

# Financing sources of pro-ecological investments in the field of renewable Energy in Poland – an overview of the support mechanisms

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**Abstract.** In view of an increasing trend in energy consumption and EU pressure on using sources of low greenhouse gas emission, Poland is facing an unprecedented challenge following increasing dependence from energy imports and also a necessity of climate change reduction. The target of this study is the presentation of investment financing mechanisms favoring environmental protection through the introduction of systems based on energy respect and renewable sources. This study is an analysis of the material of financial law, resolutions and trends in the pro-ecological policy of the state and self-government programs for environmental protection, ecological plans and priorities.

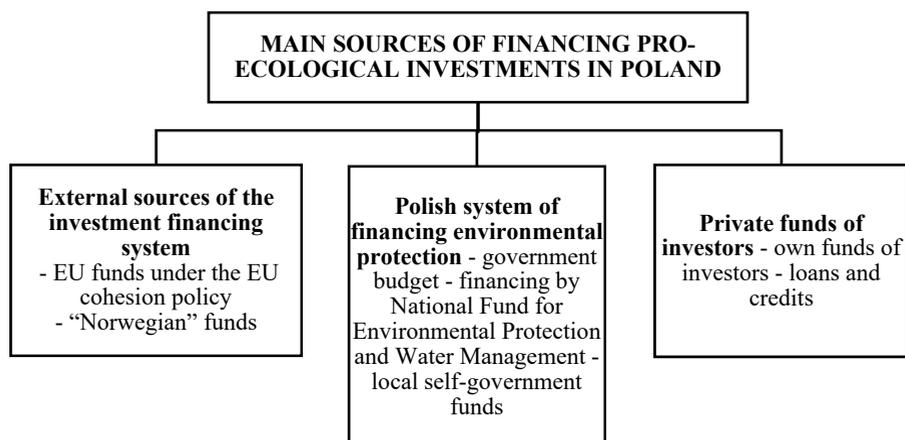
## 1 Introduction

Increasing the use of energy from renewable sources together with energy conservation and enhanced energy efficiency are important parts of the package, the implementation of which is necessary to reduce greenhouse gas emissions. The elements mentioned above also have an impact on increasing energy security, development of innovation and new technologies as well as creating employment opportunities, especially in rural regions.

The effective financing system is the necessary means to achieve such ambitious goals. In general terms, the financing system is a set of rules and regulations defining the ways, the mode of collecting and redistributing funds for a given purpose. In Poland, the system of financing tasks in the field of environmental protection consists of institutions, economic instruments, regulations defining the principles on which financial resources are collected and distributed in order to improve the quality of the natural environment [1]. The current strategic system of financing investments in areas related to environmental protection is based on domestic and foreign sources. The ventures are mainly implemented by self-governments, state budget units, private individuals and entrepreneurs. Acquiring financing of investments related to the production of energy from renewable sources and increasing of energy efficiency is significant for the development of this sector. Long periods of time of investment amortization and uncertainty of legal and business conditions force the necessity of support for further development of this industry. Figure 1 presents the distribution of sources for financing pro-ecological investments in Poland [1, 2].

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**Fig. 1.** Main sources of financing pro-ecological investments in Poland.<sup>†</sup>

The aim of this study is to analyze the financing instruments implemented in Poland, projects related to the development of environmental protection through the introduction of systems related to dispersed energy and improvement of energy efficiency. The article reviews existing financing mechanisms for pro-ecological investments related to renewable energy.

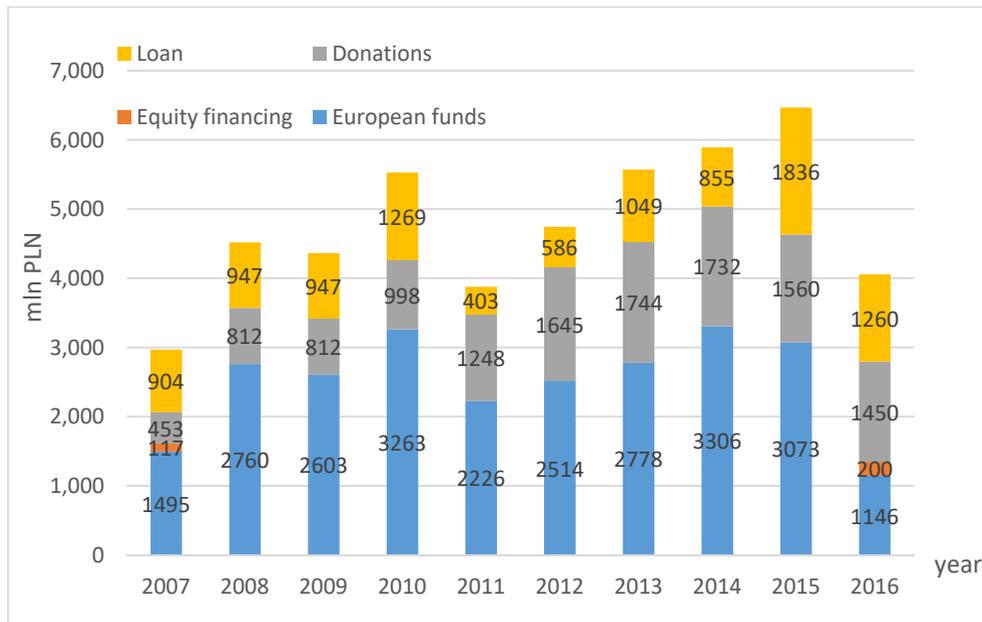
## **2 Domestic and foreign sources of financing for pro-ecological investments**

The Polish system of financing environmental protection is based on a strictly determined spending of funds raised from fees and penalties for using the environment for activities in the sphere of sustainable development. According to the Environmental Protection Law, the financial means of environmental protection include: the fee for using the environment, administrative fines, and different tax rates and other public levies serving the purposes of environmental protection. The funds obtained in this way are available for investments limiting environmental pollution [2–4].

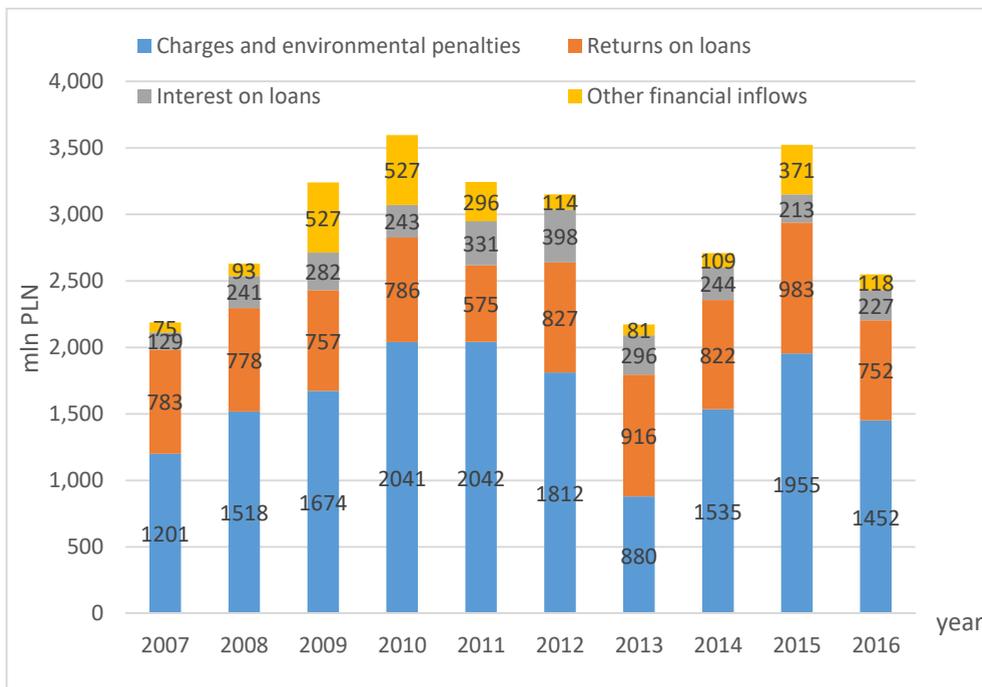
Fees resulting from the use of the environment and fines for violations or infringements of the terms of use are the main source of income for the National Fund for Environmental Protection and Water Management (NFOŚiGW), Voivodship Funds for Environmental Protection and Water Management (WFOŚiGW) and local government budgets. In addition, tasks and investments concerning environmental protection are also co-financed by the state budget. Figure 2 presents the structure of funds at the disposal of the National Fund for Environmental Protection and Water Management. Figure 3 presents the structure of inflows to the National Fund for Environmental Protection and Water Management [2–4, 10].

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<sup>†</sup> The proposal to divide the systems and the main sources of financing pro-ecological investments has been distinguished between domestic, foreign and private financing. Own elaboration.



**Fig. 2.** Financing by NFOŚiGW environmental protection and water management from own resources as well as EU funds [8].

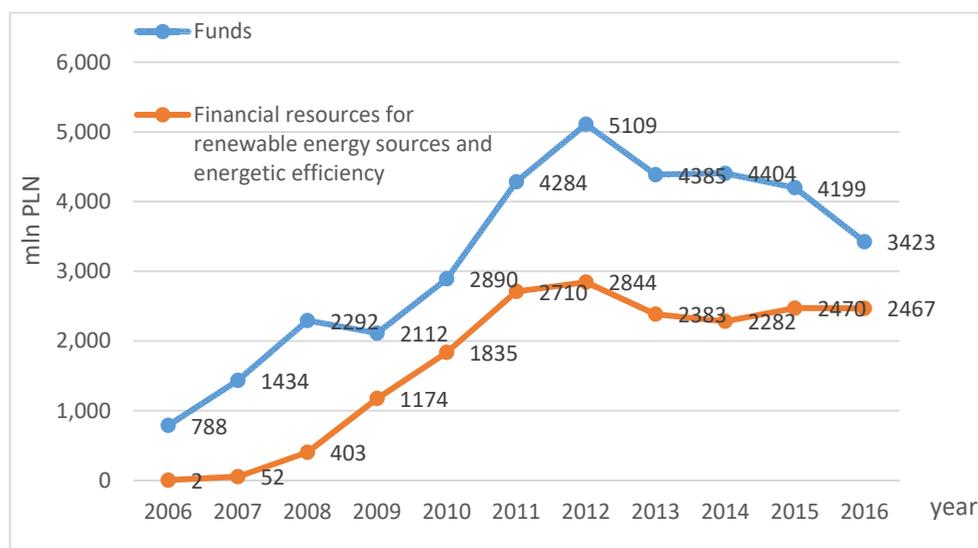


**Fig. 3.** The structure of NFOŚiGW inflows [8].

The National Fund for Environmental Protection and Water Management grants loans and subsidies for interest on preferential credits, and also allows redemption of preferential loans for purposes specified in the Act of 27.04.2001 Environmental Protection Law

(Journal of Laws No. 62, item 667), according to the priorities of NFOŚiGW. One of the priorities is air protection. As a part of the above-mentioned assistance, one can apply for support for investments related to the use of renewable energy sources, for example in accordance with the assumptions of the Prosumer Program. Figure 4 shows the ratio of the total funds available to NFOŚiGW to funds allocated to renewable energy sources and improvement of energy efficiency.

The Voivodship Funds for Environmental Protection and Water Management exists in 16 voivodships, supervising and supporting environmental protection projects based on the Joint Strategy of NFOŚiGW activities, as well as on the basis of priorities consistent with the adopted policy of a given voivodship. Fund offers vary depending on the voivodship's priorities.



**Fig. 4.** Ratio of total financial sources allocated for investments at the disposal of the National Fund for Environmental Protection and Water Management, to funds allocated to renewable energy and improvement of energy efficiency [8].

External sources of the investment financing system in the field of environmental protection include EU funds under the EU cohesion policy and “Norwegian” funds. Moreover, environment-friendly investments are initiated by means that are not only at the disposal of the Minister of the Environment, but also at the disposal of voivodship self-governments. For example, investments in rural areas are supported under the Rural Development Program (PROW), while local ones are implemented with the participation of Regional Operational Programs (RPO). Some EU funds for investments related to renewable energy sources and energy efficiency remained at the disposal of the Minister of Energy [18, 19].

Private funds of investors, meaning natural persons or entrepreneurs, are expenditures designed for pro-ecological projects. They are mainly paid from two sources: current funds or loans and credits (including preferential loans granted by the Bank of Environmental Protection). Such expenses may also be incurred to ensure the continued functioning of investments already made. Entrepreneurs in the field of broadly understood renewable energy extraction activities may also incur capital expenditures financed from specially allocated funds, meaning non-returnable funds, bank loans, or proceeds from issuing securities or leasing [1, 21].

### **3 Implemented programs for supporting pro-ecological investments**

Launched programs based on domestic funds are very popular. Their beneficiaries, unlike systems powered by foreign capital, are a much more diverse group. This chapter presents examples of implemented programs among which investors can choose.

PROSUMENT – the aim of the program is to acquire heat and electricity from renewable energy sources. It has been dedicated to individuals, communities and housing cooperatives. Beneficiaries can get a loan, a low interest loan or subsidy. It is worth adding that the program is very popular [8].

BOCIAN – a program promoting the acquisition of energy from renewable sources aimed at reducing CO<sub>2</sub> emissions to the atmosphere. The program has been directed to people running a business for any investment project related to renewable energy. In addition, the program covered the development of small hydropower plants. The implementation consists in granting a loan for investment purposes [15].

PolSEFF – the second edition of the Polish Sustainable Energy Financing Program developed by the European Bank for Reconstruction and Development is implemented under the Priority Program of the National Fund for Environmental Protection and Water Management with the support of the EU. The program is a credit line with a total value of 200 million EUR, which is to reach small and medium sized enterprises through banks for the implementation of projects improving their energy efficiency. The basic criterion is to increase energy efficiency by at least 20% of a given company, while for investments requiring an energy audit this threshold is 30% [16, 21].

POIiŚ (2014–2020) – Operational Program Infrastructure and Environment, combines many priorities, among others promoting low-emission strategies by improving energy efficiency and the use of renewable energy sources. The group of entities that can apply for co-financing can include: local government units, public administration, health care institutions, and large, medium and small enterprises. Limitations may apply to competence and experience or the area of activity [17].

GIS – green investment system, under which a separate pool of financial resources has been allocated by the EU. The above program implements Kyoto provisions on the reduction of greenhouse gases. According to the protocol, each state received a package of emission units. In the event that a given country reaches a level below the set limit of units, the unused portion may be resold to another country that has not been able to meet the restrictions. Poland has developed a significant surplus of AAU (Assigned Amount Units), thanks to which it obtained additional funds for green investments. The obtained funds were primarily intended to reduce energy consumption in public buildings or less energy-consuming street lighting. The program was intended mainly for large investors [18].

PROW – Rural Development Program under which beneficiaries can receive support to modernize agricultural production and to manage by-products. Installations submitted to the project should be related to the carried out activity and have a minimum durability over five years [19].

RPO (2014–2020) – Regional Operational Programs are aimed at supporting the given area. The distribution of subsidies takes into account the population of a given region, the level of unemployment as well as GDP per capita. The condition for obtaining renewable energy sources development funds in a given area is to include green energy in the strategy. Beneficiaries may be entities included in the business plan, but generally programs are addressed to: local governments, natural persons, micro, small and medium enterprises and other organizations [18, 19].

Preferential loans of Bank of Environment Protection (BOŚ). In agreement between WFOŚiGW and BOŚ, a package of preferential loans for pro-ecological investments was

created. The loan terms vary depending on the region. The common feature of the activities is the support of individuals. Loans are to ensure the possibility of performing installations related to renewable energy, provide financing up to 90% of investment costs and flexible loan periods of up to 20 years. There is also the possibility of an additional capital surcharge of up to 40% of the project value [21].

#### 4 The share of renewable energy in total consumption and the trend of energy efficiency – statistical data

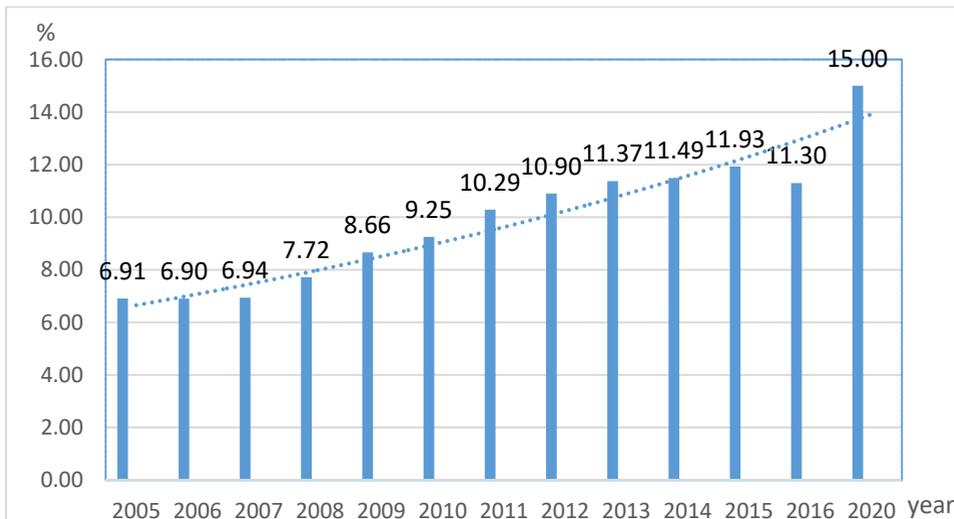
In Directive 2009/28/EC on the promotion of the use of energy from renewable sources adopted on 23 April 2009 by the European Parliament and the Council, one of the goals set for Member States is to achieve a certain amount of the consumption of energy from renewable sources. The goal for Poland is to reach 15% of the final gross consumption from renewable sources in 2020 [5–9, 12].

Table 1 and Figure 5 present data on a gross final consumption of energy from renewable sources in individual sectors as well as the sectoral and total share of energy from renewable sources in final gross energy consumption for Poland in 2012–2016. The data was obtained from the report of the Central Statistical Office report on energy from renewable sources in 2016.

**Table 1.** Share of energy from renewable sources in final gross energy consumption in 2012–2016 [11].

Specification	2012	2013	2014	2015	2016
	%				
Share of RES in heating and cooling	13.37	14.10	14.01	14.54	14.70
Share of RES energy in power engineering	10.68	10.73	12.40	13.43	13.36
Share of RES in transport	6.46	6.59	6.25	6.44	3.93
Share of energy from renewable sources in final gross energy consumption	10.9	11.37	11.49	11.93	11.30

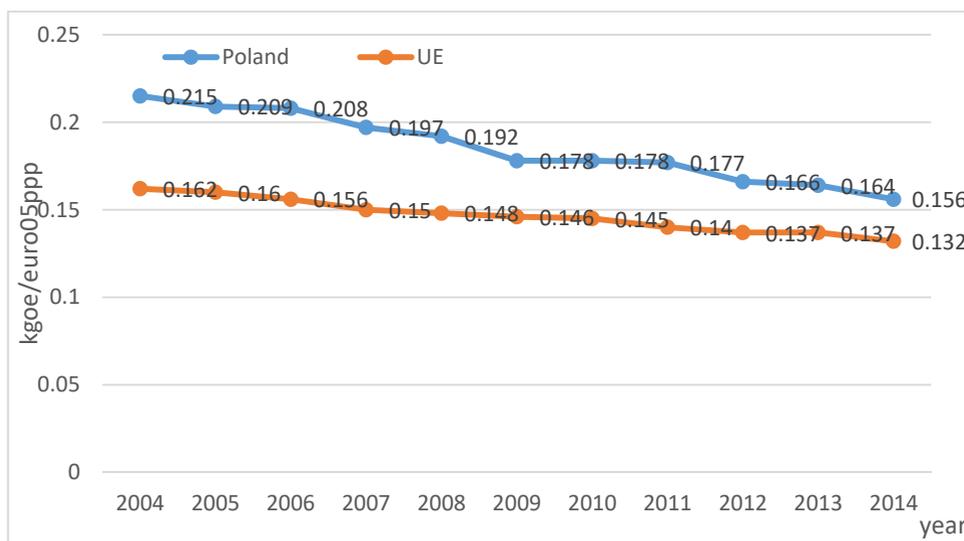
The share of energy from renewable sources in final gross energy consumption in 2016 amounted to 11.3% and increased by 4.39 percentage points compared to 2005. The average annual growth rate of the share of energy from renewable sources in 2005–2016 amounted to 4.6%.



**Fig. 5.** List of share of energy from renewable sources in final gross energy consumption in 2005–2016 [16].

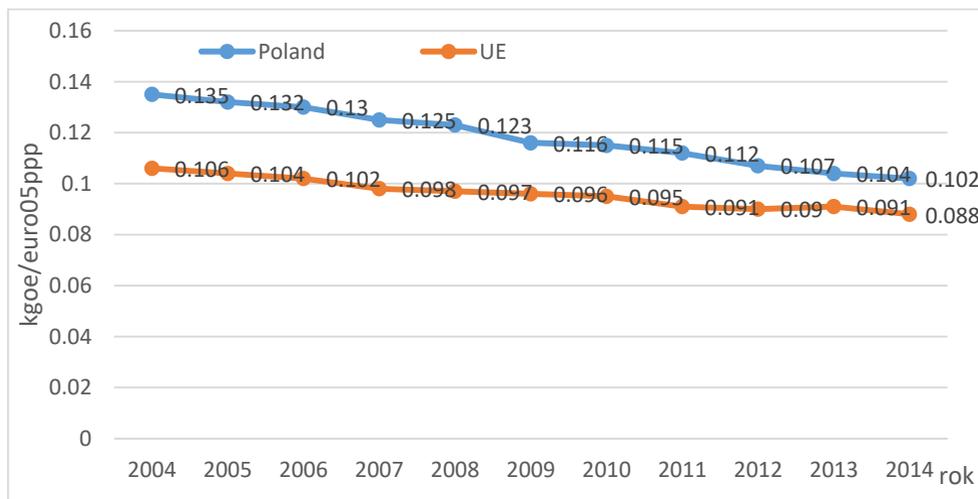
The national goal in the field of energy efficiency is to achieve a 20% reduction in primary energy consumption by 2020. As part of the monitoring of the Europe 2020 Strategy, pursuant to Directive 2012/27/EU, the indicator “primary energy consumption” was used as the national gross energy consumption excluding non-energy consumption. For Poland 96.4 Mtoe was adopted as the target for 2020, but in 2015 the value indicator was already 90 Mtoe.

Primary energy consumption of GDP with climatic correction, expressed in constant prices from 2005, including purchasing power parity in 2014, amounted to 0.156 kgoe/eur05ppp. This value for 2000 was 28% higher than the European average, while in 2014 it was higher by only 17%. The reduction in energy intensity in the years 2000–2014 in Poland reached 3.2% – almost twice as fast as in the EU – 1.7%. Figure 6 shows the change in primary energy consumption.



**Fig. 6.** Primary intensity of GDP with climatic correction [16].

The difference in the final GDP effectiveness between Poland and EU in 2014 was 11%. As a result, the rate of improvement amounted to 2.7%, which is a good result compared to the European average 1.6%. Figure 7 shows the rate of change in final energy consumption [11].



**Fig. 7.** Final intensity of GDP with climatic correction [16].

## 5 Conclusions

The publication presents the sources of funds necessary for the implementation of pro-ecological investments in the field of renewable energy and improvement of energy efficiency in Poland. The funds come from many sources and can be obtained in various forms, for example loans, credits and non-returnable subsidies. Based on statistical data it can be concluded, that the share of energy from renewable sources in final consumption increases. Increasing the energy efficiency of energy production and generation processes is one of the pillars of conducting a sustainable energy policy. This is reflected in legislation and actions by national and EU institutions. In Poland, from 2004 to 2014 there was a significant improvement in energy efficiency. Primary and final energy consumption decreased by approx. 3% annually. The most important factor having an impact on the increase in energy consumption in Poland was the growth in economic activity. Improvement of energy efficiency significantly reduces the demand. Comparing Poland's achievements with the results in the European Union, there is a noticeable improvement in the efficiency of energy use and the upward trend is much higher than the European average. The direct cause of this trend can be seen as an increase in financial resources allocated for environmental protection purposes by investing in renewable energy sources installations and introducing systems and solutions aimed at reducing energy consumption. The system functioning in Poland ensuring rational disposal of funds obtained from domestic and foreign sources, using the presented programs of investor support, successively helps in the implementation of assumptions set in EU directives. After Poland's accession to the EU, the possibility of using additional financial resources for implementation of tasks in the field of environmental protection has expanded. EU funds have become the main impulse for undertaking renewable energy sources activities and improving energy efficiency. In addition, they have led to the use of domestic funds and the mobilization of the investor's own funds.

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