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FINANCING OF INSTRUMENTS IMPROVING ENERGY EFFICIENCY IN POLAND IN THE YEARS 2014-2020

Abstract

This article presents an analysis of the methods and sources of financing for energy efficiency improvement in Poland planned for the years 2014-2020. The study provides an overview of the available information that will enable potential investors (public institutions and enterprises) to tailor a suitable financial engineering to the technical requirements of a planned energy-saving investment.

Key words

energy efficiency, energy efficiency investments, EU grants

Introduction

In the years 2014-2020, more than € 11.5 billion will be invested across the European Union in energy efficiency. By comparison, it was only € 5.5 billion in the years 2007-2013 [1]. Although the overall level of public spending in the EU's key cohesion policy in the 2014-2020 period will fall by 3.5% compared to the 2007-2013 period, support for energy efficiency and other investments in sustainable energy will increase to an unprecedented degree. The organization of the funds will also change. Table 1 presents a summary of the modifications in the mechanisms and the structure of financing the energy efficiency investments.

Table 1. Planned financing of energy efficiency improvements in the European Union in the years 2014-2020

Source of financing	Financing mechanisms		Financing covering energy efficiency	
	In the years 2007-2013	In the years 2014-2020	In the years 2007-2013	In the years 2014-2020 (own prognosis)
Financing under the EU cohesion policy	Operational programs, including financial instruments (e.g. JEREMIE)	Operational programs, including financial instruments (e.g. JEREMIE) Instrument Connecting Europe	EUR 5.5 billion, planned for energy efficiency, cogeneration and management of energy	EUR 5.3 billion (-3.5 %) [2] EUR 5.8 billion [3]
Financing of research	7. Framework Program (e.g. Concerto, E2B PPP, Smart Cities)	Horizon 2020	EUR 290 million	EUR 423 million (+46%)
Financing of expansion policy	Instruments of international financial institutions (SMEFF, EEFF)	There is no data on the future of the instruments	Approx. EUR 184 million	There is no data on the future of the instruments
European Energy Program for Recovery (EEPR)	European Energy Efficiency Fund (EEFF)	None - "Increasing the funds seems unreasonable" [5]	EUR 185.5 million	- [5]
Competitiveness and Innovation Framework Program (CIP)	Intelligent Energy Europe (IEE)	None - IEE and ICT-PSP are included in the Horizon 2020	Approx. EUR 730 million	-

	Information and Communication Technologies Policy Support Program (ICT-PSP)	Program		
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Source: own study based on [1],[2],[3],[4],[5]

The European public funding intended for improving energy efficiency in the years 2014-2020 will be characterized by new features compared to the 2007-2013 perspective. The level of the available funds will be increased by over 100%, and the leverage involving private funding will be increased. In addition, the emphasis put on the use of repayable instruments will be increased, and energy services and Energy Performance Contracting (EPC) will be promoted further.

A deep evolution in the financing of energy-saving investments will also take place in Poland in the coming years. Next to the above-mentioned new trends in the European financial engineering organization in energy efficiency, one can also mention the following changes that will be observed in Poland:

- The level of funds at regional level will be increased by over 25%, while the national funds will be reduced by nearly 35%;
- The number and diversity of priority programs of the National Fund for Environmental Protection and Water Management will increase, which will further support the involvement of Polish beneficiaries in programs financed at European level;
- In the face of the unexpectedly weak results of the existing energy efficiency improvement measures, such as the white certificate scheme, new forms of systemic energy efficiency support will be sought to achieve the targets set out in Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency.

Compared to the financial perspective for 2007-2013, the Multiannual Financial Frameworks initiated in 2014 will involve major changes in the methods and sources of financing of energy efficiency investments, especially in Poland. Thus, the purpose of this article is to present and organize the available information, which, in the author's intention, will enable potential investors (public institutions and companies) to match an appropriate financial engineering with the technical requirements of the planned undertaking.

Financing energy efficiency from public funds

The aim of the program	Limitation or avoidance of carbon dioxide emissions by financing undertakings that improve the energy efficiency of civic buildings
Measures covered by the program	<ul style="list-style-type: none"> ▪ Co-financing may be provided for implementation of projects in civic buildings; ▪ Thermo-modernization of civic buildings, including the changes in: equipment of facilities with equipment of the highest economically justified energy efficiency standards, directly connected with the thermo-modernization of buildings; ▪ 3) Replacement of interior lighting with energy saving lighting (as additional measures carried out in parallel with thermo-modernization of the structures).
Duration	2010-2017 (allocation of funds in 2010-2016)
Beneficiaries	<ul style="list-style-type: none"> ▪ Local government units and their associations; ▪ Entities providing public services in the execution of the tasks of their own local government units other than business entities; ▪ Volunteer Fire Department; ▪ Institutions within the meaning of the Higher Education Act and research institutes; ▪ Independent public health care institutions and health care entities operating within the meaning of art. 551 of the Civil Code regarding the provision of health services; ▪ Non-governmental organizations, churches and other religious associations entered in the register of churches and other religious associations and church legal persons; ▪ The entities or units referred to in item 1-6 being parties to a loan agreement in a group project.
Implementing body	The National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	Non-repayable forms (grants) - PLN 657 million Repayable forms (loans) - PLN 995 million
Source of financing	Non-repayable forms - proceeds from the sale of allocated emission units (Green Investment System grants) or other funds of the National Fund for Environmental Protection and Water Management Repayable forms - National Fund for Environmental Protection and Water Management funds

Public institutions

In the years 2014-2020, Polish public institutions will be able to apply for support for improvement of the energy efficiency from the following sources of financing:

- Green Investments System (Part 1) - energy management in civic buildings;
- Green Investments System (Part 5) - energy management in buildings of selected entities in the public finance sector;
- Green Investments System (Part 6) - SOWA - Energy-efficient street lighting;
- Efficient use of energy. Part 4 - LEMUR Energy Efficient Civic Buildings;
- Priority program 5.8. KAWKA - Liquidation of low emission, supporting energy efficiency growth and the development of distributed renewable energy sources;
- Operational Program PL04 "Energy Saving and Promoting Renewable Energy Sources" (program area no. 5 - energy efficiency) under the EEA Financial Mechanism and the Norwegian Financial Mechanism in the years 2012-2017;
- Regional Operational Programs of voivodships for the years 2014-2020;
- The Operational Program Infrastructure and Environment for the years 2014-2020.

Green Investments System (Part 1) - energy management in civic buildings

Green Investments System (Part 5) - energy management in buildings of selected entities in the public finance sector

The aim of the pro- Limitation or avoidance of carbon dioxide emissions through co-financing of under-

gram	takings improving the energy efficiency in selected public finance sector entity buildings.
Measures covered by the program	<ul style="list-style-type: none"> ▪ Thermo-modernization of buildings, including the changes in: equipment of facilities with equipment of the highest economically justified energy efficiency standards, directly connected with the thermo-modernization of the structures; ▪ 2) Replacement of interior lighting with energy saving lighting (as additional measures carried out in parallel with thermo-modernization of the structures).
Duration	2010-2015 (allocation of funds in 2010-2013)
Beneficiaries	<p>Part A</p> <ol style="list-style-type: none"> 1) Polish Academy of Sciences and the scientific institutes it created; 2) State cultural institutions; 3) Self-government cultural institutions operating under the Act on the Organization and Operation of Cultural Activities; 4) Budget management institutions; 5) District and municipal headquarters of the State Fire Service. <p>Part B</p> <p>State budget units.</p>
Implementing body	National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	<p>PLN 545 million, including:</p> <p>Part A - PLN 100 million</p> <p>Part B - PLN 445 million</p>
Source of financing	<p>Part A - proceeds from the sale of allocated emission units or other funds of the National Fund for Environmental Protection and Water Management</p> <p>Part B - funds of the National Fund for Environmental Protection and Water Management</p>

Green Investments System (Part 6) - SOWA - Energy-efficient street lighting

The aim of the program	The aim of the measure is to reduce carbon dioxide emissions by co-financing undertakings improving the energy efficiency of street lighting systems.
Measures covered by the program	<p>Co-financing may be provided for the implementation of projects involving:</p> <ul style="list-style-type: none"> ▪ the modernization of street lighting (i.a. the replacement of: light sources, luminaires, starters, power cables, posts, installation of new lighting points within the modernized lighting lines, if it is necessary to meet the EN 13201 standard); ▪ the installation of devices for intelligent lighting control; ▪ the installation of controllable power reduction and supply voltage stabilization systems.
Duration	2013-2017 (allocation of funds in 2014)
Beneficiaries	Local government units having entitled to manage street lighting infrastructure within the scope of the implemented undertaking.
Implementing body	National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	<p>PLN 256 million, including:</p> <p>Non-repayable forms (grants) - PLN 160 million</p> <p>Repayable forms (loans) - PLN 196 million</p>
Source of financing	The proceeds from the sale of allocated emission units or other funds of the National Fund for Environmental Protection and Water Management

Efficient use of energy. Part 4 - LEMUR Energy Efficient Civic Buildings

The aim of the program	The aim of the program is to avoid CO ₂ emissions associated with the design and construction of new energy efficient civic buildings and collective housing.
Measures covered by	Investments consisting in the design and construction or only construction of new

the program	civic buildings and collective housing. Grants - financing the costs of project documentation preparation depending on the energy efficiency class of the building being designed. Loan - up to PLN 1000 per 1 m ² of usable area in rooms with controlled air temperature in the building. A loan is subject to partial redemption depending on the class of energy efficiency of the building obtained.
Duration	2013-2020 (allocation of funds in 2014-2020)
Beneficiaries	<ul style="list-style-type: none"> ▪ Public finances sector units ▪ Local government units and their associations and companies, ▪ Entities providing public services in the execution of the tasks of their own local government units other than business entities, including local government legal persons, ▪ Institutions within the meaning of the Higher Education Act and research institutes. ▪ Independent public health care institutions and health care entities operating within the meaning of art. 55 of the Civil Code regarding the provision of health services, ▪ Non-governmental organizations, churches and other religious associations entered in the register of churches and other religious associations and church legal persons, carrying out public tasks.
Implementing body	National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	PLN 30 million - non-repayable forms PLN 270 million - repayable forms
Source of financing	National Fund for Environmental Protection and Water Management
Planned emission reduction	31 thousand Mg of CO ₂ in the period 2014-2020

Priority program 5.8. KAWKA - Liquidation of low emission, supporting energy efficiency growth and the development of distributed renewable energy sources

The aim of the program	Reducing the exposure of the populace to the effects of air pollution in areas where there are significant overruns of the admissible and target concentrations of those pollutants for which air protection programs have been developed. The aim of the program will be achieved by reducing pollutant emissions, especially PM 2.5, PM 10 and CO ₂ emissions.
Measures covered by the program	Undertakings located in areas of cities of more than 10 000 inhabitants (the quantitative restriction does not apply to spa towns): <ul style="list-style-type: none"> ▪ undertakings aimed at limiting the low emission, related to increasing energy efficiency and using high-efficiency cogeneration systems and renewable energy sources; ▪ reduction of pollutant emissions into air from public transport sources; ▪ educational campaigns (for beneficiaries) showing the health and social benefits of eliminating low emissions; and/or informing about the time horizon of banning solid fuels or other systemic measures guaranteeing maintaining pollution levels after corrective measures are carried out; ▪ creation of databases (this pertains to local government units or institutions indicated by them), allowing for the preparation of an inventory of sources of emissions to air from public transport sources.
Duration	Implementation: 2013-2018 Allocation of funds: 2013-2015
Beneficiaries	The entities indicated in air protection programs that plan to implement or implement undertakings that may be funded by voivodeship environmental protection and water management funds from resources provided by the National Fund for Environmental Protection and Water Management, taking into account the terms of this program.

Implementing body	The National Fund for Environmental Protection and Water Management, Voivodeship Environmental Protection and Water Management Funds
Monitoring institution	The Minister of Environment
Budget	PLN 400 million
Source of financing	State funds
Planned emission reduction	134 Mg of CO ₂

Operational Program PL04 "Energy Saving and Promoting Renewable Energy Sources" (program area no. 5 - energy efficiency)

The aim of the program	The program aims to reduce greenhouse gas and air pollution emissions and increase the share of renewable energy in the overall energy balance.
Measures covered by the program	Thermo-modernization of civic buildings Modernization or replacement of existing energy sources (including the replacement or reconfiguration of obsolete local grids) for civic buildings with modern, energy efficient and environmentally friendly sources of heat or electricity with a total rated power of up to 5 MW Installation, modernization or replacement of thermal units with a total rated power of up to 3 MW, supplying civic buildings.
Duration	10.06.2013 - 30.04.2016
Beneficiaries	Units from the public finance sector or non-public entities performing public tasks
Implementing body	National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	EUR 55.9 million (PLN 232 million)
Source of financing	The Financial Mechanism of the European Economic Area in the years 2009 - 2014

Regional Operational Programs of voivodships for the years 2014-2020

The aim of the program	The aim of the programs will include i.a. air quality protection, increasing the use of biogas (cogeneration), as well as improved energy efficiency.
Measures covered by the program	Investments consisting in thermo-modernization of public buildings, modernization of heat sources, development of high-efficiency cogeneration systems and improvement of energy efficiency of heating networks.
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	Public finances sector units
Implementing body	Marshal's Offices of the Voivodeships
Monitoring institution	The Minister of Infrastructure and Development
Budget	PLN 2 309 577 246 ⁷
Source of financing	European Regional Development Fund, state funds
Planned emission reduction	No data

The Operational Program Infrastructure and Environment for the years 2014-2020

The aim of the program	The aim of the program will include i.a. air quality protection and improvement of the energy efficiency of public institutions.
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⁷ A forecast based on [9], assuming an increase in capital expenditures for energy efficiency of public institutions by 25.17%, i.e. an increase proportional to the overall increase in ERDF allocation within the ROP 2014-2020 as compared to the ROP 2007-2013. The EUR/PLN exchange rate published by the ECB on 01.11.2013 was accepted for the calculations.

Measures covered by the program	Investments consisting of thermo-modernization of civic buildings, modernization of heat sources within Priority Axis I: Promotion of renewable energy sources and energy efficiency ⁸
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	Public finances sector units
Implementing body	The Ministry of Economy
Monitoring institution	The Ministry of Infrastructure and Development
Budget	PLN 331 796 thousand ⁹
Source of financing	European Regional Development Fund, Cohesion Fund, state funds
Planned emission reduction	No data

The Industry

Polish companies in the years 2014-2020 will be able to apply for financing of energy saving investments from public sources such as:

- Energy-saving investments in small and medium-sized enterprises;
- Support for entrepreneurs in the scope of low carbon and resource efficient economy;
- Priority Program: Intelligent Energy Networks (IEN);
- Regional Operational Programs for the years 2014-2020;
- The Operational Program Infrastructure and Environment for the years 2014-2020;
- The program for access to financial instruments for the SME sector (PoISEFF);
- The system of energy efficiency certificates, the so-called white certificates.

Energy-saving investments in small and medium-sized enterprises

Aim	The aim of the program is to reduce energy consumption because of investment in energy efficiency and the use of renewable energy sources in the small and medium enterprises sector. Because of the implementation of the program, CO ₂ emissions will be reduced.
Target group	SMEs
The scope of the support	<ul style="list-style-type: none"> ▪ Investment projects aimed at improving energy efficiency, consisting in the purchase of equipment listed in the List of Eligible Materials and Equipment (LEME) - the list of equipment is published on www.nfosigw.gov.pl. This applies to the projects financed in the form of a loan with a grant not exceeding EUR 250 000, which is equivalent to Polish zloty at the average NBP exchange rate as of the date of signing of the loan agreement. ▪ Investment projects in energy efficiency improvement, based on individual solutions and achieving energy savings of at least 20%. Financing in the form of a loan with a grant for a project of this kind may not exceed EUR 1 000 000. ▪ Projects consisting in thermo-modernization of the building/s remaining at the disposal of the beneficiary, resulting in achieving at least 30% of energy savings. Financing in the form of a loan with a grant for a project of this kind may not exceed EUR 1 000 000. ▪ Investments involving the use of renewable energy sources, including, i.a. photovoltaics, in existing facilities using conventional energy sources. Financing in the form of a loan with a grant for a project of this kind may not exceed EUR 1 000 000.

⁸ Operational Program Infrastructure and Environment for the years 2014-2020 (Draft), Ministry of Regional Development, August 26, 2013.

⁹ A forecast based on [9], assuming a decrease in capital expenditures for energy efficiency of public institutions by 35.92% compared to the years 2007-2013, i.e. a decrease proportional to the overall decrease in allocation within the OPIE 2014-2020 as compared to the OPIE 2007-2013. The EUR/PLN exchange rate published by the ECB on 01.11.2013 was accepted for the calculations.

Form of support	<ul style="list-style-type: none"> ▪ Grants for partial repayment of loan capital are granted within the limit granted to the bank by the National Fund for Environmental Protection and Water Management. ▪ The bank establishes a security for the loan with a grant. The bank guarantees repayment of the grant funds to the National Fund for Environmental Protection and Water Management in the cases specified in the cooperation agreement concluded between the National Fund for Environmental Protection and Water Management and the bank. ▪ The terms of cooperation, including the mode and deadlines for transferring funds by the National Fund for Environmental Protection and Water Management to the banks for partial repayment of loans are specified in detail in the cooperation agreements concluded by the National Fund for Environmental Protection and Water Management with the banks. ▪ Monitoring and control of the correct implementation of the project and use of funds from the loan with a grant is carried out by the bank. Where a grant is a public aid, the bank carries out the obligations associated with granting it as a public aid provider.
Budget	The SMEs registered in Poland
Implementing Institution	Banks that have signed an agreement with the National Fund for Environmental Protection and Water Management
Source of financing	The National Fund for Environmental Protection and Water Management
Duration	2014-2017

Support for entrepreneurs in the scope of low carbon and resource efficient economy

Objective	The aim of the program is to reduce the negative impact of enterprises on the environment.
Target group	Entrepreneurs
The scope of the support	<p>Part 1) Power engineering/electric power audit of the enterprise: audits in entities where the minimum average final energy consumption (total electricity and heat) in the year preceding the submission of the application for audit co-financing was 20 GWh/year, including:</p> <ul style="list-style-type: none"> ▪ power engineering audits of technological processes, ▪ electric power audits of buildings and internal industrial networks, ▪ power engineering audits of heat, electricity and cooling sources, ▪ power engineering audits of internal heating networks and buildings. <p>Part 2) Increasing energy efficiency. Projects compliant with the announcement of the Minister of Economy from December 21, 2012 on the detailed list of energy efficiency improvement projects, aimed at improving energy efficiency, as well as the technological changes aimed at this in the existing technical facilities, installations and devices.</p> <p>Part 3) E-CUMULATOR - An Ecological Accumulator for the Industry. Types of projects:</p> <ul style="list-style-type: none"> ▪ Reduction of the consumption of primary raw materials through projects involving i.a. the construction, expansion or modernization of the existing production installations or industrial devices; ▪ Limitation of harmful emissions to the atmosphere; ▪ Use of industrial waste, including sewage sludge, in power production.
Form of support	Part one - grant up to 70% Part two - loan up to 75% Part three - loan up to 75%
Budget	Grants - PLN 25 million Loans - PLN 714 million

Implementing Institution	The National Fund for Environmental Protection and Water Management
Source of financing	The National Fund for Environmental Protection and Water Management
Duration	2013-2017

Priority Program: Intelligent Energy Networks (IEN)

Aim	In this area, the National Fund for Environmental Protection and Water Management will co-finance promotional and educational activities, implementation (in pilot areas) of smart metering and information transmission networks, works on balancing and optimization of electricity, heat and gas consumption (measurement and return measures), implementation (in pilot areas) of distributed renewable energy sources, energy storage facilities and intelligent lighting networks using energy-efficient lighting, development works, preparation of IT systems and standards specifications. Implementing smart energy networks in urban pilot areas will be conducive to sustainable urban development.
Effect	Reduction of energy consumption
Target group	<ul style="list-style-type: none"> ▪ Entrepreneurs - operators of electricity and gas distribution and transmission systems, balancing the system, acting jointly with the local government and/or housing co-operatives (communities); ▪ Local government units that organize ISE pilot areas in their area and implement ISE projects in its different layers, managing special economic zones;
The scope of the support	<ul style="list-style-type: none"> ▪ Promotional and informational activities in the field of intelligent energy networks, with focus on <i>smart grids</i>, including <i>smart metering</i>; ▪ Deployment of smart metering (AMI) in pilot areas and optimization of consumption of electricity, gas, heat and utility water; ▪ Implementation of distributed renewable and/or alternative energy sources under <i>smart grid</i> projects (in pilot areas); ▪ Implementation of energy storage facilities under <i>smart grid</i> projects (in pilot areas); ▪ Implementation of intelligent lighting networks using energy-efficient lighting in pilot areas; ▪ Preparation of studies (including IT programs) for development of systems for peak load management and for integration of measurement and distribution of energy with telecommunications systems energy for transmission and distribution enterprises; ▪ Preparation of technical feasibility studies for smart grid projects; ▪ Preparation of studies in the field of specification and determination of standards for smart grid activities.
Budget	542 million, the National Fund for Environmental Protection and Water Management
Implementing Institution	The National Fund for Environmental Protection and Water Management
Duration	Start: 2012. End: not determined. No call for applications was scheduled for 2014.

Regional Operational Programs for the years 2014-2020

The aim of the program	The aim of the programs will include i.a. air quality protection, increasing the use of biogas (cogeneration), as well as improved energy efficiency of enterprises.
Measures covered by the program	Investments consisting in thermo-modernization of enterprise buildings, modernization of heat sources, development of high-efficiency cogeneration systems and improvement of energy efficiency of district heating networks.

Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	Enterprises ¹⁰
Implementing body	Marshal's Offices of the Voivdeships
Monitoring institution	The Minister of Infrastructure and Development
Budget	990 498 thousand ¹¹
Source of financing	European Regional Development Fund, state funds
Planned emission reduction	No data

The Operational Program Infrastructure and Environment for the years 2014-2020

The aim of the program	The aim of the program will include air quality protection and improvement of the energy efficiency of enterprises.
Measures covered by the program	Investments consisting in thermo-modernization of enterprise buildings, modernization of heat sources, heating and power networks, construction of high-efficiency cogeneration units within Priority Axis I: Promotion of renewable energy sources and energy efficiency ¹²
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	Enterprises ¹³
Implementing body	The Ministry of Economy
Monitoring institution	The Ministry of Infrastructure and Development
Budget	1,198,939 thousand ¹⁴
Source of financing	European Regional Development Fund, Cohesion Fund, state funds
Planned emission reduction	No data

The program for access to financial instruments for the SME sector (PoISEFF)

Objective	PoISEFF is a Sustainable Energy Development Financing Program in Poland, with a €150 million credit line. PoISEFF's offer is addressed to small and medium-sized enterprises (SMEs) interested in investing in new technologies and devices that reduce energy consumption or produce energy from renewable sources.
Effect	Energy saving
Target group	SMEs
The scope of the support	Financing can be obtained in the form of a loan or leasing of up to EUR 1 million through the financial institutions participating in the Program (banks, lease institutions). <ul style="list-style-type: none"> ▪ Investment projects allowing to achieve at least 20% savings in energy consumption. ▪ Investment projects that increase the energy efficiency of buildings, which reduce energy consumption in SME commercial and administrative buildings by 30%;

¹⁰ The energy efficiency measures implemented within the ROP 2014-2020 by public institutions are described in item 0 of this expertise.

¹¹ A forecast assuming an increase in capital expenditures for energy efficiency of non-public institutions by 25.17%, i.e. an increase proportional to the overall increase in ERDF allocation within the ROP 2014-2020 as compared to the ROP 2007-2013. The EUR/PLN exchange rate published by the ECB on 01.11.2013 was accepted for the calculations.

¹² Operational Program Infrastructure and Environment for the years 2014-2020 (Draft), Ministry of Regional Development, August 26, 2013

¹³ The energy efficiency measures implemented within the OPIE 2014-2020 by public institutions are described in item 0 of this expertise.

¹⁴ The CBI Pro-Akademia's forecast, assuming a decrease in capital expenditures for energy efficiency of enterprises (forms of support corresponding to Measures 9.1, 9.2 and 9.4 for high efficiency cogeneration) by 35.92% compared to 2007-2013, i.e. a decrease proportional to the overall decrease in allocations within the OPIE 2014-2020 in relation to OPIE 2007-2013

	<ul style="list-style-type: none"> ▪ Investments in renewable energy sources; ▪ Investments covering selected technologies - investments in projects and equipment selected from the prepared list of technologies.
Budget	EUR 150 million from the European Bank for Reconstruction and Development (EBRD) funds
Implementing Institution	EBRD
Duration	Start: 2011. End: not determined

White certificate system

The white certificates system operates in three areas, called energy efficiency improvement undertaking categories:

- increasing energy savings by end users;
- increasing energy savings by equipment for own needs;
- reducing the loss of electricity, heat or natural gas in transmission or distribution.

The first category of end users includes all end-use sectors. The second category concerns only the so-called own needs devices, defined as auxiliary facility or installation assembly within the meaning of art. 3 item 10 of the Act from April 10, 1997. - Energy Law, used to produce electricity or heat. Whereas the category of reduction of electricity, heat or natural gas losses in transmission or distribution relates to the modernization of networks transporting energy carriers together with relevant facilities accompanying these processes. The system of white certificates is implemented by the Energy Regulatory Office.

Research and Development

The GECON Program - Generator of Ecological Concepts

The aim of the program	<p>The aim of the program is to carry out scientific research, development work and implement innovative environmental technologies resulting from them.</p> <p>A program implemented by the National Fund for Environmental Protection and Water Management and the National Center for Research and Development (NCRD) in 5 selected areas:</p> <ul style="list-style-type: none"> ▪ Environmental aspects of unconventional gas acquisition, ▪ Energy efficiency and energy storage, ▪ Protection and rationalization of water use, ▪ Acquisition of energy from clean sources, ▪ Innovative methods of obtaining fuels, energy and materials from waste and recycling of waste.
Measures covered by the program	<p>Co-financing of industrial research and development works in the amount of PLN 0.5 million to PLN 10 million</p> <p>Co-financing for the implementation phase in the amount up to PLN 20 million, but not more than</p> <p>5 times the amount of R&D base co-financing.</p>
Duration	from 2012 until the last of the co-financed projects is completed
Beneficiaries	<ul style="list-style-type: none"> ▪ Entrepreneurs seated in the Republic of Poland. ▪ A scientific consortium - where the consortium consists of at least one non-entrepreneurial scientific unit and at least one entrepreneur. The leader of the consortium is the entrepreneur. ▪ A group of entrepreneurs acting jointly based on an agreement, which consists of at least two entrepreneurs.
Implementing body	The National Center for Research and Development and the National Fund for Environmental Protection and Water Management
Budget	PLN 400 million
Source of financing	State funds

Horizon 2020 - Safe, clean and efficient energy

The aim of the program	The aim of the Horizon 2020 program in terms of energy efficiency is a response to the "Energy Challenge" in the scope of reducing energy and carbon footprint, creating new knowledge and technology, increasing public involvement in energy issues, and accelerating the deployment of energy innovation.
Measures covered by the program	<p>Co-financing will cover research and research-implementation projects concerning the following areas of energy efficiency [6]:</p> <p>A - Buildings and consumers</p> <ul style="list-style-type: none"> ▪ EE 1 – 2014: Production of prefabricated elements for the revitalization of buildings. ▪ EE 2 – 2015: Design of new low energy buildings. ▪ EE 3 – 2014: Strategies and energy solutions for the deep revitalization of historic buildings. ▪ EE 4 – 2014: Building skills. ▪ EE 5 – 2014/2015: Increasing the energy efficiency of existing buildings through organizational innovations and creation of a market for deep revitalization. ▪ EE 6 – 2015: Demand response in building groups. ▪ EE 7 – 2014/2015: Reinforcement of the ability of public authorities to plan and implement sustainable energy policies and measures. ▪ EE 8 – 2014: Public procurements for innovative sustainable energy solutions. ▪ EE 9– 2014/2015: Reinforcement of the stakeholders' positions in supporting public authorities in defining and implementing sustainable energy policies and measures. ▪ EE 10 – 2014/2015: Engaging consumers in sustainable energy. ▪ EE 11 - 2014/2015 - New ICT solutions for energy efficiency. ▪ EE 12 – 2014: Socio-economic studies on energy efficiency. <p>B - Heating and cooling</p> <ul style="list-style-type: none"> ▪ EE 13 – 2014/2015: Technologies for network heating and cooling. ▪ EE 14 - 2014/2015: Removing market barriers for the implementation of efficient heating and cooling solutions. <p>C - The Industry and Products</p> <ul style="list-style-type: none"> ▪ EE 15 – 2014/2015: Ensuring an effective implementation of EU product efficiency legislation. ▪ EE 16 – 2014/2015: Organizational innovation for increasing energy efficiency in industry. ▪ EE 17 – 2015: Direction of energy innovation by large purchasing groups. ▪ EE 18 2014/2015: New technologies for the use of heat recovery in large industrial systems, considering the entire energy process from heat production to its conversion, delivery and end use. <p>D - Financing of Sustainable Energy</p> <ul style="list-style-type: none"> ▪ EE 19 – 2014/2015: Improving the financability and attractiveness of investments in sustainable energy. ▪ EE 20 – 2014/2015: Support for the preparation of innovative aggregated projects and investment programs in the field of sustainable energy, which can be financed by banks. ▪ EE 21 – 2014/2015: Development and introduction of innovative energy services and sustainable energy financing programs.
Duration	2014-2020
Beneficiaries	<ul style="list-style-type: none"> ▪ A legal entity seated in a member state or associated state, or established under European Union law; ▪ An international organization of European importance; ▪ A legal entity established in a third state specified in the work program [7].
Implementing body	European Commission, General Directorate for Research and Innovation
Budget	EUR 5 931 million
Source of financing	European funds

1.1. Housing

1.1.1. Thermo-modernization and Renovation Fund

The aim of the program	<p>The aim of the program is to provide financial support for investors undertaking thermo-modernization, repair and renovation works of single-family houses with credits from commercial banks.</p> <p>The aim of the thermo-modernization projects supported is:</p> <ul style="list-style-type: none"> ▪ reduction of consumption of energy for the purposes of heating and warming up utility water in residential buildings, collective residences and buildings owned by local government units, which serve to carry out public tasks; ▪ reduction of the cost of obtaining the heat delivered to the above buildings - because of the technical connection to the centralized heat source due to the decommissioning of the local heat source; ▪ reduction of primary energy losses in local heating networks and the local heat sources supplying them; ▪ total or partial conversion of energy sources to renewable sources or the use of high efficiency Cogeneration - with the obligation to obtain energy savings specified in the act.
Measures covered by the program	<p>The program covers the measures aimed at:</p> <ul style="list-style-type: none"> ▪ an improvement that results in reduced demand for energy supplied for heating and warming up utility water, and heating; ▪ an improvement that results in the reduction of primary energy losses in local heating networks and the local heat sources supplying them; ▪ execution of a technical connection to a centralized heat source, due to the decommissioning of the local heat source, resulting in a reduction in the costs of obtaining heat; ▪ total or partial conversion of energy sources to renewable sources or use of high-efficiency Cogeneration. <p>The prerequisite for receiving the thermo-modernization bonus is to contract a credit from a commercial bank for the implementation of the undertaking. The amount of the thermo-modernization bonus constitutes 20% of the loan amount used, if it is not in excess of:</p> <ul style="list-style-type: none"> ▪ 16% of the costs incurred for the realization of the thermo-modernization undertaking; ▪ the double amount of the expected annual energy cost savings, determined based on an energy audit.
Duration	<p>Start - 2009</p> <p>End - the measure is of a systemic nature and the provisions in force do not regulate the time of completion of the measure</p>
Beneficiaries	<p>The thermo-modernization bonus can be provided for the owners or administrators of:</p> <ul style="list-style-type: none"> ▪ residential buildings, ▪ collective residence buildings, ▪ civic buildings owned by local government units and used by them for the performance of public tasks, ▪ a local heating network, ▪ a local heat source. <p>All investors, regardless of their legal status, can benefit from the bonus, e.g.: legal entities (e.g. housing co-operatives and commercial law companies), local government units, housing communities, natural persons, including single family home owners.</p> <p>The bonus is not available to budgetary units and budgetary facilities.</p>
Implementing body	Bank Gospodarstwa Krajowego (National Economy Bank)
Monitoring institution	The Ministry of Infrastructure and Development

Budget	PLN 150-200 million per year
Source of financing	<ul style="list-style-type: none"> ▪ Funds transferred from the state budget - in the amount specified in the Budget Act; ▪ Interest on deposits of funds in banks; ▪ Proceeds from the fund's investment in securities; ▪ Donations and bequests; ▪ Other proceeds.

Credit subsidies for the construction of energy efficient homes

The aim of the program	The aim of the program is to save energy and reduce CO ₂ emissions through co-financing of energy efficiency improvement undertakings in newly built residential buildings.
Measures covered by the program	<ul style="list-style-type: none"> ▪ construction of a single-family house; ▪ purchase of a new single-family house; ▪ purchase of a residential unit in a new multi-family residential building.
Support rules	<p>A grant for partial repayment of bank credit capital. The amount of co-financing is:</p> <ul style="list-style-type: none"> ▪ In the case of single-family houses: <ul style="list-style-type: none"> — standard NF40 – EUco 40 kWh/(m²*year) – grant: PLN 30 000 gross; — standard NF15 – EUco 15 kWh/(m²*year) – grant: PLN 50 000 gross. ▪ For residential units in multi-family buildings: <ul style="list-style-type: none"> — standard NF40 – EUco 40 kWh/(m²*year) – grant: PLN 11 000 gross; — standard NF15 – EUco 15 kWh/(m²*year) – grant: PLN 16 000 gross. <p>Additional rules:</p> <ul style="list-style-type: none"> ▪ in case of failure to meet the assumed NF15 standard, the grant may be reduced to the level envisaged for the NF40 standard; ▪ in case of failure to meet the assumed NF40 standard, the grant will not be provided; ▪ if a part of a single-family house/residential unit is used for running a business (including rental), the amount of co-financing will be reduced proportionately; ▪ to the share of business space in the total area of the single-family house/residential unit; e.g. if the business activity is carried out on 20% of the total area, the amount of co-financing is reduced by 20%; ▪ in the event where the business activity is conducted on an area exceeding 50% of the single-family house/residential unit mentioned, the undertaking is not eligible for co-financing by the National Fund for Environmental Protection and Water Management.
Duration	2013-2022
Beneficiaries	<ul style="list-style-type: none"> ▪ Natural persons holding a valid building permit and who have the right to administrate a real property on which they will build a residential building; ▪ Natural persons who have the right for the developer to transfer onto them the rights to a real property together with a single-family house, which a developer will build on, or perpetual usufruct of land and ownership of a single-family house that will be settled on and will be a separate real property, or ownership of a residential unit. The developer is also understood as a housing cooperative.
Implementing body	Banks with whom the National Fund for Environmental Protection and Water Management entered into agreements
Monitoring institution	The National Fund for Environmental Protection and Water Management
Budget	PLN 300 million
Source of financing	State funds

Regional Operational Programs of Voivodeships for the years 2014-2020

The aim of the program	The aim of the programs will include air quality protection and improvement of the energy efficiency of residential buildings.
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Measures covered by the programs	<ul style="list-style-type: none"> ▪ Renovation of multi-family residential buildings. ▪ Adaptation and renovation of buildings for residential purposes for people with special needs [8].
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	<ul style="list-style-type: none"> ▪ Local government units, their associations and societies, ▪ Organizational units of local self-government units with legal personality; ▪ Housing co-operatives; ▪ Residential communities; ▪ Societies for Social Construction; ▪ Other organizational units included in the local revitalization program, which have the right to administrate a given property; ▪ Institutions and organizations (including non-governmental organizations) dealing with homelessness, supervised apartments (e.g. for people out of prison); ▪ Churches and religious associations (if they will create shelters for the homeless and supervised apartments); ▪ Non-profit actors, integrating different social groups.
Implementing body	Marshal's Offices of the Voivdeships
Monitoring institution	The Minister of Infrastructure and Development
Budget	EUR 937 million ¹⁵
Source of financing	European Regional Development Fund, state funds
Planned emission reduction	No data

Transport

Priority program 5.8. KAWKA - Liquidation of low emission, supporting energy efficiency growth and the development of distributed renewable energy sources

The aim of the program	Reducing the exposure of the populace to the effects of air pollution in areas where there are significant overruns of the admissible and target concentrations of those pollutants for which air protection programs have been developed. The aim of the program will be achieved by reducing pollutant emissions, especially PM 2.5, PM 10 and CO ₂ emissions.
Measures covered by the program	<p>Projects located in areas of cities of more than 10 000 inhabitants (the quantitative restriction does not apply to spa towns):</p> <ul style="list-style-type: none"> ▪ reduction of pollutant emissions into air from public transport sources; ▪ educational campaigns (for beneficiaries) showing the health and social benefits of eliminating low emissions; and/or informing about the time horizon of banning solid fuels or other systemic measures guaranteeing maintaining pollution levels after corrective measures are carried out; ▪ creation of databases (this pertains to local government units or institutions indicated by them), allowing for the preparation of an inventory of sources of emissions to air from public transport sources.
Duration	Implementation: 2013-2018 Allocation of funds: 2013-2015
Beneficiaries	The entities indicated in air protection programs that plan to implement or implement undertakings that may be funded by voivodeship environmental protection and water management funds from resources provided by the National Fund for Environmental Protection and Water Management, considering the terms of this program.
Implementing body	The National Fund for Environmental Protection and Water Management, Voivodeship Environmental Protection and Water Management Funds
Monitoring institution	The Minister of Environment
Budget	PLN 400 million

¹⁵ Forecast based on [9] and [12], assuming that the maximum percentage of funds for housing in the 2014-2020 perspective will be the same as in the 2007-2013 perspective - 3% of total funds.

Source of financing	State funds
Planned emission reduction	134 Mg of CO ₂

Green Investment System (Part 7) - GAZELA - Low emission urban transport

The aim of the program	Limitation or avoidance of carbon dioxide emissions through co-financing of undertakings that reduce energy and fuel consumption in urban transport.
Measures covered by the program	Co-financing may be provided for undertakings aimed at reducing energy and fuel consumption in urban transport. The program includes the following measures: <ul style="list-style-type: none"> ▪ concerning rolling stock, consisting of: <ul style="list-style-type: none"> — buying new hybrid buses powered by CNG gas, — training of drivers of urban transport vehicles involving low-emission rolling stock, ▪ concerning infrastructure and management, consisting of: <ul style="list-style-type: none"> — modernization or construction of a service station for refueling public transport vehicles adapted to hybrid buses powered by CNG gas, — modernization or construction of cycling routes, — modernization or construction of bus lanes, — Modernization or construction of Park&Ride car parks, — implementation of urban transport management systems, — implementation of an urban bicycle system.
Duration	No call for applications was scheduled for 2014.
Beneficiaries	<ul style="list-style-type: none"> ▪ Municipalities; ▪ Communal companies that operate to carry out the tasks of municipalities involved in local public transport; ▪ Other entities providing local urban transport services based on an agreement concluded with the municipality.
Implementing body	The National Fund for Environmental Protection and Water Management
Monitoring institution	The Minister of Environment
Budget	Non-repayable forms (grants) - PLN 80 million
Source of financing	Proceeds from the sale of allocated emission units (Green Investment System grants) or other funds of the National Fund for Environmental Protection and Water Management

Regional Operational Programs of Voivodeships for the years 2014-2020

The aim of the program	The aim of the programs will include i.a. ensuring the possibility of completing the transport infrastructure development program launched in recent years, developing low carbon transport.
Measures covered by the program	Investments in the infrastructure and rolling stock for "clean" public transport in cities (especially rail transport), limiting and placating car traffic in city centers, facilities for non-motorized (pedestrian and cycling) traffic
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	Local government units, urban transport infrastructure administrators and carriers providing passenger transport services.
Implementing bodies	Marshal's Offices of the Voivodeships
Monitoring institution	The Minister of Infrastructure and Development
Budget	PLN 3 130 million ¹⁶
Source of financing	European Regional Development Fund, state funds

The Operational Program Infrastructure and Environment for the years 2014-2020

¹⁶ Forecast based on [9], assuming an increase in capital expenditure on transport programs in the field of intelligent transport systems and development of urban transport, proportional to the overall change in the level of allocation of the ROP 2014-2020 as compared to the ROP 2007-2013

The aim of the program	The aim of the program will include i.a. ensuring the possibility of completing the transport infrastructure development program launched in recent years, developing low carbon transport.
Measures covered by the program	Investments in the infrastructure and rolling stock for "clean" public transport in cities (especially rail transport), limiting and placating car traffic in city centers, facilities for non-motorized (pedestrian and cycling) traffic
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	local government units, urban transport infrastructure administrators and carriers providing passenger transport services.
Implementing body	The Minister of Infrastructure and Development
Monitoring institution	The Minister of Infrastructure and Development
Budget	PLN 7 686 million ¹⁷
Source of financing	European Regional Development Fund, Cohesion Fund, state funds

Eastern Poland Program for the years 2014-2020

The aim of the program	The aim of the programs will include i.a. ensuring the possibility of completing the transport infrastructure development program launched in recent years, developing low carbon transport.
Measures covered by the program	Investments in the infrastructure and rolling stock for "clean" public transport in cities (especially rail transport), limiting and placating car traffic in city centers, facilities for non-motorized (pedestrian and cycling) traffic
Duration	2014-2020 (allocation of resources by the end of 2023)
Beneficiaries	local government units, urban transport infrastructure administrators and carriers providing passenger transport services.
Implementing bodies	Marshal's Offices of the Voivdeships
Monitoring institution	The Minister of Infrastructure and Development
Budget	PLN 1 676 million ¹⁸
Source of financing	European Regional Development Fund, state funds
Planned emission reduction	No data

Conclusion

The system of supporting processes aimed at increasing energy savings in Poland in 2014-2020, presented in this paper, is a comprehensive set of financial engineering tools. Compared to the efficiency-enhancing support system from 2007-2013, there is no significant qualitative change in the new financial perspective. The most important difference lies in giving the issues of interdisciplinary research and the creation of science and industry consortia a priority for socio-economic transformations, including enhancing the energy efficiency of the whole European Union. There are several insights that are relevant to achieving the goals set in the 2nd National Energy Efficiency Action Plan.

From a horizontal point of view until 2025

- The current perspective for Poland's energy efficiency policy is a short-term one, ending in 2016, which means that the discussed financial support system is not complementary to other energy efficiency monitoring tools across the economy. Inter-ministerial cooperation is needed for the amendment of the

¹⁷ Forecast based on [9], assuming a decrease in capital expenditure on transport programs in the field of intelligent transport systems and development of urban transport, proportional to the overall decrease in the level of allocation of the OPIE 2014-2020 as compared to the OPIE 2007-2013

¹⁸ Forecast based on [9], assuming a decrease in capital expenditure on transport programs in the field of intelligent transport systems and development of urban transport, proportional to the overall decrease in the level of allocation of the OPEP 2014-2020 as compared to the OPEP 2007-2013

Energy Efficiency Act, which would set long-term energy saving goals (at least 2025), as well as introduce reporting obligations for energy savings, using an IT system managed by the Ministry of Economy, integrated with the KSI SIMIK system managed by the Ministry of Infrastructure and Development.

- In the discussed set of measures for supporting energy efficiency, Poland lacks a reference to the optimization of the use of crude oil and natural gas as an energy fuel, which is important for achieving the energy efficiency goals, especially for processes of reducing energy consumption in buildings and transport. It seems that a separate set of financial engineering tools should be introduced to reduce Poland's dependence on oil and gas imports, preceded by an energy efficiency study on fuel imports and an in-depth analysis of economic changes in this area.
- Since regional policy is not monitored and evaluated in terms of energy efficiency, there is a lack of incentives for regional energy efficiency in the support system for the years 2014-2020.

From the point of view of the 2014-2020 perspective

- The support system discussed for lowering the energy intensity of the Polish economy does not offer sufficient incentives for public institutions to monitor and stimulate energy savings. With the next obligation to monitor and report on energy efficiency measures for public institutions, a motivation system should be developed, preferably financed by public institutions for obtaining energy savings and proper monitoring of the implementation of the National Energy Efficiency Action Plan. It seems appropriate to cover public institutions, within which significant energy savings are achieved, with the white certificates as well. It seems reasonable to analyze the possibility of involving public institutions in a white certificate system that would stimulate energy saving measures.
- The anticipated support system does not assume that the management bodies of individual support programs or public bodies issuing tenders are obliged to verify that the project or offer submitted in response to an advertisement or public contract is energy efficient. It is difficult to determine whether the detailed descriptions of the program (SPO) will include such a requirement. Beneficiaries of public support should consider the energy saving issues in their Terms of Reference. This would require a commitment by national and regional institutions to require beneficiaries of grants or bidders to specify the energy efficiency criteria in the public procurement process, such as the amount of final energy savings. The introduction of such administrative solutions does not contradict the Public Procurement Law (PZP), does not require the amendment of the PPL and falls within the scope of the ordering parties' freedom to determine the conditions of selection.
- A separate tool, under-utilized in the 2007-2013 period, aimed at stimulating energy efficiency were the white certificates that went to businesses without the need for an incentive effect. For this not to happen in the coming period, just as European co-financing within the meaning of art. 8 sect. 3 of the Commission Regulation (EC) No 800/2008 from August 6, 2008, it would be desirable to adopt a regulation stating that aid in the form of white certificates will have an incentive effect, for example if at least one of the following conditions is met:
 - the size of the measures taken to save energy is significantly increased through white certificates;
 - the scope of the measures taken to save energy is significantly broadened through white certificates;
 - the total amount spent by the entrepreneur on energy saving measures is significantly increased through white certificates.

The introduction of the above white certificate solution into the support system for the years 2014-2020 should contribute to a significant acceleration of the implementation of energy efficiency measures by forcing larger scale actions by large enterprises.

Bibliography

FINANCING OF INSTRUMENTS OF ENERGY EFFICIENCY IMPROVEMENTS IN POLAND IN 2014-2020

Abstract

In the article methods and sources of financing the improvement of energy efficiency in Poland in 2014-2020 were presented. It is an overview of the available information, which will allow investors to invest in energy-saving investments.

Key words

Energy efficiency, energy-saving investments, EU funding, financing