeranian to the north-west.



Source: Wikipedia [https://pl.wikipedia.org/wiki/Wojew%C3%B3dztwo\\_mazowieckie#/media/File:Masovian\\_in\\_Poland\\_\(%2Bdrivers\).svg](https://pl.wikipedia.org/wiki/Wojew%C3%B3dztwo_mazowieckie#/media/File:Masovian_in_Poland_(%2Bdrivers).svg)

The voivodeship is located mostly in the Central European Lowland, only its small eastern fragments are located in the Eastern Baltic-Belarusian Lowland, and the southern ones in the Polish Highlands. The shape of the surface is mostly Mazovian lowlands consisting of vast plateaus, which are separated by valleys of large rivers. In the middle of the territory there is a valley depression, the Central Mazovian Lowland, with the Warsaw Valley in the center. Larger rivers flow into it: Narew, Wkra, Bug, Pilica, Bzura, Liwiec, Świder, and the waters are discharged westwards by the Vistula.

According to data Mazovian Voivodeship had 5 403 400 inhabitants, which constituted at about 14% of the Polish population. Mazovian Voivodeship is a voivodeship with the largest population in Poland.

The main character of the settlements is the small and medium-village-type. About 40% of the municipalities are inhabited by 5.000 to 10.000 inhabitants, one third of the municipalities are smaller, with less than 5.000 inhabitants and also one third of municipalities are between 10.000 -50.000 inhabitants

Mazovia is one of the most economically developed regions in Poland. Warsaw drives the economy of Mazovia but constantly increasing role of a western Warsaw subregions is noticeable. Residents of Mazovian Voivodeship have very good life perspectives if compared to the status of persons from other regions in Poland. It is confirmed by figures indicating the lowest unemployment rate and relatively high level of income. The area is characteristic of high diversity of business activity, considerable financial outlays for development of science, high education level of population, high activity of residents and varied professional qualifications. Those factors affect the advantage of the Mazovian Voivodeship over other voivodeships in the country. Mazovia is one of the most economically developed regions in Poland. The region is the fastest developing region in reference to developed regions in European Union as a result of the highest participation in GDP generation of the country and high pace of growth of the economy. GDP growth within the metropolitan area is based on trade/services, storage and logistics. Service sector plays also dominant role in the city of Warsaw. Mazovian Voivodeship has one of the lowest unemployment rate region in the country.

## 2.2. Potentials for low-carbon sector development

This section is dedicated to the description of the EE and RES profile of the Mazovian region.

### 2.2.1. Energy efficiency

The goals of the Energy Efficiency Directive are accepted by the government of Poland. The report on the implementation of the Energy Efficiency Directive (2012/27 / EU) states that the Energy Efficiency Directive: insufficiently implemented but nevertheless provides a framework for energy efficiency. Controversial legislation hampers ecological success, increases bureaucracy and increases energy costs, and that more coherent energy legislation is needed.

From January 2017, EP limit values for newly built buildings and certain U factors for external partitions of buildings have changed, in line with the provisions of the ordinance amending the Regulation on technical conditions to be met by buildings. The gradual introduction of the regulation is aimed at adapting all the participants of the construction market to the legal requirements in force. This solution aims to fulfill the provisions of art. 9 sec. 1 of the Energy Performance of Buildings Directive, which states that until 31 December 2020 all new buildings should be buildings with almost zero energy consumption. The modifications concern the permissible values of the EP index (this index determines the building's demand for non-renewable primary energy) and the heat transfer coefficient of the external partitions (ie external and internal walls, roofs, ceilings, windows, doors, etc.), which can not exceed the limits Provisions of the Regulation of the Minister of Infrastructure

### 2.2.2. Renewables

The area of the Mazovian Voivodeship lies in the area of favorable conditions for the development of RES. Unfortunately, the enacted law on the location of wind farms (2016) slow down and even stopped the development of this industry. However, the latest energy

auctions held in December 2019 indicate that this sector might be again on the grow from 2020. As for hydro power still Wisła (the largest river in Mazovian Voivodeship and in Poland) energy potential is not fully utilized. Solar energy installations are on increasing trend since a few years (most recently 100% rise annually). Unfortunately meteorological conditions in Poland are characterized by very uneven distribution of solar radiation in the annual cycle and that causes lower annual energy production.

### Hydro power

The most favorable conditions for the construction of flow plants exist on the river Vistula. The rivers of Radomka, Wkra, Prawny Law, Orzyc, Itzanka and Liwiec enable the development of small hydropower plants. In many rivers (Wkra, Radomka) there are former water reservoirs suitable for energetic use (around 150). The energy potential of the Vistula River is still not used. Since the construction of large hydro power plants is associated with significant financial expenditures, the future development of small hydropower plants, which is characterized by relatively low investment expenditures, relatively short return period and ecological advantages can be foreseen in the future. According to the Energy Regulatory Authority data, there are 22 installations operating in the Mazovian Voivodeship with a total installed capacity of about 22 MW.

### Solar power

Average annual insolation for Mazovian Voivodeship range from 1400-1550 in the western part, and 1600-1650 in the east. Total solar radiation is 985 kWh/m<sup>2</sup> in the western part and 1081 kWh/m<sup>2</sup> in the east. The general conditions of sunshine in the Mazovian Voivodeship are good and therefore solar installations can be used throughout. The conditions of solar energy development are similar in the entire Mazovian Voivodeship. Large urban agglomerations are characterized by slightly worse conditions (due to increased levels of air pollution), while the use of solar energy is greater in them due to a much higher density of power and thermal energy demand. Most of the voivodeship's area is characterized by annual total radiation ranging from 1 000 - 1 050 kWh/m<sup>2</sup>. Only in the western part of the voivodeship average annual radiation exceeds 1055 kWh/m<sup>2</sup>.

### Wind power

In terms of airiness, Mazovia Region is characterized by great territorial variability. There are areas where wind energy can be successfully used and estimated at about 40% of the country's area, with a minimum profitability of 1000 kWh/m<sup>2</sup>/year at 30 m above the ground. The wind speed and frequency of repetition of certain speed values determines the amount of electricity produced per year and the profitability threshold is determined for an annual average wind speed of more than 4 m / s. Under such conditions, the annual capacity utilization of wind turbines is between 1500 and 2500 hours This means that the maximum installed capacity is between 17 and 28%. The area of the Mazovian voivodeship lies in the area of favourable conditions and very favourable wind resources. It is estimated that half of the voivodeship is located in areas where it is possible to use the wind at 2000 hours per year and the potential at 1300 kWh / m<sup>2</sup> / year. Areas with the most favourable winds are

the ones located in the western part of the voivodeship, including the districts of ciechanowski, garwoliński, mławski, płocki and płoński. Unfortunately, the enacted law on the location of wind farms (2016) slow down and even stopped the development of this industry.

### Geothermal energy

The Mazovian voivodeship is located in the Polish Lowlands In the geological district of Grudziądz - Warsaw. The area is approximately 70 thousand. km<sup>2</sup> with geothermal waters of 25-135 degrees Celsius, occurring in Triassic, Cretaceous and Jurassic decks, with total resources of 3,100 km<sup>3</sup>. The heat resources are estimated at 168 000 t.p.u./km<sup>2</sup>. This gives an average of 44 million m<sup>3</sup> of geothermal water per km<sup>2</sup> of surface area. The most favorable conditions for the use of geothermal energy are found in counties: Gostynin, Płock, Żuromin, Płoński, Sierpc, Sochaczew, Żyrardów.

### Waste

Mazovian voivodeship is the largest voivodeship in the country, both in terms of area and number of inhabitants. The largest number of inhabitants results in the largest amount of municipal waste collected in the country. The inhabitants of Mazovia produce about 2 mln Mg (tonnes) of municipal waste annually. These are non-sorted waste. Unfortunately, only a small percentage of waste is disposed of using modern thermal methods. There is also no well-developed system for controlling selective waste collection, for example with glass, paper, plastic and other waste. The current system operates mainly on the basis of single-municipal landfills not related by a complex system. Moreover, new public regulation is badly needed to implement many waste-to-energy investment projects that are still in the planning stage.

## 2.3. Regional low-carbon policies, institutional framework and policy

### Development strategy for the Mazovian Voivodship until 2030

In Mazovia Voivodeship there is a document that includes stated low-carbon policy of the region. The document is called Development strategy for the Mazovian voivodship until 2030 created by the Mazovian Voivodship Government (available [here](#)) The strategy, in one of its framework goals, is to provide the region's economy with a diversified energy supply with sustainable management of environmental resources. Strategy directions for this purpose are:

1. Diversification of energy sources and its efficient use
  - Development and pro-ecological modernization of installations for the production of electricity and heat in the region, including an increase in the share of energy obtained from renewable sources
  - Developing cross-border energy and gas connections and analyzing the possibilities and costs of using shale gas and possible construction of a system for its acquisition and transmission

- Improving energy efficiency
2. Supporting the development of ecological industry and eco-innovation
    - Creating organizational and financial conditions for knowledge transfer and eco-innovation
    - Stimulating the development of the ecological industry through the creation of economic and organizational support mechanisms
  3. Ensuring sustainable development and maintaining high environmental values
    - Counteracting fragmentation of the natural space and increasing the forest cover of the region
    - Monitoring of environmental pollution
    - Achieving and maintaining good status and ecological potential of waters and related ecosystems
    - Counteracting the water deficit
    - Protection of forests and valuable natural areas
    - Spreading ecological awareness
    - Air protection and noise protection
    - Rational planning of land functions taking into account the needs of environmental protection
  4. Modernization and development of local energy networks and improvement of transmission infrastructure
    - Improving local energy security through the modernization and expansion of local distribution networks
    - Expansion and modernization of the power transmission system, including adaptation to receive energy from distributed sources
    - Expansion and modernization of the natural gas and liquid fuels transmission infrastructure
  5. Counteracting natural hazards
    - Increasing the level of flood protection and preventing landslides
    - Adaptation of agriculture to climate change
  6. Improving water quality, recovery / disposal of waste, restoration of contaminated areas and reduction of pollution emissions
    - Reducing the environmental load caused by emissions of pollutants into water, atmosphere and soil
    - Organizing and creating a coherent waste management system
  7. Production of energy from renewable sources
    - Increasing the use of renewable energy sources in rural areas
    - Improving the security of the city's energy supply through construction and modernization of local energy production installations with particular emphasis on cogeneration and polygeneration technologies as well as the use of renewable energy sources.

The Strategy is being updated at present due to the year perspective and technological and political changes in the energy sector - eg. shift from shale gas to LNG.

### Air protection program for the Mazovian Voivodeship

Another document that include low-carbon policy of region is „Air protection program for the Mazovian Voivodeship till year 2022” The main goal of the program is: "Ensuring the region's economy of a diversified energy supply with sustainable management of environmental resources". This goal is to be achieved through the implementation of activities under the following directions:

- diversification of energy sources and its efficient use as well as improvement of transmission infrastructure (improvement of energy security);
- modern infrastructure of energy supply from various sources (development and pro-ecological modernization of installations for the production of electricity and heat in the field, including the use of energy obtained from active sources);
- production of energy from renewable sources (use of renewable energy sources for used groups);
- covers sustainable development and development as well as preservation of high environmental values;
- development of the development of ecological industry and eco-innovation;
- counteracting applied threats;
- investments related to water treatment and waste utilization, renovated contaminated areas, reduction of consumption;
- modernization of local energy networks (improvement of power supply security in urban energy by including and modernizing local energy production installations with a particular use of cogeneration and poly-generation technologies and renewable energy applications);
- using cultural resources and cultural heritage as well as natural environment assets for the development of the region and improving the quality of life.

The goals related to access to the service include not only in the environment and energy, but also in the field of space and transport, as part of the following than those related to the directions of activities:

- development of environmentally and community-friendly forms of transport,
- preventing excessive suburbanization and creating spatial order.

### Resolution on introducing restrictions and bans on the operation of installations in which fuel is burning in the Mazovian Voivodship - “Anti-smog resolution”

This document introduced restrictions and bans on the operation of installations in which solid fuels are burned, in particular stoves, fireplaces and boilers, if they:

- 1) provide heat to the central heating system,
- 2) provide heat to the drinking water heating system,

3) emit heat by direct heat transfer, direct heat transfer in combination with heat transfer to liquid, direct heat transfer in connection with a hot air distribution system.

It prohibits the use in the installations of: sludge and carbon concentrates and mixtures produced with their use; brown coal and solid fuels produced using this coal; hard coal in loose form, grain size 0-3 mm; fuels containing biomass with an operating humidity above 20%.

The resolution also allows installations ensuring minimum levels of seasonal energy efficiency and pollutant emission standards.

### Plans of heat, electricity and gas fuels supply

The energy planning process is in accordance with the assumptions of the currently applicable legal regulations implemented mainly at the commune level. Planning and organizing the supply of heat, electricity and gas fuels within the commune is one of the commune own tasks. According to the provisions of the Energy Law, it is the head of the municipality (mayor, city president) who is responsible for developing draft assumptions for the plan for supplying heat, electricity and gas fuels. The Act specifies the frequency of preparation of the draft assumptions (at least for a period of 15 years) and its update (every 3 years) and lists the elements it should contain. Competence in energy planning is not implemented by any poviát level authority. In turn, the powers and obligations of authorities at the voivodship level were limited to providing opinions on the coordination of cooperation with other communes, as well as testing compliance with the energy policy of the country's energy and fuel supply plans (i.e. documents prepared in a situation where the development plans of energy enterprises do not ensure the implementation of the assumptions for the plan for the supply of heat, electricity and gas fuels adopted earlier in the commune).

### Low carbon economy plans (PGN)

The obligation to create a low-carbon economy plan is not enforced by law. It is the decision of municipal councils and local communities that recognize the benefits of drawing up such a document. It is necessary to obtain EU funds in 2014-2020. Hence the convergence of PGN's time perspective with the new EU financial perspective that serves the implementation of the Europe 2020 Strategy. One of the thematic objectives of cohesion policy in 2014-2020 is precisely to support the transition to a low-carbon economy in all sectors. Low-carbon economy plans should cover the entire geographical area, managed by local authorities, and contain low-carbon and resource-efficient activities, including energy efficiency improvements and the use of local renewable energy potential. The priority of the Low Emission Economy Plan should be to reduce final energy consumption by entities located in the area covered by the plan. PGN should cover compulsory sectors of the economy in which local authorities have an impact on energy consumption, i.e. in the sector of public buildings and municipal housing, technical infrastructure, including street lighting, heating system and transport. PGN is a comprehensive document - in addition to activities in the public sector, it should cover as much as possible the private sector, i.e. the participation of local entities that are producers or consumers of final energy, including cooperatives and housing associations, trade, services and industry, as well as transport.

### 3. Decentralised funds made available from the ESI Funds through the Partnership Agreements

This Chapter is dedicated to the assessment of the relevant decentralized components of EU funding between 2014 and 2020 that is committed and disbursed within the competence of the Member States.

The programming and implementation of the EU Structural and Investment Funds (ESIFs) is conducted within a multi-annual framework covering the period of 2014-2020. Regulation (EU) N° 1303/2013 lays down common provisions applicable to the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). These Funds operate under a common framework known as the European Structural and Investment Funds. The Regulation also sets out the provisions necessary to ensure the effectiveness of the ESIF and their coordination with one another and with other EU instruments.

ESIFs include both program elements decentralised on to the EU Member States and program elements managed centrally by the European Commission or its executive bodies in accordance with the principle of subsidiarity. However, the major part of ESIFs (approximately 75%) is utilised by the Member States within a decentralised implementation system.

Each Member State has concluded a Partnership Agreements with the European Commission. The Partnership Agreements uniformly provide funding for eleven Thematic Objectives defined by the European Commission. The Thematic Objectives include:

- TO1 - Strengthening research, technological development and innovation;
- TO2 - Enhancing access to, and use and quality of ICT;
- TO3 - Enhancing the competitiveness of SMEs, of the agricultural sector (for EAFRD), and of the fishery and aquaculture sector (for EMFF);
- **TO4 - Supporting the shift towards a low-carbon economy in all sectors;**
- TO5 - Promoting climate change adaptation, risk prevention and management;
- TO6 - Preserving and protecting the environment and promoting resource efficiency;
- TO7 - Promoting sustainable transport and removing bottlenecks in key network infrastructures;
- TO8 - Promoting sustainable and quality employment and supporting labour mobility;
- TO9 - Promoting social inclusion, combating poverty and any discrimination;
- TO10 - Investing in education, training and vocational training for skills and lifelong learning;
- TO11 - Enhancing institutional capacity of public authorities and stakeholders and efficient public administration

All Partnership Agreements provide a matrix of the above Thematic Objectives (TOs) versus the structural instruments (ERDF, ESF, CF, EAFRD, EMFF; regional development, social inclusion, cohesion, agricultural & rural development and fishery funds).

The Member States are responsible to define national, sectoral or regional Operational Programmes (OPs) and ensure the translation of the Thematic Objectives onto OPs. TOs are translated into Operational Programmes (OPs) by each country in a different way. The low-carbon sector related activities may be addressed through several OPs. The OPs are typically broken down into Priority Axes (PAs) and measures within the specific PAs.

### 3.1. National/federal horizontal (sectoral) operative programmes

#### Infrastructure and Environment Program 2014-2020

The Infrastructure and Environment Program 2014-2020 is a national program supporting the low-carbon economy, environmental protection, counteracting and adapting to climate change, transport and energy security with a total budget of EUR 27.4 billion. Areas of support and types of projects that can be implemented from the program are:

1. Reducing the emission of the economy
  - production of energy from renewable energy sources (RES);
  - improving energy efficiency and the use of renewable energy sources in enterprises, the public and housing sectors;
  - promoting low-carbon strategies;
  - development and implementation of intelligent distribution systems.
2. Environmental protection, including adaptation to climate change
  - development of environmental infrastructure;
  - adaptation to climate change;
  - protecting and stopping the decline of biodiversity;
  - improving the quality of the urban environment.
3. Development of the TEN-T road network and multimodal transport
4. Road infrastructure for cities
5. Development of rail transport in Poland
6. Development of low-emission collective transport in cities
  - infrastructure and rolling stock for public collective transport in cities and in their functional areas.
7. Improving energy security
  - development of intelligent systems for the distribution, storage and transmission of natural gas and electricity;
  - construction and development of natural gas storage facilities;
  - expansion of the LNG terminal.
8. Protection of cultural heritage and development of cultural resources
9. Strengthening the strategic health care infrastructure

The Infrastructure and Environment Program is financed from three sources:

- the European Regional Development Fund, of which EUR 4,905.9 million is intended for the program,
  - Cohesion Fund, amounting to EUR 22 507.9 million,
  - National funds - public and private, with a minimum commitment of EUR 4,853.2 million.
- The final commitment of national resources, mainly private, at the closure of the program will be much higher. The indicated amount was calculated on the basis of general EU principles, according to which the minimum contribution of national funds in 15 less-

developed voivodships is 15%, and in Mazovian voivodship 20%. However, many projects in this program will include state aid, which will require a higher national contribution from project implementers, mainly from private funds.

The division of European Funds into individual areas requiring support is as follows:

Priority	Fund	Region category	UE contribution	National contribution	Financing altogether
I. Reducing the emission of the economy	FS	n/d	1 828 430 978	322 664 291	2 151 095 269
II. Environmental protection	FS	n/d	3 508 174 166	619 089 559	4 127 263 725
III. Development of the TEN-T road network and multimodal transport	FS	n/d	9 532 376 880	1 682 184 157	11 214 561 037
IV. Road infrastructure for cities	EFRR	Less developed	2 906 517 988	512 914 940	3 419 432 928
		Better developed	63 788 191	15 947 049	79 735 240
V. Development of rail transport in Poland	FS	n/d	5 009 700 000	884 064 706	5 893 764 706
VI. Development of low-emission collective transport in cities	FS	n/d	2 299 183 655	405 738 293	2 704 921 948
VII. Improving energy security	EFRR	Less developed	971 806 937	171 495 343	1 143 302 280
		Better developed	28 193 063	7 048 266	35 241 329
VIII. Protection of cultural heritage and development of cultural resources	EFRR	Less developed	416 540 167	73 507 090	490 047 257
		Better developed	50 759 833	12 689 959	63 449 792
IX. Strengthening the strategic health care infrastructure	EFRR	Less developed	400 595 249	70 693 280	471 288 529
		Better developed	67 679 778	16 919 945	84 599 723
X. Technical Support	FS	n/d	330 000 000	58 235 295	388 235 295
<b>TOTAL</b>			<b>27 413 746 885</b>	<b>4 853 192 173</b>	<b>32 266 939 058</b>

Depending on the type of entity benefiting from support and the specificity of the project, the financing structure varies. The first basic rule says that only the so-called eligible costs. The catalogue of such costs is specified for each program and type of project. If there is a

need to implement actions that were not on the list of eligible costs, they should be financed from own resources. In some projects financed under the Infrastructure and Environment program, it is required that their implementers participate in costs, bringing the so-called own contribution. This rule applies to projects in which public aid occurs. Beneficiaries receive funding in the form of:

- reimbursement - the support paid is a refund of all or part of the expenditure actually incurred by the project implementer and financed from his own funds
- advance payment - paid against planned expenses.

The final settlement is always made on the basis of documents indicating actual and correctly incurred expenses. The Infrastructure and Environment Program envisages the use of repayable forms of support for selected support areas that are important from the point of view of reducing the economy's emissions. The combination of returnable and non-returnable financing will allow for greater involvement of public and private funds in achieving the program objectives. In addition, public funds will be able to be used in the long run. Various projects are financed from the Infrastructure and Environment Program. Depending on the specifics of a given type of support, the type of entities that can use it is determined. We can distinguish the following groups of entities authorized to apply for support:

- Local government units,
- Enterprises with public goals,
- Public administration,
- Public services other than administration,
- Health care institutions,
- Culture, science and education institutions,
- Large enterprises,
- Small and medium companies,
- Social organizations and religious associations.

Restrictions may relate to competences and experience or the area of business.

The effects of the Infrastructure and Environment Program 2007-2013 in the Energy and Environment category are:

- 2,536 km of gas pipeline networks constructed
- 560 objects subjected to thermomodernization
- 917 MW of installed electrical capacity
- 17,675 constructed or modernized sewage system
- 39 newly built incinerators and composting plants
- 204 km of levees

### 3.2. Decentralised regional operative programmes

MV ROP 2014-2020 is a tool for implementing the development policy pursued by the Mazovian Voivodship Government. MV RPO 2014-2020 assumes further improvement of potentials through economic growth based on entrepreneurship, absorbent labor market, as well as sustainable development of regional resources. At the same time, the actions undertaken are to comprehensively contribute to the effective use of human capital through initiatives for social inclusion and education of the inhabitants of Mazovia and improvement of the quality of services provided by regional and local public administration. Interventions in the region will be undertaken both in cities and in rural areas to the extent provided for in ROP WM 2014-2020.

The main objective of MV ROP 2014-2020, i.e. intelligent, sustainable development increasing social and territorial cohesion using the potential of the Masovian labor market will be achieved through strategic goals constituting the answer to three basic challenges of the Europe 2020 Strategy, in the context of supporting intelligent, sustainable and inclusive development:

- The development of a competitive economy of the region based on innovation, entrepreneurship, an absorbent labor market and sustainable resources.
- Counteracting regional disparities leading to increased absorption of the regional labor market through equalization of access to employment, social inclusion and education.
- Support for activities strengthening the sustainable development of the environment in Mazovia.

The Program activities have been designed in such a way as to direct the largest pool of funds to support areas that effectively implement the objectives and results specified in the Program. Emphasis has been placed on ensuring efficiency and effectiveness of projects, complementarity of infrastructure and soft projects while maintaining the principle of CT concentration. The justification for the allocation for each thematic objective and investment priority as required by the thematic concentration has been grounded in the results of the ex-ante evaluation. MV RPO 2014-2020 will be implemented in eleven Priority Axes (OP), including ten thematic axes and one dedicated Technical Assistance axis:

- I. Use of research and development activities in the economy budget EUR 278 217 130
  - Specific objective 1: Increased marketisation of research and development activities
  - Specific objective 2: Increased research and development activity of enterprises
- II. Increase in Mazovia's e-potential budget EUR 153 599 843
  - Specific objective 1: Increased use of public e-services
- III. Development of innovation potential and entrepreneurship budget EUR 196 343 025
  - Specific objective 1: Improved conditions for the development of SMEs
  - Specific objective 2: Increased level of foreign trade in the SME sector
  - Specific objective 3: Increased use of innovation in enterprises of the SME sector
- IV. Transition to a low carbon economy EUR 400 647 506
  - Specific objective 1: Increasing the share of renewable energy sources in total energy production
  - Specific objective 2: Increased energy efficiency in the public and housing sectors
  - Specific objective 3: Better air quality
- V. Environment-friendly economy budget EUR 68 356 155
  - Specific objective 1: Improving the effectiveness of limiting the effects of natural disasters
  - Specific objective 2: Increased share of waste collected selectively in the total mass of waste in Mazovia
  - Specific objective 3: Increased accessibility and development of the region's cultural resources
  - Specific objective 4: Reinforced protection of biodiversity in the region
- VI. Quality of life budget EUR 136 411 947
  - Specific objective 1: Increased quality of efficiently provided high standard health services in priority areas
  - Specific objective 2: Revitalizing marginalized areas by restoring or giving them new socio-economic functions
- VII. Development of the regional transport system budget EUR 311 110 711

Specific objective 1: Improving the coherence of the regional road network with the TEN-T network and increasing internal and external accessibility

Specific objective 2: Increasing the share of rail transport in passenger transport and improving the quality of services rendered in regional rail transport

VIII. Development of the labor market budget EUR 140 702 055

Specific objective 1: Increasing employment of people who have been identified as at risk in the labor market

Specific objective 2: Return to professional activity of persons caring for children under 3 years of age

IX. Supporting social inclusion and combating poverty budget EUR 172 908 433

Specific objective 1: Increasing the employability of people excluded and at risk of social exclusion and preventing social exclusion and poverty

Specific objective 2: Increasing access to social services for people at risk of poverty or social exclusion, in particular environmental services as well as family support services and foster care

Specific objective 3: Increasing the availability of health care services

Specific objective 4: Increasing employment in social economy entities and the scope of their activities

X. Education for the development of the region budget EUR 158 551 614

Specific objective 1: Increasing students' key competences and universal skills necessary in the labor market and the development of an individual approach to the student, especially with the largest and special educational needs;

Specific objective 2: Increasing access to high quality pre-school education;

Specific objective 3: Supporting adults in lifelong learning by acquiring and / or raising competences;

Specific objective 4: Increasing employability of students of vocational schools and educational institutions;

Specific objective 5: Increasing the chances of adults on the labor market by participating in vocational education and training

XI. Technical Assistance EUR 729 917 19 budget

MV ROP 2014-2020 is a program financed from two European funds: the European Regional Development Fund and the European Social Fund. The area of the Program implementation is the area of the Mazovian Voivodeship. The voivodship is included in the more developed regions with a special status as a formerly underdeveloped region. The distribution of funds between the country and the region ensures the participation under the MV ROP 2014-2020 59% of ERDF and 47% of ESF resources. Funds for the Program constitute about 55% of the allocation for the region, which means the ERDF allocation in the amount of EUR 1 544 686 317 and ESF in the amount of EUR 545 153 821 respectively. In total, under the MV ROP 2014-2020, the estimated allocation is 2 089 840 138 euros. The ERDF to ESF ratio is 74% to 26% respectively, while the level of EU co-financing is up to 80% for the Priority Axis. Public and private domestic funds will be involved in the implementation of the Program.

In axis IV. The transition to a low carbon economy is to reduce the economy's emissions. As part of the measures, it will be possible to apply for support for investments related to the production of electricity and heat from renewable sources along with the construction and modernization of distribution networks. The scope of support also includes projects in the field of comprehensive thermomodernization of public buildings and residential buildings. As part of

the Axis, investments in the development of sustainable multimodal urban mobility and reduction of low emissions by improving the efficiency of heat generation and distribution will also be supported. The amount of the fund for this axis was ERDF EUR 400 647 506.

Specific objective 1: Increasing the share of renewable energy sources in total energy production - budget EUR 54 475 309. Types of projects financed for this purpose are:

1. Infrastructure for the production and distribution of energy from renewable sources. The support will cover projects involving the construction, extension and reconstruction of infrastructure aimed at the production of electricity and / or heat. In particular, investments in construction / reconstruction:

- a. installations / generating electricity / heat using wind, solar (photovoltaic, solar collectors), biomass, biogas, geothermal, heat pumps and water (together with possible connection to the distribution / transmission network);
- b. installations for the production of biocomponents and second and third generation biofuels

The main target group of intervention are individual users, entrepreneurs and the public sector interested in supporting the increase in the share of renewable energy sources in energy production and the development of prosumer energy.

Specific objective 2: Increased energy efficiency in the public and housing sectors - budget EUR 104 541 043 Types of projects financed for this purpose are:

1. Thermomodernization of public buildings.

Under this measure, investments in the field of improving the energy efficiency of public buildings will be supported, in particular by promoting its comprehensive dimension, i.e. deep energy modernization, including the possibility of exchanging heat sources and the possibility of using renewable energy sources (as part of the project).

2. Thermomodernization of residential buildings.

As part of this measure, investments in the improvement of energy efficiency of multi-family and single-family residential buildings will be supported, in particular by promoting its comprehensive dimension, i.e. deep energy modernization, including the possibility of exchanging heat sources and the possibility of using renewable energy sources (as part of the project).

3. High-efficiency cogeneration

- construction and development of electricity and heat generation units in high-efficiency cogeneration 30, including renewable energy,
- reconstruction of heat generating units, as a result of which these units will be replaced by energy generating units in high-efficiency cogeneration. As part of the above projects, it is also possible to build connections to the heating / cooling and electricity grids constituting the design element for units producing electricity, heat and cooling in cogeneration.

Specific objective 3: Better air quality - Measure 4.3 Reduction of air pollution is divided into sub-measures:

Sub-measure 4.3.1 Limiting air pollution and developing urban mobility

Sub-measure 4.3.2 Urban mobility as part of the ITI

The main purpose of intervention under the measure is to improve air quality by reducing pollutant and greenhouse gas emissions of anthropogenic origin from surface and linear sources caused by increased road traffic. Types of projects financed for this purpose are:

Sub-measure 4.3.1

#### 1. Limiting "low emissions"

Under the measure, support will be granted for the implementation of projects related to the elimination of "low emissions" in the region. The intervention in action will be directed at the implementation of the heating / cooling network connections and the replacement of old boilers, furnaces, heating devices using solid fuels. Electric, oil, biomass-burning boilers (e.g. wood, pellets) or gas fuels, excluding coal stoves, will be supported. Support can only be given if the connection to the heating network is not economically justified.

#### 2. Development of sustainable multimodal urban mobility

The intervention under the Measure is aimed at increasing urban transport as an alternative to individual motorization in cities and their functional areas. Projects will be implemented to increase the use of low-emission and zero-emission collective transport and other environmentally friendly forms of urban mobility.

#### 3. Energy-saving outdoor lighting (streets, squares and roads)

- installation or modernization of external lighting (including replacement of: light sources, luminaires, igniters, power cables, poles, installation of new lighting points as part of modernized lighting lines;
- installation of devices for intelligent lighting control
- installation of controllable power reduction systems and stabilization of supply voltage

#### Sub-measure 4.3.2

##### 1. Development of sustainable multimodal urban mobility - ITI

Support will be given to projects focused on strengthening multimodal urban transport systems in the area covered by the ITI strategy.

The total budget for this action is EUR 241 631 154, sub-measure 4.3.1 EUR 127 698 810, and for sub-measure 4.3.2 EUR 113 932 344

## 4. Other EU low-carbon initiatives

The purpose of this Chapter is to identify and assess individual EE and/or RES projects in which at least one project partner from your region plays a dominant role and/or the implementation partly or wholly realized in your region. Project of interest are those that have been funded from 2014 onwards. The projects are to be identified from public sources or via interviews.

### 4.1. EU initiatives managed by the European Commission

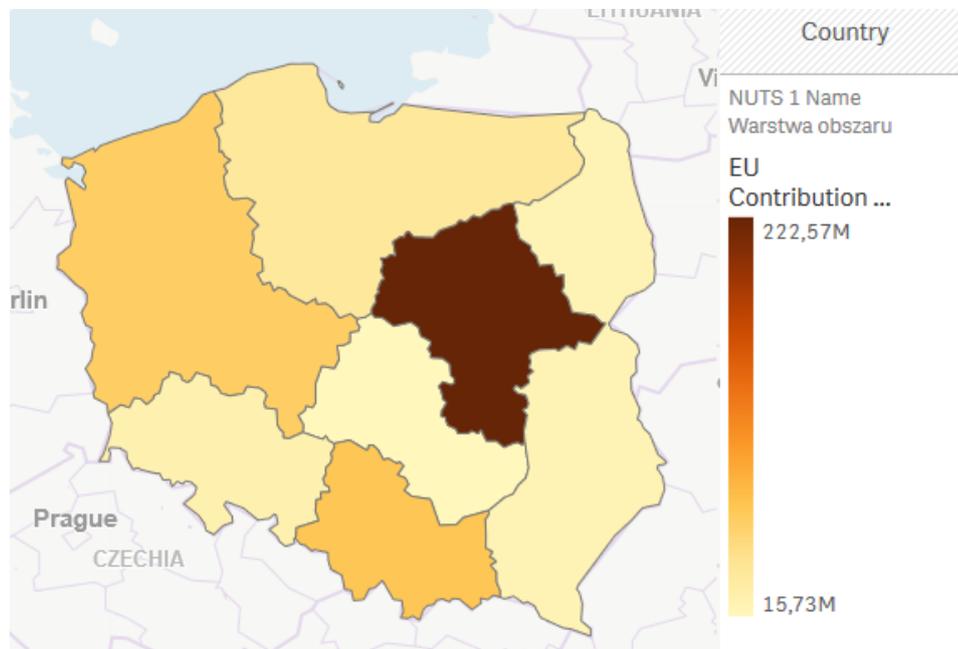
#### 4.1.1. Horizon 2020 Programme

Horizon 2020 is the biggest research and innovation programme with nearly €80 billion of funding available over 7 years (2014 to 2020). Work Programmes '10. Secure, clean and efficient energy' addressees

- Energy efficiency focusing on buildings, industry, heating and cooling, SMEs and energy-related products and services, integration of ICT and cooperation with the telecom sector;

- Low carbon technologies covering: photovoltaics, concentrated solar power, wind energy, ocean energy, hydro power, geothermal energy, renewable heating and cooling, energy storage, biofuels and alternative fuels, carbon capture and storage; and
- Smart cities and communities supporting the sustainable development of urban areas in particular in the areas of energy, transport and ICT.

Thanks to Horizon 2020 projects, in Mazovia Region more than 225M€ have been used in Innovation Actions or coordination and support actions (630 grants signed). The amount stands for more than 47% of the overall budget allocated in Poland. Mazovian Voivodeship is the first Region in the ranking of Poland. If we have a deeper look at NUTS3 level, the Warsaw city area stands out as the most active province for number of Horizon2020 participations with 222 M€ EU contribution. Mazovia Energy Agency participated in 4 Horizon project with total of €534.250 EU funds/



#### Number of project participations and Net EU Contribution

Legal Name	NUTS 2 Name	H2020 Net EU Contribution	H2020 Participations
<b>Totaux</b>		<b>€ 222.570.431</b>	<b>739</b>
FUNDINGBOX ACCELERATOR SP ZOO	Warszawski stołeczny	€ 26.224.230	17
UNIwersytet Warszawski	Warszawski stołeczny	€ 22.680.228	76
NARODOWE CENTRUM BADAN I ROZWOJU	Warszawski stołeczny	€ 16.746.866	39
SIEC BADAWCZA LUKASIEWICZ - INSTYTUT TECHNOLOGII MATERIAŁOW ELEKTRONICZNYCH	Warszawski stołeczny	€ 14.197.645	8
POLITECHNIKA WARSZAWSKA	Warszawski stołeczny	€ 9.600.257	38
INSTYTUT CHEMII FIZYCZNEJ POLSKIEJ AKADEMII NAUK	Warszawski stołeczny	€ 8.296.870	9
INSTYTUT PODSTAWOWYCH PROBLEMÓW TECHNIKI POLSKIEJ AKADEMII NAUK	Warszawski stołeczny	€ 5.401.850	35
INSTYTUT FIZYKI PLAZMY I LASEROWEJ MIKROSYNTEZY IM. SYLWESTRA KALISKIEGO	Warszawski stołeczny	€ 5.176.991	1
SIEC BADAWCZA LUKASIEWICZ-INSTYTUT LOTNICTWA	Warszawski stołeczny	€ 4.941.053	11
INSTYTUT BIOLOGII DOŚWIADCZALNEJ IM. M. NENCKIEGO POLSKIEJ AKADEMII NAUK	Warszawski stołeczny	€ 4.595.980	7
POLSKA AKADEMIA NAUK	Warszawski stołeczny	€ 3.960.215	4
SYNEKTIK SPÓŁKA AKCYJNA	Warszawski stołeczny	€ 3.687.250	1
SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO	Warszawski stołeczny	€ 2.850.008	14
SIEC BADAWCZA LUKASIEWICZ - PRZEMYSŁOWY INSTYTUT AUTOMATYKI I POMIARÓW PIAP	Warszawski stołeczny	€ 2.848.296	10
INSTYTUT ENERGETYKI	Warszawski stołeczny	€ 2.596.144	9
INTERNATIONAL INSTITUTE OF MOLECULAR AND CELL BIOLOGY	Warszawski stołeczny	€ 2.498.888	1
Instytut Geofizyki Polskiej Akademii Nauk	Warszawski stołeczny	€ 2.436.131	11
WARSZAWSKI UNIWERSYTET MEDYCZNY	Warszawski stołeczny	€ 2.352.598	4
BIOTREM SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ	Warszawski stołeczny	€ 2.288.075	2
KRAJOWA AGENCJA POSZANOWANIA ENERGII SPÓŁKA AKCYJNA	Warszawski stołeczny	€ 2.284.346	19
FUNDACJA PARTNERSTWA TECHNOLOGICZNEGO TECHNOLOGY PARTNERS	Warszawski stołeczny	€ 2.248.107	4
VIGO SYSTEM S.A.	Warszawski stołeczny	€ 2.233.525	5
INSTYTUT MATEMATYCZNY POLSKIEJ AKADEMII NAUK	Warszawski stołeczny	€ 2.196.587	4
ORANGE POLSKA SPÓŁKA AKCYJNA	Warszawski stołeczny	€ 2.012.423	8
BILLON DIGITAL SERVICES SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ	Warszawski stołeczny	€ 1.946.403	1
MOSTOSTAL WARSZAWA SA	Warszawski stołeczny	€ 1.846.840	8
IZNAB SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ	Warszawski stołeczny	€ 1.745.875	6
MIASTO STOLECZNE WARSZAWA	Warszawski stołeczny	€ 1.694.003	11
CENTRUM ASTRONOMICZNE IM. MIKOŁAJAKOPERNIKA POLSKIEJ AKADEMII NAUK	Warszawski stołeczny	€ 1.659.625	4
NAUKOWA I AKADEMICKA SIEC KOMPUTEROWA - PANSTWOWY INSTYTUT BADAWCZY	Warszawski stołeczny	€ 1.650.700	4
PANSTWOWY INSTYTUT GEOLOGICZNY - PANSTWOWY INSTYTUT	Warszawski stołeczny	€ 1.634.973	12

#### 4.1.2. LIFE Programme

The LIFE programme is the EU's funding instrument for the environment and climate action created in 1992. The current funding period 2014-2020 has a budget of €3.4 billion. The LIFE programme is divided in two sub-programmes, one for environment (representing 75% of the overall financial envelope) and one for climate change (representing 25% of the envelope).

The individual regional reports are expected to address the climate change component of the LIFE programme, only with a primary focus on the climate mitigation activities supports in the areas of renewable energies and energy efficiency as well as climate change mitigation strategies and action plans at local, regional or national level.

125 Projects were found from LIFE Programme in Poland, 86 with Poland as Lead Partner. In Mazovian Voivodship 46 project were founded, 18 related to low-carbon and energy focus presented below:

Project Title	Project Nr	Project Website	Year Of Finance	Lead Partner Country
Green Foundry LIFE - Inorganic binder system to minimize emissions, improve indoor air quality, purify and reuse of contaminated foundry sand	LIFE17 ENV/FI/000173	<a href="http://greenfoundry-life.com/">http://greenfoundry-life.com/</a>	2017	FI
LIFE SWEAP - Shipments of Waste Enforcement Actions Project	LIFE17 GIE/BE/000480	<a href="https://www.sweap.eu/">https://www.sweap.eu/</a>	2017	BE
LIFE Climate CAKE PL - System of providing and disseminating information in order to support the strategic implementation of climate policy	LIFE16 GIC/PL/000031	<a href="http://www.kobize.pl/pl/category/id/71/life-climate-cake-pl">http://www.kobize.pl/pl/category/id/71/life-climate-cake-pl</a>	2016	PL
REAL Alternatives 4 LIFE - Refrigerant Emissions Alternatives and Leakage - blended learning for low GWP refrigerants	LIFE16 GIC/UK/000007	<a href="http://www.realalternatives.eu/">http://www.realalternatives.eu/</a>	2016	UK
SOLID LIFE - "Solidia low CO2 cement : from cement production to precast industry"	LIFE15 CCM/FR/000116	<a href="http://www.solidlife.eu">http://www.solidlife.eu</a>	2015	FR
LIFEJustice for Nature - You have right to effective protection of nature	LIFE15 GIE/PL/000758	<a href="http://projekty.gdos.gov.pl/masz-prawo-cele">http://projekty.gdos.gov.pl/masz-prawo-cele</a>	2015	PL
LIFERADOMKLIMA-PL - Adaptation to climate change through sustainable management of water of the urban area in Radom City	LIFE14 CCA/PL/000101	<a href="http://life.radom.pl">http://life.radom.pl</a>	2014	PL
LIFE EMU-NEW - Proecological pilot installation for fabrication of asphalt emulsions modified by nanostructural waste polymers	LIFE14 ENV/PL/000370	<a href="http://www.emunew.pl">http://www.emunew.pl</a>	2014	PL
LIFE_WZROST_PL - Implementation of Sustainable Development based on Socially Responsible Transformation	LIFE14 GIC/PL/000008	<a href="http://www.energiao.dnowa.pl">http://www.energiao.dnowa.pl</a>	2014	PL
LIFE-ENERGA Living Lab-PL - ENERGA Living Lab for the improvement of the energy end-use efficiency	LIFE13 ENV/PL/000004	<a href="http://www.elivinglab.pl">http://www.elivinglab.pl</a>	2013	PL
LIFE_ADAPTCITY_PL - Preparation of a strategy of adaptation to climate change with use of city climate mapping and public participation	LIFE13 INF/PL/000039	<a href="http://adaptcity.pl/">http://adaptcity.pl/</a>	2013	PL

LIFE CO2SHOE - Footwear Carbon Footprint	LIFE12 ENV/ES/000315	<a href="http://www.co2shoe.eu">http://www.co2shoe.eu</a>	2012	ES
LIFE COGENERATION PL - Demo installation for electricity/heat COGENERATION with gasification of fuel based on municipal waste and sewage sludge	LIFE12 ENV/PL/000013	<a href="http://lifecogeneration.pl/">http://lifecogeneration.pl/</a>	2012	PL
CA - CLEAN AIR	LIFE11 ENV/DE/000495	<a href="http://www.cleanair-europe.org">http://www.cleanair-europe.org</a>	2011	DE
MOREENERGY - MOBILE demonstration line for generation of Renewable ENERGY from micronised biomass	LIFE11 ENV/PL/000442	<a href="http://lifemoreenergy.eu/">http://lifemoreenergy.eu/</a>	2011	PL
AETHER - Demonstration of the reduction of CO2 emissions from the production of an innovative class of cements	LIFE09 ENV/FR/000595	<a href="http://www.aether-cement.eu">http://www.aether-cement.eu</a>	2009	FR
Hydro4LIFE - Hydropower Sustainability Assessment Protocol: EU Assessments, Monitoring, Capacity Development and Outreach	LIFE09 ENV/UK/000026		2009	UK
DOKLIP - A Good Climate For Counties	LIFE09 INF/PL/000283	<a href="http://www.chronmyklimat.pl/doklip">http://www.chronmyklimat.pl/doklip</a>	2009	PL

#### 4.1.3. INTERREG and other EU initiatives

##### Interreg Central Europe

The goal of the program is cooperation across borders, which improves the quality of life and working conditions in the regions of Central Europe. Jointly addressing challenges that are important to several countries brings better results than actions only at national level. Projects can cooperate with public and private institutions (with legal personality) and international institutions. The topics of the program include innovation and increasing competitiveness, low-carbon strategies, natural and cultural resources, and transport connections. Most money was allocated to priority 1 (Cooperation in the field of innovation to increase competitiveness) and priority 3 (Cooperation in the field of natural and cultural resources). The program is managed by the City of Vienna, the Joint Secretariat is also located in Vienna. The area of program support is: Austria, Croatia, Czech Republic, Poland, Slovakia, Slovenia, Hungary, selected regions of Germany, selected regions of Italy. The program budget is EUR 246 million from the European Regional Development Fund. The program mainly supports soft activities that have transnational significance and create lasting results. However, it is also possible to implement pilot or demonstration investments. Projects focusing exclusively on academic cooperation, scientific research or networking and the exchange of experience are not funded. Examples of project products that must find

practical application include: action and development plans, cooperation models, feasibility studies, pilot implementations, recommendations for decision-makers and practitioners in a given field.

85 projects have already been approved in the program. 119 Polish partners participate in 64 projects. Eight projects are managed by Polish institutions. The total co-financing granted to Polish partners is nearly EUR 20 million from the European Regional Development Fund.

### Interreg Baltic Sea Regions

The program in 2014-2020 supports cooperation projects in the areas of innovation, effective management of natural resources and sustainable transport. The program is managed by the Schleswig-Holstein Investment Bank (Germany), the Joint Secretariat is located in Rostock and Riga. The support area is the EU countries: Poland, Denmark, Sweden, Finland, Lithuania, Latvia, Estonia, selected regions of north-eastern Germany, non-EU countries: Norway, Belarus Russia (selected regions). Program budget: EUR 264 million from the European Regional Development Fund. The program supports transnational cooperation and integration by financing projects related to key challenges and opportunities for the region. Transnational projects are a response to the needs and problems that individual countries are not able to deal with on their own (e.g. transport, efficient use of energy sources and environmental resources, ensuring the purity of international waters). Research only projects that do not indicate how to use the results in practice cannot count on funding. Topics of cooperation:

#### 1. Potential for innovation

examples of activities - identifying challenges related to managing research and innovation infrastructure, creating platforms enabling knowledge transfer and creating interregional synergies in the development of regional smart specialization strategies, developing and testing actions supporting cross-sectoral networking between SMEs.

#### 2. Effective management of natural resources

examples of actions - implementation of integrated action plans for the protection of the Baltic Sea and runoff waters, testing innovative ecological solutions in the field of energy production from renewable sources, evaluation and testing of alternative technologies for obtaining energy from waste, development of a system of incentives promoting energy-efficient products and services.

#### 3. Sustainable transport

examples of activities - development of regional transport nodes, multimodal transport nodes, harmonization of transport modes and transport networks in terms of technical, legal, organizational, security issues, etc., implementation of new models of transport services ensuring access to remote areas, use of advanced technologies in the field of maritime safety and security, e.g. implementation of e-navigation, automatic navigation systems.

#### 4. Institutional capacity for macro-regional cooperation

under this priority, support from the program funds can be obtained by institutions coordinating the implementation of the EU Strategy for the Baltic Sea Region (coordinators of priority actions and horizontal action leaders). There are coordinators of three SUERMB priority areas in Poland: for nutrients - Chief Inspectorate for the Environment, for innovation - the Ministry of Science and Higher Education, for culture - the Ministry of Culture and National Heritage). In addition, the priority institutional capacity in terms of macro-regional cooperation is financed by the seed money instrument, used to prepare projects implementing the Strategy's objectives under various programs (including national and regional) covering the area of the Baltic States.

Each project requires the participation of institutions from at least three countries. Projects may include public authorities and institutions, service providers and recipients, technology transfer centers, regional agencies, associations of legal entities, European Groupings of Territorial Cooperation, advisory institutions, universities, research organizations, non-governmental organizations and enterprises. You can participate in the project as a financing partner with the right to reimbursement of eligible expenses (up to 85% for Polish institutions) or as an associated partner - without the right to reimbursement and without obligations.

The program approved 111 projects in priorities 1-3: 105 standard projects and 6 project platforms. 173 Polish partners participate in 90 standard projects, and seven projects are managed by Polish institutions. 4 project institutions participate in 4 project platforms. The total funding awarded to Polish partners is over EUR 30 million from the European Regional Development Fund.

### Interreg Europe

The program budget is EUR 359 million from the European Regional Development Fund. As part of four calls, the entire European Regional Development Fund was allocated to projects (EUR 322.4 million). Institutions from the entire European Union, Norway and Switzerland may cooperate. The program aims to modernize regional development policies and programs, especially regional and national operational programs, as well as European Territorial Cooperation programs. Interreg Europa supports the exchange of experience and deepening knowledge among institutions that cooperate on a selected policy area. The result, individual for each partner, can be, e.g. development of a new project concept for financing from the selected operational program, introduction of a change in the program management system in the region (e.g. new application evaluation methods or changes in the project selection system to the ROP), introduction strategic changes (e.g. adding a new goal to the strategy, changing the voivodship plan / strategy, low-emission municipal plans, etc.). The topics of the program include: research and innovation, competitiveness of SMEs, supporting low-carbon economy, environmental protection and resource efficiency. The program is managed by the French Hauts-de-France region, the Joint Secretariat is located in Lille (France).

The program approved 107 with Poland as partner and 3 with Poland as a leader. In Mazovia Region 14 project were developed (all with Poland as a partner), presented below:

Project acronym	Partner	ERDF contribution in EUR	Partner's own contribution in EUR	Total partner budget in EUR	Project start date	Project end date
S3Chem	Marshal's Office of the Mazovian Voivodeship	152 694,00	26 946,00	179 640,00	2016	2021
SPEED UP	Marshal's Office of the Mazovian Voivodeship	140 845,00	24 855,00	165 700,00	2016	2021
RESOLVE	Marshal's Office of the Mazovian Voivodeship	153 436,05	27 076,95	180 513,00	2016	2021
DEMO-EC	Milanówek City Hall	191 165,00	33 735,00	224 900,00	2017	2021
EMPOWER	Mazovia Energy Agency	103 799,45	18 317,55	122 117,00	2017	2021
ClusterFY	Polish Agency for Enterprise Development	195 972,60	34 583,40	230 556,00	2017	2021
Agri Renaissance	Mazovia Development Agency	50 099,00	8 841,00	58 940,00	2018	2022
Agri Renaissance	Marshal's Office of the Mazovian Voivodeship	70 899,35	12 511,65	83 411,00	2018	2022
RENATUR	Mazovia Development Agency	135 617,50	23 932,50	159 550,00	2019	2023
COHES3ION	Marshal's Office of the Mazovian Voivodeship	113 556,60	20 039,40	133 596,00	2019	2022
SMARTY	Institute of Sustainable Technologies	149 770,00	26 430,00	176 200,00	2019	2023
SMARTY	Marshal's Office of the Mazovian Voivodeship	68 000,00	12 000,00	80 000,00	2019	2023
Success Road	Mazovia Development Agency	113 445,25	20 019,75	133 465,00	2019	2022
START EASY	Mazovia Development Agency	135 114,30	23 843,70	158 958,00	2019	2023

### URBACT III

The budget of the program is EUR 74.302 million from the European Regional Development Fund. The support area is 28 EU Member States, Norway and Switzerland cannot use the allocation of the European Regional Development Fund (ERDF), but can participate in the implementation of the program at their own expense, countries covered by the Instrument for Pre-Accession Assistance (IPA) can participate in operations that use IPA funding, but do not receive ERDF co-financing, partners from other countries anywhere in the world can participate in the program with self-financing. URBACT is the European Territorial Cooperation Program for Sustainable Urban Development. Underlines the key role cities play in the face of increasingly complex social changes. URBACT helps cities to develop practical, innovative and sustainable methods combining economic, social and environmental dimensions. It enables them to share good practices and lessons learned with all professionals involved in urban policy in Europe. The URBACT III 2014-2020 program develops the URBACT I (2002-06) and URBACT II (2007-13) programs. In earlier perspectives, the URBACT Program brought together 181 cities, 29 countries and 5,000 active participants. Polish cities actively participated in this initiative - in total 23 cities from Poland participated in various URBACT networks. The URBACT program is targeted at all key actors for sustainable urban development at European, national, regional and local levels: politicians,

decision makers, urban practitioners, elected representatives and stakeholders of other public bodies, the private sector and civil society. URBACT III will focus on the five thematic objectives of cohesion policy 2014-2020:

1. Strengthening research, technological development and innovation;
2. Supporting the transition to a low-carbon economy in all sectors;
3. Preservation and protection of the natural environment and support for efficient resource management;
4. Promoting sustainable and high-quality employment and employee mobility;
5. Promoting social inclusion, combating poverty and all discrimination.

Participation in the Program consists in networking cities (i.e. creating project consortia) with various thematic areas important for urban development, e.g. urban revitalization, supporting the transition to a low-emission economy, promoting social integration and combating poverty, promoting employment and employee mobility, strengthening research, technological development and innovation, etc. in URBACT networks, cities share experiences and good practices, learn from each other, and draw common conclusions to improve their urban policies. Each participating city using the URBACT method must create a URBACT Local Support Group to involve local stakeholders. Local Support Groups are created at the beginning of the network's operation, and its goal is to develop a Local Action Plan, which can and should become an important strategic or operational document for each project partner. Networks in the URBACT III program will be created in a similar way as in previous editions: they will consist of several partners and last 2.5 years.

### ESPON2020

The program's budget is EUR 48.6 million, with European Union support of EUR 41.3 million from the European Regional Development Fund. ESPON 2020 is the European Territorial Cooperation 2014-2020 program aimed at promoting and supporting the European territorial dimension in the field of development and cooperation by providing research results, knowledge transfer and information to representatives of public authorities and other policy makers at all levels.

The goal of the ESPON 2020 Program is to strengthen the effectiveness of the EU Cohesion Policy and other sectoral policies and programs financed by the European Structural and Investment Funds (ESIF) and to support the implementation of the Europe 2020 Strategy by developing, disseminating and promoting territorial data concerning the entire area of the 28 EU Member States and four States Partner: Iceland, Liechtenstein, Norway and Switzerland. This is accomplished by creating, providing and disseminating analyzes and information on European, regional and local trends and territorial features in, for example, employment and the labor market, business structures (such as SMEs) and investment models, functional urban areas, models transport, aging and demographic change, cultural, landscape or cultural heritage, vulnerability to climate change and the impact of such changes, land use and resource constraints, institution and management arrangements, infrastructures, communications and accessibility, service provision, metropolitan regions, small and medium-sized cities, or connections between rural and urban areas. Territorial

data will support an integrated, territorially focused approach and will allow for increasing the scope of benchmarking of individual regions, cities and larger European territories, which in turn may contribute to identifying and exploring new opportunities for development and economic growth.

As part of the preparation for the implementation of individual ESPON 2020 activities, in the context of accomplishing the mission and goals, the most important target groups to which ESPON 2020 territorial data is addressed have been identified:

- European policy makers operating in the area of cohesion policy and other policies, sectoral programs, especially those that cannot or do not have the tools to implement a territorial approach
- national decision-makers and practitioners responsible for territorial cohesion, ETC programs, macro-regional strategies and the preparation and implementation of cohesion policy at national level, as well as for other related policy areas
- institutions implementing programs financed from the ESI Funds and preparing periodic reports
- regional and local policy makers and practitioners responsible for territorial planning and development and / or involved in cross-border, transnational and macro-regional cooperation.

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- institutions implementing programs financed from the ESI Funds and preparing periodic reports
- regional and local policy makers and practitioners responsible for territorial planning and development and / or involved in cross-border, transnational and macro-regional cooperation.

ESPON 2020 will be implemented under five specific objectives:

1. Constant development of territorial data in the form of applied research and analyzes.
2. Improved knowledge transfer and analytical user support.
3. Improving territorial observation and tools for territorial analysis
4. Broader coverage and use of territorial data.
5. More effective, efficient and effective program implementation and professional management assistance.

The Program Managing Authority is the Ministry of Sustainable Development and Infrastructure in Luxembourg.

## 4.2. Joint initiatives of the EU with International Financial Institutions

### 4.2.1. European Local Energy Assistance (ELENA)

ELENA is a joint initiative by the European Investment Fund and the European Commission under the Horizon 2020 programme. ELENA provides grants for technical assistance focused on the preparation and implementation of bankable energy efficiency, distributed renewable energy and urban transport programmes. ELENA typically supports projects above EUR 30 million investments cost with a 3-year implementation period for energy efficiency and 4-year for urban transport and mobility.

The grant may be used to finance costs related to feasibility and market studies, programme structuring, business plans, energy audits and financial structuring, as well as to the preparation of tendering procedures, contractual arrangements and project implementation units.

Ongoing projects in Poland are described in the table below:

Project name	Location	Date	Total PDS costs	Elena contribution	More information
PL-Alior EE Loans in buildings	Poland	27/02/2019	EUR 1,874,500	EUR 1,687,050	<a href="https://www.eib.org/attachments/documents/pl-alior-ee-factsheet-en.pdf">https://www.eib.org/attachments/documents/pl-alior-ee-factsheet-en.pdf</a>
ENERGY EFFICIENCY by GETIN	Poland	27/02/2019	EUR 2,294,060	EUR 2,064,654	<a href="https://www.eib.org/attachments/documents/getin-factsheet-en.pdf">https://www.eib.org/attachments/documents/getin-factsheet-en.pdf</a>
Energy Efficiency Finance Facility for Residential Buildings (EEFFRB)	Poland	26/03/2019	EUR 3,500,000	EUR 3,150,000	<a href="https://www.eib.org/attachments/documents/eeffrb-factsheet-en.pdf">https://www.eib.org/attachments/documents/eeffrb-factsheet-en.pdf</a>
The National Integrator of Investment Processes in District Heating Companies in Poland (KAPE)	Poland	27/09/2019	EUR 2,323,000	EUR 2,090,700	<a href="https://www.eib.org/attachments/documents/project-factsheet-kape-en.pdf">https://www.eib.org/attachments/documents/project-factsheet-kape-en.pdf</a>
BIT SYSTEM for Pomorskie Region	Pomorskie Region, Poland	29/10/2018	EUR 2,554,691	EUR 2,299,000	<a href="https://www.eib.org/attachments/documents/bit-system-factsheet-en.pdf">https://www.eib.org/attachments/documents/bit-system-factsheet-en.pdf</a>

### 4.2.2. Joint European Support for Sustainable Investment in City Areas (Jessica)

JESSICA is a policy initiative of the European Commission (EC) developed jointly with the EIB and in collaboration with the Council of Europe Development Bank (CEB). It supports integrated, sustainable urban-renewal projects. A range of sophisticated financial tools are used including equity investments, loans and guarantees, offering new opportunities for the use of EU Structural Funds.

In Mazovia Region only one Jessica project was conducted. Mazovia Energy Agency was involved in this initiative. Improvement of the condition of the natural environment of the Mazovia

Voivodship (Region), including safety improvements for its inhabitants through the establishment of systems for the prevention and elimination of natural hazards and environmental disasters as well as the streamlining of environmental management formed a long-term objective of the Mazovian Voivodship Development Strategy. This objective was also included in Priority Axis IV “Environment, prevention of threats, and energy” of the MROP (2007-2013), and in Measure 4.3 “Air Protection, energy”, under which projects implemented led to:

- improvement of air quality,
- ensuring energy security,
- increased utilisation of renewable energy sources.

By decision of the Board of the Mazovian Voivodship, the objectives of the MROP defined for Measure 4.3 “Air Protection, energy” was to be achieved with support under the JESSICA initiative.

Under Measure 4.3 of the MROP, the UDF’s activities focused on the implementation of projects defined in the Detailed Description of the Priority Axes of MROP (Detailed MROP), in particular on urban projects concerning:

- 1) renewable energy: wind, solar, biomass, hydroelectric, geothermal and other energy, energy efficiency, cogeneration, energy control, i.e.:
  - construction, extension and upgrading of infrastructure for the generation and transmission of energy from renewable sources (wind, hydro, solar, geothermal, organic/biomass, other) - taking into account the example projects specified in the Detailed MROP),
  - construction of small and medium combined electricity and heat generation units (cogeneration),
  - construction, extension and upgrading of storage reservoirs and barrages to provide capability for the utilisation of rivers (hydropower),
- 2) electricity, i.e.:
  - construction, extension and upgrading of the local and regional electricity transmission and distribution infrastructure,
- 3) natural gas, i.e.:
  - construction, extension and upgrading of the local and regional natural gas transmission and distribution infrastructure,
  - purchase of plant and construction of technical facilities ensuring the correct operation of natural gas distribution systems,
- 4) energy efficiency, cogeneration, energy control, air quality, i.e.:
  - construction, extension and upgrading of district heating systems with a view to achieving energy efficiency through the use of low-energy technologies and solutions, taking into account the example projects specified in the Detailed MROP,
  - equipment of district heating systems with installations reducing dust and gas emissions,
  - thermal upgrading of public utility buildings including the replacement of equipment in those facilities with low-energy equipment, taking into account the example projects specified in the Detailed MROP.

The UDF’s activities should have contributed to the achievement of the output and result indicators adopted by the MROP Managing Authority specified in the Detailed MROP for Measure 4.3.

The UDF managed by MAE and BGK offered the following urban project support products:

- loans - up to 75% of the total eligible expenditure offered to all the entities mentioned in the Detailed MROP and simultaneously meeting the definition of enterprise;
- guarantees - up to 80% of the outstanding amount of the loan or other financial liability contracted by an investor with another bank;
- equity contributions to companies implementing urban projects.

That urban projects intended for support under the JESSICA initiative had to provide a lower market rate of return than commercial projects. In the case of projects eligible for support in the form of equity contributions, the Internal Rate of Return should not exceed 15%. The reference for this rate calculated for debt instruments (loans) was the standard banking practice with regard to the Rate of Return on Investment acceptable to banks. Each urban project was subjected to case-by-case evaluation by the UDF.

The terms of project financing were diversified depending on the character of the project, the form of financial support requested (loan, guarantee or equity contribution), and mainly on the levels of the key performance indicators of the project (e.g. Internal Rate of Return, Net Present Value, Payback Period, Cash Flow Profile).

Owing to the characteristics of the urban projects supported under the JESSICA initiative, including their integrated nature combining the commercial component and the social component having a negative effect on the profitability of projects, the terms of support offered by the UDF (such as e.g. loan interest rate, the amount of the annual guarantee fee, the acquisition price of shares in companies implementing urban projects) was preferential compared with market terms. Each provision of support under the JESSICA initiative for the implementation of projects falling within the description of Measure 4.3 constituted state aid within the meaning of the MRD Regulation.

The provision of support to an urban project under the JESSICA initiative will be conditional on a positive result of evaluation concerning:

- the compliance of an urban project with the assumptions of the JESSICA initiative and the MROP, and with provisions on structural funds, granting state aid and environmental impact assessment;
- technical/engineering analysis concluding that the project meets the criteria of Measure 4.3 described in the Detailed MROP;
- the investor's borrowing capacity (in the case of special-purpose vehicles, the evaluation concerns the economic and financial aspect of the urban project) - where support is to be provided through a loan or guarantee;
- financial credibility of the project;
- cash flows under the project;
- financial profitability of the project, taking also into account the rule that support under the JESSICA initiative should contribute to improving project profitability - to a level close to that achieved by a project undertaken solely for commercial purposes;
- credit risk (for loans and guarantees) / investment risk (for equity contributions);
- the method and form of security for the performance of obligations arising from the financial support granted by the UDF;

- the degree of the project's impact on the social, economic, environmental and spatial areas of the city, i.e. external benefits of the project in the a/m impact areas;
- the advisability of investment in the project concerned in the form of a loan, guarantee or acquisition / taking of shares.

#### Terms and conditions for granting loans

- the loan maturity period calculated from the loan disbursement date to the date of final repayment of the loan must not exceed 20 years (240 months). A grace period for the repayment of the principal amount of the loan will be available up to 1 year after physical and financial completion of an urban project, but the grace period may not extend beyond 30 June 2016. No grace period will be available for the repayment of interest on the loan;
- the maximum amount of the loan must not exceed 75% of the total eligible expenditure related to the implementation of an urban project;
- proceeds of a loan must not be used to refinance any expenses paid by the investor from its own contribution;
- in determining the amount of the loan relative to the total eligible expenditure of an urban project, the net value of the urban project will be taken into account. VAT will be considered eligible expenditure of an urban project only when the investor is unable to recover it and makes a relevant statement to this effect;
- a loan will be granted for the implementation of an urban project meeting the criteria of a new investment in accordance with the MRD Regulation;
- loans will be disbursed in a single payment or in tranches, based on expenses incurred by the investor or in the form of advance payments, the next advance disbursement being conditional on having accounted for funds already disbursed;
- the loan interest rate level will be variable, determined on a case-by-case basis for each urban project;
- the interest rate will be determined on the basis of the NBP reference rate (base rate) adjusted by the annual Energy Index expressed in percent at 0 to 80% of the base rate, provided that the interest rate must not be less than 0.25% per annum; the percentage adjustment will make it possible to maintain the loan interest reduction assumed by the UDF over a longer timeframe as a safeguard against an increase in the NBP reference rate. Based on the above assumptions and given the current NBP interest rate, the rate of interest on the loans would now range at 0.9% to 4.5.

The granting of guarantees was preceded by entering into appropriate agreements with lending banks, which defined the rules of cooperation in granting guarantees. The agreements were concluded in a simplified form.

#### 4.2.2.1. Energy loan

Energy loan initiative began when Voivodeship got back money from the loans from Jessica project. As a reminder in Poland Jessica is implemented regionally in the framework of Regional Operational Programs (ROP). After Voivodeship got back money from the loans in Jessica the money had to be allocated again. The new idea was created

for loans for projects in the field of comprehensive energy modernization of residential buildings available under measure 4.2 Energy efficiency.

Mazovian Regional Loan Fund and Mazovia Energy Agency, acting as a Financial Intermediary for the funds of the Mazovian Voivodeship Trust Fund, announce the call for applications for financial support in the form of a preferential loan for the implementation of projects in the field of energy and air protection on the 9<sup>th</sup> of October 2019. The total amount of trust fund funds of the Mazovian Voivodeship for loans is PLN 50 million app. EUR 11.600.000 milion.

For the loan can apply the SMEs and local government units from Mazovia Region. The scope of projects possible to support in the form of a loan includes:

- building insulation;
- replacement of windows, external doors and lighting for energy-efficient;
- reconstruction of heating systems (including replacement and connection to a heat source);
- reconstruction of ventilation and air conditioning systems;
- energy management systems;
- installation of RES in energy-efficient buildings;
- installation of cooling systems, including renewable energy sources;
- installation of measuring systems.

Terms of the loan are:

- Loans are granted in PLN.
- The unit loan amount is the range PLN 1,000,000.00. -10,000,000.00.
- The period of the loan, calculated from the date of signing the contract to the date of the final repayment of the loan, may not exceed 20 years (240 months).
- A grace period for repayment of loan principal is possible for a period of 12 months from the date of signing the contract.
- There is no grace period for paying interest.

The call for proposals will be carried out on a continuous basis until the funds allocated for loans are depleted

#### 4.2.3. Sustainable Energy Finance Facility (SEFF) of EBRD

The EBRD SEFF operates in EBRD's countries of operation. It partners with local financial institutions such as commercial banks, to establish sustainable energy financing channels. These partnerships help direct more finance towards investment opportunities where energy and other resources are used more rationally. Finance for sustainable energy projects is provided for two key areas: energy efficiency and small-scale renewable energy. Local financial institutions on-lend the funds which they have received from the EBRD to their clients, including small and medium-sized businesses, corporate and residential borrowers, and renewable energy project developers.

The Polish Sustainable Financing Facility - PolSEFF - was initiated by the European Bank for Reconstruction and Development (EBRD) supported by the European Union. The programme's objective was to overcome barriers faced by Polish SMEs to invest in energy efficiency and renewable energy and increase the number of energy efficient technologies and sources of

renewable energy in the market. The programme was launched in January 2011 with an initial credit line of EUR 150 million and a grant support of EUR 28 million. The following financial institutions participated in PolSEFF and provided financing to the SMEs: Bank BGŻ, BGŻ Leasing, BNP Paribas Bank Polska, BZ WBK Leasing, Bank Millennium, Millennium Leasing, and Societe Generale Equipment Leasing Polska. As the awareness of the programme spread among Polish entrepreneurs, their interest to participate in PolSEFF grew dynamically. In order to meet the demand for financing under the programme, the EBRD increased the PolSEFF credit line to EUR 180 million in 2012. Within PolSEFF three types of investments were financed:

- investments based on the List of Eligible Materials and Equipment (LEME)
- large scale energy efficiency, renewable energy and building sector projects
- investments of Suppliers.

Entrepreneurs who financed their investments within PolSEFF received investment incentives of 10% or 15% of the leasing or loan value.

PolSEFF<sup>2</sup> is the second edition of the successful *Polish Sustainable Energy Financing Facility* programme developed by the European Bank for Reconstruction and Development (EBRD). It is implemented as a part of the NF Programme, operated by the National Fund for Environmental Protection and Water Management. PolSEFF2 is a €200 million credit line made available to participating banks. The banks then offer loans to SMEs for financing energy efficiency investments. Two types of investment projects are eligible to participate in the programme:

- Energy Efficiency Improvement Projects - Investments in equipment, systems and processes that enable the beneficiaries to reduce primary and/or end use of electric energy, fuels or other types of energy. These investments must result in energy savings of at least 20%.
- Building Thermo-modernisation Projects Energy efficiency measures in commercial and residential buildings that require energy performance certification, and may include investments that generate energy from renewable sources. These investments must result in energy savings of at least 30%.

Since the beginning of the Polish Sustainable Energy Financing Facility PolSEFF programme in 2011 until its end in May 2014 more than 1,900 Polish SMEs have financed more than 2,000 investments projects aimed at improving energy efficiency or generate renewable energy. The financed projects resulted in energy savings of 343 GWh and reduced CO<sub>2</sub> emissions by over 102 thousand tonnes.

Source: PolSEFF

Details	Unit	Value
Number of completed projects	Qty.	2,021
Granted financing	Euro	185,990,885
Incentives granted	Euro	18,325,190
Estimated energy savings	MWh / year	342,843
Estimated CO <sub>2</sub> emission reduction	Ton/ year	101,868

Chosen realized PolSEFF and PolSEFF2 projects from 2014 in the thematic of low carbon economy and energy:

<b>PolSEFF statistics - status September, 2014</b>						
Project Type	Loan amount disbursed	Incentive paid	Number of projects financed	Primary Energy Saving	Expected Annual RE Production EI. Equivalent	CO2 reduction
	million EUR	million EUR		MWh / year	MWh / year	t / year
<b>Total*</b>	<b>186</b>	<b>18.3</b>	<b>2,021</b>	<b>342,843</b>	<b>15,718</b>	<b>101,868</b>
Energy Efficiency (incl. LEME based)**	176.7	17.2	1,936	272,594	0	77,073
Renewable Energy**	1,2	0.1	19	52,790	15,716	19,651
Buildings thermo-modernization	8.1	1.0	66	17,459	1.3	5,145
LEME based	116.3	11.3	1,578	199,983	15,718	60,998

Project name	Company	Outputs	Investment size	More information
Printing machine replacement	Printing house	Annual energy saving of 40.2%	€887,000	<a href="http://www.polsekff.org/sites/default/files/1._printing_house_new.pdf">http://www.polsekff.org/sites/default/files/1._printing_house_new.pdf</a>
Biomass burner investment	Fuel Wholesaler	Annual primary energy savings of 3,000 MWh	€51,400	<a href="http://www.polsekff.org/sites/default/files/17._biomas_boiler.pdf">http://www.polsekff.org/sites/default/files/17._biomas_boiler.pdf</a>
Replacement of metal bending equipment	Boiler producer Company	Annual energy saving of 32% (4,219kWh) Annual CO2 emissions decrease of 4 tonnes	€105,000	<a href="http://www.polsekff.org/sites/default/files/32._modernization_of_boiler_production_line.pdf">http://www.polsekff.org/sites/default/files/32._modernization_of_boiler_production_line.pdf</a>
Building Thermal Insulation	Mining Equipment Manufacturer	Energy saving for heating of 54%	€342,655	<a href="http://www.polsekff.org/sites/default/files/8._building_thermomodernization.pdf">http://www.polsekff.org/sites/default/files/8._building_thermomodernization.pdf</a>
Construction of CHP biogas unit	Construction Company	Annual generation - electricity 4,270.5 MWh - heat 1,086.8 MWh	€1,250,000	<a href="http://www.polsekff.org/sites/default/files/14._biogas_plant.pdf">http://www.polsekff.org/sites/default/files/14._biogas_plant.pdf</a>

Modernisation of lighting integrated with photovoltaic panels	Cosmetics manufacturer	Annual energy savings: 63,954kWh (50%) Renewableenergyproduction: 30,000 kWh Annual CO2 emission savings: 95.2 tonnes	625,000 PLN	<a href="http://www.poleff2.org/sites/default/files/g.1._case_study_poleff2_-_led_lightinh_with_photovoltaic_panel.pdf">http://www.poleff2.org/sites/default/files/g.1._case_study_poleff2_-_led_lightinh_with_photovoltaic_panel.pdf</a>
Replacement of the heating system	Retail sale of footwear	Annual energy savings: 126.7 MWh/year (46%) Annual CO2 emission savings: 38 tons	165,000 PLN	<a href="http://www.poleff2.org/sites/default/files/g.6._retail_sale_of_footwear_-_heating_system_replacement_lemeng_0.pdf">http://www.poleff2.org/sites/default/files/g.6._retail_sale_of_footwear_-_heating_system_replacement_lemeng_0.pdf</a>
Thermal modernisation of a building - LEME based	Hotel and Restaurant Operator	Annual energy savings: 47 GJ(52%) Annual CO2 emission savings: 6 tonnes	277,146 PLN	<a href="http://www.poleff2.org/sites/default/files/f.3._case_study_-_hotel_building_thermal_modernization.pdf">http://www.poleff2.org/sites/default/files/f.3._case_study_-_hotel_building_thermal_modernization.pdf</a>
Building thermomodernisation integrated with photovoltaics	Plastic processing	Annual energy savings: 152 MWh Annual CO2emission savings: 158 to nnes	270,863PLN	<a href="http://www.poleff2.org/sites/default/files/f_6_case_study_poleff2_-_building_-_thermomodernisation.pdf">http://www.poleff2.org/sites/default/files/f_6_case_study_poleff2_-_building_-_thermomodernisation.pdf</a>
Thermal modernisation of a building - audit based	Mining equipment manufacturer	Annual energy savings: 3,156 GJ(54%) Annual CO2 emission savings: 231tonnes	1,513,848 PLN	<a href="http://www.poleff2.org/sites/default/files/f.1._case_study_poleff2_-_f._all_-_building_thermal_modernization_v2_final_template_0.pdf">http://www.poleff2.org/sites/default/files/f.1._case_study_poleff2_-_f._all_-_building_thermal_modernization_v2_final_template_0.pdf</a>

More project information available here:

<http://www.poleff2.org/en/success-stories>

<http://www.poleff.org/en/success-stories>

## 5. Cooperation with private stakeholders

Chapter 6. aims assess the provide sector initiatives and close-to-market solutions promoting low-carbon investments. The key interest here is to identify innovative financial solutions that can mobilise private funds, and can be replicated at a large scale in your region with a perspective of potential adoption by other partner regions.

- Energy Performance Contracting (EPC)/Energy Service Companies (ESCOs);
- Crowdfunding; and
- Venture capital/equity contribution.

## Energy Performance Contracting (EPC)/Energy Service Companies (ESCOs)

The term of EPC - Energy Performance Contracting became known in the middle of 1990 decade and was introduced to the market by international American and later on by European firms. The development of these types of contracting services to the Polish market was done very carefully with thorough full support provided by international banking institutions and international engineering firms. The first implementations were done in district heating and chemical industry. Later on this type of contracting has been rather scarcely applied due to relatively high implementation risks and low energy prices from coal fired energy generation installations. The issue of EPC came back at the beginning of 2007 after joining EU by East and Mid European Countries, when the first 7-year period of EU energy efficiency and renewable & low emission programs financially supported from EU had been initiated. At the beginning they were mainly financed from abroad.

The terms of EPC may have in Poland double mining:

EPC(1) - Engineering, Procurement & Construction contracting, defines total contractor responsibility for project execution - in this document to avoid confusion we will use the term of EPCC;

EPC(2) - Energy Performance Contracting defines the purpose and goals of modernization contracting, which mostly calls for EPCC type of contracting responsibility range, in this case further down we will continue to apply the term of EPC;

EPCC may be applicable for both types of clients: - public as well as private. Total scope of responsibility for contract execution (engineering, procurement & construction) is assigned to the contractor except an early design development stage which specifies investment program, feasibility study, contracting conditions and financing - the stage of tender documentation development.

Energy Performance Contracting aims mainly for energy economy improvement by lowering energy demand and consumption in buildings, city building districts and industrial installation. This type of contracting is generally applicable in modernization processes of:

- building envelopes by improving their thermal insulation;
- lowering energy distribution losses in buildings and building districts;
- application of efficient combined heat and power energy generation in building districts and industrial complexes.

These mentioned above modernization processes also improve operational economy of property, leading to financial gains.

Recently investors/owners are forced to lower CO<sub>2</sub> emission in energy generation processes which leads to application of Renewable Energy Sources - RES and low emission fuels in energy generation as e.g. NG - natural gas in energy cogeneration (gas & heat) processes. Usage of RES is rewarded with color certificates - bonds (green, yellow, red etc.) to cover additional investment costs.

Public clients are usually unable to develop necessary for EPC documentation which specifies energy performance targets and project technical vision, feasibility study, financing and contract documentation - so called the early design stage documentation. Usually they call

for support to external auditing firms which as an early design stage contractor support the client in modernization processes.

Public-Private Partnership is a venture organised to perform difficult just for public organisation on its own complex projects due to technical (lack of expertise), financial (lack of financial resources - third party financing - TPF) or formal reasons. PPP is usually performed under long time agreement - contract of which target is to modernise public infrastructure e.g.: EPC of public property infrastructure.

For public institutions as kindergartens, schools, universities and hospitals or local governments buildings it would be difficult to collect funds for modernization of their premises as well as to receive loans for improving energy performance of their premises, so an idea of financing modernizations out of energy savings had been developed in USA and spread out in Europe.

Public-Private Partnership also defines the type of contracting relation between public property owner and private contractor which rewards himself out of operational savings after modernization. The contractor that undertakes this type of activity is called an ESCO. Unfortunately, this term in Poland has double mining.

ESCO(1) - Energy Saving Company, defines the type of the contractor which performs EPC rewarding himself out of energy savings in demand and consumption:

and later on the more complex one:

ESCO(2) - Energy Service Company which performs the contracting responsibility as the one above and in addition takes care about energy operational demand, consumption and in addition, RES investments, energy supply safety and financing (TPF) being rewarded out of energy and media savings, RES bonds as well as energy and media seasonality management.

In ESCO mode contractors finance projects execution out of their own funds or out of banking loans usually not more than up to 80%. In this case, banks usually require good references and proven history of ESCO project execution from contractors.

There are several modes of ESCO contracting modes, e.g.:

- BOO (Build - Operate - Own);
- BOT (Build - Operate - Transfer);
- BOOT (Build - Own - Operate - Transfer).

In general, there are 3 types of EPC rewarding:

- payment after fulfilment of EP conditions;
- first out payment initiated right from savings appearance in full amount to shorten the period of payment;
- shared savings payment between owner and the contractor according to the contract agreement.

General remark: it's important to keep right relation between: return time from investment, warranty period and life cycle of delivered products.

In Energy Performance Contracting the phase of the Early Design Engineering plays a decisive role. It consists of several engineering activities to be performed by experienced engineering

firms. Failure at this phase may lead to serious consequences and it is vital in EPC modernization contracting (which should cover buildings, buildings technical installations and in particular energy distribution and generation as well as energy installation management). The early design engineering phase should include:

- building and installation inventory and exploitation characteristics;
- energy performance auditing;
- technical concepts of improvements;
- feasibility studies with life cycle analysis of life cycle concepts and project financing concept;
- early design modernisation engineering concept;
- project financing;
- contracting documentation proposal.

For large scale EPCC should be performed according to EPCC procedures and consists of 6 stages:

- financing institutions selection including usually an Investment Fund and Banks if necessary;
- preliminary offers collection, analysis and contracting condition adjustments;
- final offers collection and contractor selection;
- modernisation part of contract execution with commissioning;
- exploitation in warranty period;
- contract completion.

Depending on the project size, ESCO projects in Poland are financed by international banks in cooperation with Investment Funds, where they usually play roles of payment guarantors. It's possible to finance EPCC projects in combined mode e.g.: in ESCO mode out of savings and in leasing mode the parts not generating savings as e.g.: reconstructions and extensions. At the moment basic banking interest is at the level of 1.5%, total interest varies between 7% to 15%. The large scales of EPCC usually are financed by consortia of Investment Funds and Banks. In case of public firms EPCC can be financed from Public Support mechanisms. The EPC early design phase is usually financed out of bank credits.

### Crowdfunding

Crowdfunding (subscription) - is a form of financing for different type of projects organized by a group of people. In crowdfunding case a project is financed by a group of people donating relatively small sums of money by those interested in project execution.

In principle, the crowdfunding is an activity consisting in some kind of funds collection and allocation for financing a project execution in order to achieve certain goals, eg.: improvement in energy distribution installations within a building by occupiers in order to decrease costs of living.

In most of the European countries crowdfunding is not legally regulated. In Poland a Polish Society of Crowdfunding operates, which provides legal support to interested groups of people.

## Venture capital/equity contribution

Within five years, a joint fund of PGE (Polish Energy Group), Polish Development Fund (PFR) and the National Center for Research and Development (NCBiR) is targeting projects including in the area of Industry 4.0, digitization, energy storage, electromobility and big data.

PGE Ventures, SpeedUp Group and the National Center for Research and Development have jointly created the SpeedUp Energy Innovation fund powered by PGE Ventures (SEI). The goal of the new corporate venture capital (CVC) fund is to invest in start-ups at an advanced stage of growth. Ultimately, the capitalization of the new fund will amount to PLN 100 million. The entity responsible on the part of PGE for the implementation of such projects is PGE Ventures, which will act as an investor and will have an impact on the investment policy of the SEI fund. The resources that the SEI fund will have at its disposal will be allocated to the development of the most innovative technological start-ups. The PFR's strategic goals include a significant increase in the availability of financing for young and innovative companies. This is to translate into the construction of a modern 4.0 economy, which is to make Poland an innovation hub of European significance. This goal is implemented, among others, by PFR Ventures, which, together with independent investors, plans to invest approx. PLN 4.5 billion in start-ups. The joint fund of PGE Ventures, PFR Ventures and the National Research Center is the world's first institutional of CVC Fund (FoF). Half of its funds come from European funds (Intelligent Development Operational Program 2014-2020). During the 5-year investment period, the SEI fund plans around 12 capital entries and several follow-on investments. The planned investment threshold for carrying out the first financing round will be between 3-3.5 million PLN, there is also the possibility of additional recapitalization of selected projects from the first financing round to the amount of even 10 million PLN. The SEI Fund also includes the possibility of conducting co-investments, especially during planned continuation investments.

The new fund will be particularly interested in companies with high potential for generating financial flows and characterized by high technological potential. As part of the investment criteria, the SEI fund provides that potential investment projects must be at least in the early growth phase. In addition, these projects must generate revenues from operations, and capital needs should be allocated primarily to market expansion.

Enea has established the venture capital fund Enea Innovation, which will invest in innovative projects in the energy industry. The fund will invest in projects at an early stage of development, but it will be possible to co-invest companies at the stage of expansion and development. The fund's capitalization will amount to PLN 50 million, and for each project up to PLN 5 million.

The fund will have a five-year investment horizon. After this period, Enea will decide which projects are for sale and which technologies will be kept. The fund will invest in projects related to the core business of the group, in projects supplementing the sales offer, and in completely new technologies for the industry.

The new Enea fund is the next step in the development of the R&D project support system. The fund will complement the portfolio of financing instruments for research and development projects that start-ups offer to the above-mentioned institutions such as NCBR, PGE or the PFR Group. The fund's investment activities will result in the presence of young companies at every stage of development, while having access to innovative technologies that are developed by the most mature start-ups. This means that selected projects that will be in the fund's investment portfolio will be able to be tested in a natural environment, i.e. using the Enea

infrastructure, including power plants, combined heat and power plants, and distribution assets.

Those public owned funds, described before, are to identify and support the development of the most unique technologies that will contribute measurably to resolving Poland's significant problems in the energy sector. They aim to make a lasting impact on the Poland innovation ecosystem and the comprehensive support provided to new technology ventures at the very early stage goes far beyond the financial investment and is delivered with the intention to help turn these companies into market leaders.

In addition, private owned funds are also available at the very early stage of new ventures, providing financing and in-depth advisory to technology entrepreneurs. A dedicated IT tool was offered to integrate corporate finance, business development expertise to assure rapid scaling up and internationalisation:

## 6. Evaluation

Investments in venture capital will be a key indicator in showing the direction of changes in the Polish energy sector. This is particularly true for investments in innovation and digitalisation - intangible assets - which will shape energy supply and consumption technologies in the next decades. Investments in intangible assets such as software, R&D, data, efficiency management, branding are growing throughout the economy - and they will become the most important source of future productivity in the energy sector. Such a trend can be seen in Europe, and in the United States in some combination's investments in so-called intangible assets already outweigh investments in traditional assets. A similar trend is already visible in Poland.

The information indicated in the points above can be used as a confirmation of growing investments in energy technologies from venture capital funds that targets companies working on new technologies that can change the current arrangement in the energy sector and offering potentially high returns over several years - if of course one of these companies will succeed. While venture capital funds usually do not finance initial research, its activity shows well where people expect new technologies that can meet market needs and change the current order in the energy sector.

This year, venture capital investments in energy are reaching a record level, but VC funds are no longer mainly interested in solar farms, as it was a decade ago, and their focus was primarily on companies working on energy technologies for the transport sector, mainly in the area of vehicles electric. The growing interest of venture funds in technologies on the demand side should also be pointed out - at the expense of manufacturing technologies. This trend is confirmed by VC investments recorded so far this year in demand-side technologies, which have exceeded the value of investments in technologies related to renewable energy.

On the other hand, it is also necessary to indicate challenges related to the implementation of large projects in the energy sector, which begin even before the contractor enters the construction site. These are environmental restrictions, which narrows the choice of technologies that can be implemented, and on the other hand, investments are carried out under the Public Procurement Law, which is not a flexible environment for the implementation of long-term investments.

In this situation, it becomes obvious from the investor's point of view that sources of expenditure coverage should be found at the stage of project preparation. In turn, during the implementation of multi-year contracts, it is necessary to ensure adequate financial liquidity

and continuous adaptation of solutions to successively tightening environmental requirements, which may change several times during the implementation of large investments. In addition, obtaining financing sources for traditional energy, especially in a situation where some European banks restrictively refers to financing of energy from solid fuels, will additionally require an innovative and flexible approach.

## 7. Conclusions and recommendations

### ✓ Conclusions and recommendations at the level of the target region

There are many challenges facing the energy market in Mazovia. On the one hand, prices for end users should guarantee the competitiveness of the local economy, on the other, they should be attractive enough to give energy producers an impulse to invest in new production capacity, and its distributors in the necessary development and modernization of the network. The energy sector is a specific sector - no return on investment in the short term should be expected. Therefore, stability of regulation, long-term vision and strategy that allow investors to assess effectiveness and risk are key to the development of the industry. Prosumer support will be important to ensure stability and security. Such instruments can already be seen at local level, but regional authorities should strengthen the legislative framework for them.

### ✓ Conclusions and recommendations at national level

Regardless of its specificity, investments in the energy sector should be financed, like any other business venture, in a way aimed at optimizing the structure of expenditure, i.e. both through share capital and in the form of debt capital. Regulatory external factors, such as the instability of regulations in the case of individual sources of production or the tightening of technical and environmental requirements, which do not facilitate investment decisions, are also a challenge for the sector in obtaining financing.

One should not forget about state support instruments, including in the form of a capacity market mechanism that gives a significant impetus to business development.

### ✓ Conclusions and recommendations at macro-regional (EUSDR, EUSAIR, EUSBSR, EUSALP)

The strategic goal of implementing macro-regional policies in the energy sector should be to ensure an optimal level of security of energy supply for the inhabitants of the region. Unlimited access, both for enterprises and households, to high quality, reliable energy supplies at attractive prices should be one of the main conditions for a satisfactory standard of living of the inhabitants and the economic development of the macro-region.

The functioning of a stable regional fuel and energy market with a significant share of energy production at local and regional level and a significant contribution to the national energy balance will be of key importance. The renewable energy sector may be a strategic flywheel for the development of a macro-region, determining its competitiveness.

Such setting of priorities is consistent with the idea and concept of ensuring energy security at the level of the country and the European Union as well as the development conditions and endogenous potential of the regions.

It is also important for energy companies to boldly take advantage of modern investment financing opportunities created by today's financial market. Examples of such instruments are hybrid bonds or raising funds on global markets, e.g. by issuing Eurobonds.

Hybrid financing is an instrument that has been gaining popularity in recent years on global financial markets. It is an intermediate solution between typical debt financing and the issue of shares (usually it takes the form of a subordinated bond issue). It is beneficial both from the point of view of shareholders, as they are not diluted, as well as for the issuer, which due to its debt nature will be able to use the effect of the tax shield. A characteristic feature of hybrid financing is the long nominal maturity (although with the option of early redemption after the period agreed by the parties in the issue documentation).

## Appendix 1.

### Fact sheet to national/federal horizontal (sectoral) operative programmes

Title of OP		Infrastructure and Environment Program 2014-2020	
Priority axis 1: Reducing the emission of the economy Priority axis 2: Environmental protection Priority axis 6: Development of low-emission collective transport in cities Priority axis 7: Improving energy security			
Specific objectives:	Support for a resource-efficient and environmentally friendly economy that fosters territorial and social cohesion		
Final beneficiaries:	<ul style="list-style-type: none"> <li>Local government units,</li> <li>Enterprises with public goals,</li> <li>Public administration,</li> <li>Public services other than administration,</li> <li>Health care institutions,</li> <li>Culture, science and education institutions,</li> <li>Large enterprises,</li> <li>Small and medium companies,</li> <li>Social organizations and religious associations.</li> </ul>		
Available budget:	Total budget:	EUR 2,151,095,269 EUR 4,127,263,725 EUR 2,704,921,948 EUR 1,178,543,609	Axis 1 Axis 2 Axis 6 Axis 7
	EU funding:	EUR 1,828,430,978 EUR 3,508,174,166 EUR 2,299,183,655 EUR 1,000,000,000	Axis 1 Axis 2 Axis 6 Axis 7
	National contribution:	EUR 322,664,291 EUR 619,089,559 EUR 405,738,293 EUR 178,543,609	Axis 1 Axis 2 Axis 6 Axis 7
Description of measures (with budget breakdown):	Axis 1 INVESTMENT PRIORITY I supporting the production and distribution of energy from renewable sources; INVESTMENT PRIORITY II promoting energy efficiency and the use of renewable energy sources in enterprises; INVESTMENT PRIORITY III supporting energy efficiency, intelligent energy management and the use of renewable energy sources in public infrastructure, including in public buildings, and in the housing sector; INVESTMENT PRIORITY IV developing and implementing intelligent distribution systems operating at low and medium voltage levels; INVESTMENT PRIORITY V promoting low-carbon strategies for all types of territories, in particular for urban areas, including supporting sustainable multimodal urban mobility and adaptation measures with a mitigating effect on climate change; INVESTMENT PRIORITY VI promoting the use of high-efficiency cogeneration of heat and electricity based on useful heat demand Axis 2		

	<p>INVESTMENT PRIORITY I support investments targeted at specific types of threats while increasing disaster and disaster resilience and developing disaster management systems.</p> <p>INVESTMENT PRIORITY II investing in the waste management sector in order to fulfill the obligations set out in the Union acquis in the field of the environment and to meet the investment needs that go beyond those obligations set by the Member States;</p> <p>INVESTMENT PRIORITY III investing in the water management sector in order to meet the obligations set out in the Union acquis in the field of the environment and to meet investment needs going beyond these obligations, as defined by Member States;</p> <p>INVESTMENT PRIORITY IV protection and restoration of biodiversity, soil protection and restoration, and support for ecosystem services, also through the Natura 2000 program and green infrastructure;</p> <p>INVESTMENT PRIORITY V undertaking projects aimed at improving the quality of the urban environment, urban regeneration, reclamation and decontamination of post-industrial areas (including post-military areas), reduction of air pollution and promotion of measures to reduce noise.</p> <p>Axis 6</p> <p>INVESTMENT PRIORITY I promoting low-carbon strategies for all types of territories, in particular urban areas, including supporting sustainable multimodal urban mobility and adaptation measures with a mitigation effect on climate change</p> <p>Axis 7</p> <p>INVESTMENT PRIORITY I increasing energy efficiency and security of supply through the development of intelligent systems for distribution, storage and transmission of energy and through the integration of distributed generation of energy from renewable sources.</p>
<p><b>Main expected results:</b></p>	<p>Increasing in the share of energy production from renewable sources - goal 15% of of the final energy consumption</p> <p>Greenhouse gas emissions reduction</p> <p>Sale of heat energy for municipal and living purposes</p> <p>Households with a better energy consumption class</p> <p>Annual primary energy consumption reduction in public buildings</p> <p>Newly-built or modernized energy transmission and distribution networks</p>
<p><b>Implementation status in your region:</b></p>	<p>By the end of 2018, contracts with the highest value in Poland were signed in the Mazovian voivodship - EU funding of EUR 4.5 billion</p>

Fact sheet to decentralised regional operative programmes

Title of OP		Regional Operational Programme for Mazovia Region	
Priority axis 4: Transition to a low carbon economy			
Specific objectives:	<p>Specific objective 1: Increasing the share of renewable energy sources in total energy production</p> <p>Specific objective 2: Increased energy efficiency in the public and housing sectors</p> <p>Specific objective 3: Better air quality</p>		
Competent implementation body/bodies:	Mazovian Voivodship Government		
Final beneficiaries:	<p>LGUs, their associations and associations, LGU organizational units with legal personality; public finance sector entities with legal personality; government administration; enterprise; universities; medical entities operating in the public health care system; housing cooperatives, housing associations; non-governmental organizations, churches and religious associations, as well as legal persons of churches and religious associations; State Forest Holding and its organizational units; entity that implements financial instruments, energy service providers; cultural institutions</p>		
Available budget:	Total budget:	EUR 400 647 506	
	EU funding:	80%	
	Ratio of national contribution:	20%	
Description of measures (with budget breakdown):	<p>The main goal is to reduce the economy's emissions. As part of the measures, it will be possible to apply for support for investments related to the production of electricity and heat from renewable sources along with the construction and modernization of distribution networks. The scope of support also includes projects in the field of comprehensive thermomodernization of public buildings and residential buildings. As part of the Axis, investments in the development of sustainable multimodal urban mobility and reduction of low emissions by improving the efficiency of heat generation and distribution will also be supported.</p> <p>Specific objective 1: Increasing the share of renewable energy sources in total energy production - budget EUR 54 475 309. Types of projects financed for this purpose are</p> <ol style="list-style-type: none"> <li>1. Infrastructure for the production and distribution of energy from renewable sources.</li> </ol> <p>Specific objective 2: Increased energy efficiency in the public and housing sectors budget EUR 104 541 043 Types of projects financed for this purpose are:</p> <ol style="list-style-type: none"> <li>1. Thermomodernization of public buildings.</li> <li>2. Thermomodernization of residential buildings.</li> <li>3. High-efficiency cogeneration <ul style="list-style-type: none"> <li>• construction and development of electricity and heat generation units high-efficiency cogeneration, including renewable energy,</li> <li>• reconstruction of heat generating units</li> </ul> </li> </ol> <p>Specific objective 3: Better air quality - Measure 4.3 Reduction of air pollution divided into sub-measures:</p> <ol style="list-style-type: none"> <li>Sub-measure 4.3.1 Limiting air pollution and developing urban mobility</li> <li>Sub-measure 4.3.2 Urban mobility as part of the ITI</li> </ol>		

	<p>The main purpose of intervention under the measure is to improve air quality by reducing pollutant and greenhouse gas emissions of anthropogenic origin from surface and linear sources caused by increased road traffic. Types of projects financed for this purpose are:</p> <p>Sub-measure 4.3.1</p> <ul style="list-style-type: none"> <li>- Limiting "low emissions"</li> <li>- Development of sustainable multimodal urban mobility</li> <li>- Energy-saving outdoor lighting (streets, squares and roads)</li> </ul> <p>Sub-measure 4.3.2</p> <ul style="list-style-type: none"> <li>- Development of sustainable multimodal urban mobility - ITI</li> </ul> <p>The total budget for this action is EUR 241 631 154, sub-measure 4.3.1 EUR 127 608 810, and for sub-measure 4.3.2 EUR 113 932 344</p>
<p><b>Main expected results:</b></p>	<p>Increasing the share of electricity production from renewable sources in electricity production          Additional capacity to generate energy from renewable sources          Greenhouse gas emissions reduction          Sale of heat energy for municipal and living purposes          Households with a better energy consumption class          Annual primary energy consumption reduction in public buildings          Reduced PM10 concentration</p>
<p><b>Implementation status:</b></p>	<p>By the end of 2018, 450 applications for funding were submitted -application formal correct for a total amount of EUR 681.6 million, including funding. from the ERDF EU 485.4 million. 273 applications were approved for implementation, of which 27 contracts with a total value of EUR 470.1 million were signed, including funding. E 313.9 million. Most projects are implemented in the Warsaw-East subregion - 1 contracts with the value of ERDF 74.3 million euros.</p>

## Appendix 3.

### Fact sheet to other EU low-carbon initiatives

<b>Project Name</b>	<b>More carbon reduction by dynamically monitoring energy efficiency</b>
<b>Project Acronym</b>	<b>EMPOWER</b>
<b>Programme:</b>	<b>Interreg Europe</b>
<b>Objectives of the Call or Financial Facility:</b>	Improving low carbon economy policies
<b>General/specific objectives of the Project:</b>	The aim of the project is to reduce carbon dioxide emissions in buildings, as well as to support jobs and stimulate economic growth in the local economy and improve regional policy.
<b>Participating organization(s) from the Region:</b>	Mazovia Energy Agency
<b>Role in the Project:</b>	PP
<b>Project summary:</b>	The EMPOWER project addresses two urgent challenges in European regions: reducing CO2 emissions from buildings using new technologies and better management, as well as the need to increase investment to achieve EU CO2 reduction goals. The potential is significant because: buildings account for 40% of EU energy demand and 36% of carbon dioxide emissions, and effective energy monitoring can reduce demand by 10%, but unfortunately progress is slow. Energy monitoring systems are available for individual homes and large systems, little exists for medium systems. Key decision makers do not always understand energy management. Private investors are concerned about long-term investment in energy management, they need good local management and quality data.
<b>Project funding/financial scheme:</b>	85% financed from programme Interreg Europe; 15% Partner own resources
<b>Main information sources:</b>	Project website: <a href="http://www.interregeurope.eu/empower/">www.interregeurope.eu/empower/</a>

## Fact sheet to other EU low-carbon initiatives

<b>Project Name</b>	<b>Boosting energy efficiency in Central European cities through smart energy management</b>
<b>Project Acronym</b>	<b>BOOSTEE-CE</b>
<b>Programme:</b>	<b>Interreg Central Europe</b>
<b>Objectives of the Call or Financial Facility:</b>	Cooperating on low-carbon strategies in CENTRAL EUROPE
<b>General/specific objectives of the Project:</b>	To develop and implement solutions for increasing energy efficiency and renewable energy usage in public infrastructures
<b>Participating organization(s) from the Region:</b>	Mazovia Energy Agency
<b>Role in the Project:</b>	PP
<b>Project summary:</b>	The main goal of the project is to improve electricity management in existing public buildings and ultimately reduce energy consumption in various CE areas, especially those less developed in a low-carbon approach. As part of international cooperation, an attempt will be made to solve the common EE problem of public buildings. In addition, the project will contribute to raising public awareness, environmental, economic and other benefits related to energy saving issues, which will contribute to aligning the level of knowledge and competence between project partners. To this end, the OnePlace platform for knowledge transfer to other regions of Europe will be developed. Along with the development and implementation of the 3D energy management system and pilot activities, the project will be characterized by an innovative approach to the energy audit of buildings, which will generate added value in the medium term. Project results can be replicated in other EU areas
<b>Project funding/financial scheme:</b>	85% financed from programme Interreg Europe; 15% Partner own resources
<b>Main information sources:</b>	Project website: <a href="http://www.interreg-central.eu/Content.Node/BOOSTEE-CE.html">www.interreg-central.eu/Content.Node/BOOSTEE-CE.html</a>

## Fact sheet to other EU low-carbon initiatives

<b>Project Name</b>	<b>Developing and transferring an innovative Energy Financing miX in order to activate private sector finance for increased investments in sustainable energy projects</b>
<b>Project Acronym</b>	<b>E-FIX</b>
<b>Programme:</b>	<b>Horizon 2020</b>
<b>Objectives of the Call or Financial Facility:</b>	Innovative financing schemes
<b>General/specific objectives of the Project:</b>	The overall objective of the E-FIX project is to prepare the European market – with a focus on countries of various EU enlargement rounds, as well as markets of countries, which have recently reached EU association status – for the intensified usage of innovative financing mechanisms in the energy sector in order to facilitate the increase of investments in energy projects and services.
<b>Participating organization(s) from the Region:</b>	Mazovia Energy Agency
<b>Role in the Project:</b>	PP
<b>Project summary:</b>	In the target countries of the E-FIX project of Central and South Eastern Europe and the assoc. countries AM and GE, there is considerable idle potential for EE and REN products and services. Both potential energy project developers and financiers face barriers regarding the accurate assessment of energy project feasibility and achieving investment security. The E-FIX project will result in increased investments in sustainable energy projects in the partner countries as well as lay the groundwork for better-informed and equipped stakeholders. The trainings of these stakeholders will provide them with the capacity to act as E-FIX Ambassadors, multipliers to promote and implement the E-FIX approach. On a larger scale, the E-FIX approach will be disseminated EU-wide, activating dormant private finance thereby contributing to the general growth of the EU markets of energy technology and services as one step into the direction of a low carbon economy.
<b>Project funding/financial scheme:</b>	100% financed form Horizon2020 Programme
<b>Main information sources:</b>	Project website: <a href="http://www.energyfinancing.eu/en/">www.energyfinancing.eu/en/</a> -

## Fact sheet to other EU low-carbon initiatives

<b>Project Name</b>	<b>Renewable Low Temperature District</b>
<b>Project Acronym</b>	<b>Related</b>
<b>Programme:</b>	<b>Horizon 2020</b>
<b>Objectives of the Call or Financial Facility:</b>	Innovation action
<b>General/specific objectives of the Project:</b>	The RELaTED project aims to develop an innovative concept of decentralized Ultra-Low Temperature (ULT) heating networks
<b>Participating organization(s) from the Region:</b>	Mazovia Energy Agency
<b>Role in the Project:</b>	PP
<b>Project summary:</b>	<p>The RELaTED project aims to develop an innovative concept of decentralized Ultra-Low Temperature (ULT) heating networks, which will allow the introduction of low-temperature heat sources, lower operating costs due to less heat loss and better energy efficiency in heat generating installations. The RELATED project approach will also relate to the strategy of smart power grids, which involves decentralization of energy and the transformation of consumers into prosumers. The result of the project will be to achieve decarbonisation of heat energy supply in European cities, through efficient integration and balancing of various renewable and waste heat sources with high efficiency and economics of scale. Guaranteeing economic viability along with a tendency to reduce the heat load on district heating (DH) networks can be possible by moving towards NZEB buildings (buildings with almost zero energy consumption). RELaTED will adapt several technologies available on the market to better integrate with the ULT DH concept to ensure optimal operation. In particular, district network stations will be adapted to 3FS systems (Tri-Functional Sub Stations) to allow bi-directional heat flows and net metering to allow heat injection from a local renewable energy source or waste heat. Considering the complexity and specificity of each district heating network, RELaTED will be implemented for four different district heating networks covering different countries, climates and scale. In addition, two regional studies will be carried out to assess the possibility of introducing ULT DH in two regions of Central and Southern Europe.</p>
<b>Project funding/financial scheme:</b>	70% financed from Horizon 2020 Programme; 30% Partner own resources
<b>Main information sources:</b>	Project website:

## Fact sheet to other EU low-carbon initiatives

<b>Project Name</b>	emPOWERing regional stakeholders for realising the full potential of european BIOeconomy”
<b>Project Acronym</b>	Power4Bio
<b>Programme:</b>	Horizon 2020
<b>Objectives of the Call or Financial Facility:</b>	Realising the potential of regional and local bio-based economies
<b>General/specific objectives of the Project:</b>	The POWER4BIO project aims at empowering regional stakeholders to boost the transition towards bioeconomy regions in Europe by providing them with the necessary tools, instruments and guidance to develop and implement sound sustainable bioeconomy strategies.
<b>Participating organization(s) from the Region:</b>	Mazovia Energy Agency
<b>Role in the Project:</b>	PP
<b>Project summary:</b>	POWER4BIO will be based on a comprehensive program to support mutual learning and internal and interregional cooperation between regional stakeholders to ensure exchange of knowledge between sectors and regions, and to jointly develop and complement various sustainable bioeconomy chains. The result of the project will be the development, application and approval of a standardized and flexible methodology based on a three-stage approach (stakeholder involvement, regional analysis and strategy development) to help regional entities focus on their bioeconomy. Regional Bioeconomy Councils will also be created to move towards bioeconomy in selected regions, and regional bioeconomic strategies will be developed or updated. Another achievement will be the development of business models, including examples of best practices suitable for local implementation in EU regions and a portfolio of support policies and funding instruments, as well as the development and implementation of a capacity building program and training to enhance the capabilities and skills of regional / local authorities and other stakeholders in various aspects of the bioeconomy. The POWER4BIO project involves 5 regions of Central and Eastern Europe and 5 regions from Western Europe selected to cover a wide range of geographical, climatic, infrastructure, market and logistics requirements.
<b>Project funding/financial scheme:</b>	100% financed form Horizon2020 Programme
<b>Main information sources:</b>	Project website: <a href="http://www.power4bio.eu/">www.power4bio.eu/</a>