



THE ROLE OF GREEN FINANCE IN THE MANAGEMENT OF SUSTAINABLE DEVELOPMENT IN SERBIA

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Abstract:

Nowadays, when consequences of global warming are manifested in the form of various and increasingly frequent natural disasters, both at global and national level, it is increasingly clear that sustainable development is becoming imperative for survival and development of society and economy. The starting point for achieving sustainable development is harmonizing the economic activity of society and the economy with the ecological dimension of society. Green finance, which encourages and supports green projects that include procurement of energy-efficient equipment, and production of clean energy, plays a very important role in the overall sustainable development. In this paper, the authors analyzed the green finance that includes purchasing energy-efficient equipment in Serbia, to determine their impact on the management of sustainable development.

Keywords:

green finance, EBRD, GEF, sustainable development, Serbia.

1. INTRODUCTION

Frequent natural disasters in the world and Serbia are clear indicators of the negative impact of human and economic activities on the environment. With increasingly frequent floods, earthquakes, storms, and droughts, climate change has become a part of everyday life and seriously affects people's lives and the entire economic activity development. The resulting damages and business interruptions harm the health and well-being of every person, but also the gross domestic product of the country affected by those damages (Ilić et al., 2020). It is becoming increasingly obvious that economic growth and development at the expense of environmental pollution is unsustainable and that the consequences of such unbalanced development on human health and economic activity are serious and far-reaching.

At the international and national level, numerous actors strive to reduce these negative consequences of global warming, which is manifested by the aforementioned climate changes, rising sea levels, reduction of biodiversity, and forest protection. To achieve this goal, the aim is to transform the "brown" economy, which is based on a high level of carbon dioxide emissions, into a green economy where these emissions are very low, by setting the goal of reducing carbon dioxide emissions to a level below 2°C at the global level. At the same time, it aspires that at the national level, each country develops a long-term green economy development plan with clearly defined and highlighted priority areas while providing relevant resources - technology, knowledge, finance, and public support (Đorić, 2021). With that goal in mind, certain conventions, programs, initiatives, and agreements were adopted at the international level.

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At the world summit in Rio de Janeiro in 1992, the UN Framework Convention on Climate Change (UNFCCC) was adopted, which set the framework for development of international cooperation in the fight against climate change and global warming (IFF, 2021) (Jemović & Radojičić, 2021). In the same year, the United Nations Environment Program Finance Initiative (UNEP FI) was adopted, thus establishing a partnership between UNEP and the international financial sector (banks, insurance companies, and investors) from 60 countries around the world to include integrated environmental protection and directed investment policy towards ecologically sustainable projects into the business activities and services of financial institutions. (Jemović & Radojičić, 2021). The Paris Agreement on Climate Change from 2015 and the adoption of the SDGs were of the particular importance for managing sustainable development. The Paris Agreement was adopted by 196 countries and set concrete climate goals for the whole world - to limit the global temperature within 2°C of the pre-industrial levels and to reduce it even further to 1.5°C. In order for the goal of reducing global warming to 1.5°C to be achieved, it is necessary to reduce the emission of carbon dioxide by 45% in comparison to the level of 2010 by 2030. This transformation will be possible by achieving 17 sustainable development goals (SDGs), which were adopted by 150 world leaders (IFF, 2021) (Bhutta et al., 2022).

Achieving the adopted SDGs goals and reducing carbon dioxide emissions to the mentioned level requires significant investments. The realization of these goals is not possible without financial resources that would support green projects, green infrastructure, innovative technologies, and equipment that are based on low carbon dioxide emissions, and also without the advisory and professional support of the key players on the green financial market. In this sense, the development of a green financial system and green finance becomes crucial for sustainable development, and the role of international institutions in providing financial resources, funds, and professional and advisory support in the developed and developing countries, such as Serbia, becomes particularly important.

Serbia is a country that mainly relies on fossil fuels, especially for electricity production, whereby more than 80% is produced using coal, imported oil, and gas. It affects pollution of water, air, and soil, thus further negatively affecting agriculture, the health system, and the economy as a whole (GEF, 2017). Consequently, by the end of this century, Serbia could face an annual increase in air temperature of 4%, which is twice the goal set at the global level (Popović et al.). The issue of environmental pollution requires urgent measures in order for the pollution to be reduced, sustainable policies developed, and to provide financial resources and professional and advisory support for the transformation towards a green economy.

At the time when environmental awareness has not yet been fully developed in Serbia and no domestic funds have been set aside to support sustainable development based on the green economy, the funds provided by development financial institutions such as the German Development Bank (KfW), the International Finance Corporation (IFC), are very important. Various creditors such as the European Bank for Reconstruction and Development (EBRD) and funds have an intention to improve energy efficiency in Serbia and stimulate the use of renewable energy sources, such as - Global Environment Facility (GEF), Green for Growth Fund (GGF), Instrument for Pre-Accession (IPA), Western Balkans Sustainable Energy Financing Facility (WeBSEFF), Western Balkans Investment Framework (WBIF) (Behrens, 2021, pp 34-35) (Ostojić, 2022).

The subject of research in this paper is green finance in the Republic of Serbia, which is provided for the financing of more energy-efficient equipment by the European Bank for Reconstruction and Development (EBRD) within the Green Economy Financing Facility (GEFF) program, which was formed by the Green Climate Fund and Government of Luxemburg. The goal of the research is to determine the impact of green finance on the environment and business efficiency of companies that have introduced innovations, and therefore their contribution to the management of sustainable development in the Republic of Serbia.

The rest of the work is divided into the following units. The second part provides a brief overview of the related literature. The data and methodology used in the analysis are presented in the third part. The results and discussion follow in the fourth part, and the conclusion in the fifth.

2. LITERATURE REVIEW

Numerous researchers in the country and abroad have tried to define green finance and point out its importance for sustainable development. The different definitions of green finance are often found in literature. According to some definitions, they are identified with climate finance and sustainable finance, while others differentiate concerning these two categories of finance. According to IFF (2021) and UNEP (2016), green finance is a broader term than climate finance, as it is not only intended for projects aimed at reducing carbon dioxide emissions but also for projects that include other aspects of environmental protection, such as those related to energy efficiency, use of renewable energy sources, etc. On the other hand, green finance is a narrower term than sustainable finance, because it does not include social and government aspects of sustainability. According to the definition of the People's Bank of China, green finance represents a series of policies and institutional arrangements that attract private capital



investments in projects related to environmental protection, energy conservation, and clean energy, through financial services that include lending, private equity funds, bonds, shares, and insurance (UNEP, 2016). OECD (2023) defines green finance as finance that achieves economic growth while simultaneously reducing pollution and greenhouse gas emissions, minimizing waste, and improving the efficiency of natural resource use. This highlights the importance of the balance between economic growth and environmental protection, but also their importance for long-term sustainability.

Zeng et al. (2022) indicate that green finance integrates the concept of environmental management into the financial industry, which is significant for sustainable development. One of the significant roles of green finance they point out is that it enables the promotion of technological innovations of organizations while reducing pollution and improving the quality of the environment.

In their research, Rasoulinezhad & Taghizadeh-Hesary (2022) used the STIRPAT model to analyze the relationship between carbon dioxide emissions, energy efficiency, and green energy index and green finance in 10 countries that are at the very top when it comes to supporting green finance. Their research results showed that green bonds are an adequate instrument for promoting green energy projects and reducing carbon dioxide emissions, but only in the long term.

Xiong & Dai (2023) analyzed the impact of green finance on sustainable development in China for the period 1990-2020 and found that it stimulated technological innovation, and the use of renewable energy sources and thus had a positive impact on the sustainable development. They also pointed out that the use of green financial instruments encouraged the development of environmentally friendly technologies.

Zakari (2022) investigated the role of green finance on sustainable economic and environmental development in 26 OECD countries for the period 2000-2018 by regression analysis. The results of this research showed that green finance promoted sustainable economic and ecological development and recommended that green finance be promoted by developing an adequate financial market, green financial system, and rapid development of this financial system in the underdeveloped areas.

3. DATA AND METHODOLOGY

The paper used secondary data collected on the success stories of small and medium-sized enterprises and companies from the corporate sector that, with the support of GEF Serbia Leasing and partner company UniCredit Leasing, acquired more energy-efficient equipment. The analytical method and content analysis method were used for data analysis, while the comparison method was used for the comparative data analysis. The hypothetico-deductive method was applied when setting up and testing the following hypotheses:

- H1: Green finance encourages the application of new technologies and affects the reduction of carbon dioxide emissions.
- H2: The introduction of new technology enables more efficient operations of companies.
- H3: Green finance encourages socially responsible business.

Summarizing the conclusions about the impact of green finance on the sustainable development of Serbia and building the image of socially responsible companies was carried out using the synthetic method.

4. RESULTS AND DISCUSSION

An analysis of 6 success stories belonging to the SMEs sector and the corporate sector for which GEF Serbia Leasing worked on projects and financially supported their investments in new, more energy-efficient equipment was carried out for the following companies: *Zlatiborac Ltd.* from Belgrade, *Arum Deč Ltd.*, Company *Knjaz Miloš JSC* from Arandjelovac, Agricultural cooperative *Graničar* from Šid, *Teko Mining Ltd.* from Belgrade, *Karin Komerc MD* (Table 1).

Zlatiborac Ltd. Belgrade is a private family-owned company, which has been operating on the Serbian market since 1992, producing dried and smoked meat specialties according to the family recipe and tradition (which dates back to 1885) (GEFF, 2023), (Zlatiborac, 2023). With its products, this company supplies the leading retail trade chains in Serbia, but also the market of North Macedonia, Bosnia and Herzegovina, Montenegro, Slovenia, Russia, and Belarus (GEFF, 2023). To modernize its business and reduce the harmful impact on the environment, this company received funds worth 271,800 euros and invested them in new cutting and slicing machines. The investment in new equipment contributed to a 30% reduction in operating costs, thanks to a reduction in electricity costs and maintenance costs. Along with the increase in business efficiency, this company also reduced the emission of harmful gases by 30% (1.8 tonnes per year), building the image of a socially responsible company that operates on the principles of sustainable development (GEFF, 2023).



Arum Deč Ltd., an agricultural and recycling family-owned company that was founded in 1992, and today is a leading company in the distribution of vegetable seeds in the country and a major importer of agricultural machinery, organic fertilizers, irrigation systems, and equipment for proper ventilation of crop storage (GEFF, 2023), (Arum Deč, 2023). On the Serbian market, it distributes its products and services to agricultural producers, restaurants, hotels, and retail supermarkets. To collect and recycle waste products from restaurants and the food industry (used paper, oil, plastic, glass, etc.) at the end of the first decade of the 21st century, the company *Arum Deč Ltd.* launched a business line that deals with recycling, and in 2020, in cooperation with *GEFF leasing in Serbia* (via UniCredit Leasing), it invested 14,900 euros in a new, more energy-efficient forklift (GEFF, 2023). Thanks to this investment, electricity consumption was reduced by 5.3 MWh per year, and thus the costs of the business line for recycling were also reduced. The use of this forklift also reduced carbon dioxide emissions during the transport and handling of waste and recycled materials by 1.9 tonnes per year (GEFF, 2023).

The company *Knjaz Miloš JSC Arandjelovac* with a tradition longer than two centuries is today one of the leading producers of mineral water, non-alcoholic, and energy drinks on the domestic market and in the region (Knjaz Miloš, 2023) (GEFF, 2023). It is known for its com-

mitment to socially responsible business, which is reflected in organized ecological cleaning actions, prize games, and tree planting actions for the collected used packaging for recycling (Knjaz Miloš, 2023). To modernize its equipment, guided by the principles of energy efficiency, the company *Knjaz Miloš JSC Arandjelovac* invested 594,000 euros in new, energy-efficient equipment for the production of juices and carbonation. On this basis, it reduced the consumption of electricity by 35% and the emission of carbon dioxide by 56 tonnes per year. This investment enabled the company to amass financial savings of 17,000 euros per year (GEFF, 2023).

Agricultural cooperative *Graničar* from Šid was founded in 1990. It is engaged in crop and fruit production on 2300 ha of land, where it grows corn, soybeans, sugar beet, oil-seed rape, sunflower, seed corn and sunflower, and apples (ZZ Graničar Šid, 2023), (GEFF, 2023). To increase business efficiency and reduce environmental pollution, the cooperative invested 102,000 euros in the purchase of four Bašak tractors, which consume significantly less fuel. The reduced consumption of diesel fuel by 256 MWh per year enabled savings of 20,400 euros per year and reduced carbon dioxide emissions by 62 tonnes per year. Continuous investments in modern and efficient equipment are an integral part of the strategic determinations of the Agricultural Cooperative *Graničar* from Šid,

Table 1. Investments in new equipment in Serbia with the support of GEFF Serbia Leasing.

Investor	Location	Investment	Investment size (EUR)	Financial results (savings-EUR/year)	Energy savings (MWh per year)	CO2 savings (tonnes per year)	Impact
<i>Zlatiborac Ltd. Belgrade</i>	Belgrade and Mačkat, Serbia	Machine for slicing	271,800	10,815.00	6.1	1.8	Increased efficiency, lower maintenance costs and reduced CO2 emissions
<i>Arum Deč Ltd.</i>	Deč, Serbia	Forklift	14,900		5.3	1.9	Woman-led business, reduced environmental impact, cost savings
<i>Knjaz Miloš JSC Arandjelovac</i>	Arandjelovac, Serbia	Juice treatment and carbonation unit	594,000	17,000	75	56	Increased efficiency, reduced energy consumption and CO2 emissions
<i>Agricultural cooperative Graničar</i>	Šid, Serbia	Four tractors	102,000	20,400	256	62	Increased efficiency, reduced environmental impact
<i>TEKO Mining Ltd. Beograd</i>	Belgrade and Batočina, Serbia	Loaders	372,000	30,800	387	94	Increased efficiency, reduced CO2 emissions and reduced fuel consumption
<i>Karin Komerc MD</i>	Veternik, Serbia	Line for separation of gravel and sand	289,700	33,260	100.6	16.8	Increased efficiency, reduced water and energy consumption, climate change mitigation

Source: (GEFF, 2023).



as evidenced by the investments in equipment that were made earlier and the investments that were launched even after the procurement of tractors related to the construction of the cold storage (GEFF, 2023).

Teko Mining Ltd. Belgrade is an integral part of *Teko Mining GmbH*, which has been operating in Serbia since 2014. This company owns several quarries where it excavates and produces the various types of stone material used for the construction and development of infrastructure in our country (Teko Mining, 2023) (GEFF, 2023). Intending to improve the efficiency of *Teko Mining Ltd.* Belgrade invested 372,000 euros in two Caterpillar loaders. The result of this investment is a reduced consumption of diesel fuel of 387 MWh per year, which achieves financial savings of 30,800 euros per year and a reduction of carbon dioxide emissions by 94 tonnes per year, i.e., as near as 27% less when compared to the previously used equipment (GEFF, 2023). Reducing carbon dioxide emissions is in line with one of the company's long-term commitments regarding environmental protection - to reduce the consumption of resources used in the performance of activities (Teko Mining, 2023).

Karin Komerc MD is a company that was founded in 2005 in Veternik to carry out work in the field of civil engineering, high-rise construction, and hydraulic engineering, but also production and sale of concrete, and exploitation and separation of gravel (Karin Komerc, 2023) (GEFF, 2023). The company previously financed from its funds the replacement of older trucks with new trucks with Euro 6 engines, which reduced the emission of harmful exhaust gases. To further modernize its business, especially the gravel and sand separation process, it invested 289,700 euros in a new Binder+Co machine based on BIVITEC technology, which is lighter and more efficient (GEFF, 2023). The acquisition of this machine enabled an increase in gravel separation capacity by 50% and separation efficiency by 10%. Electricity consumption was reduced by 22.5% per year, water by 34% per year, and carbon dioxide emissions by 16.8 tonnes per year. Reduced fuel consumption and maintenance costs resulted in savings of 33,260 euros per year (GEFF, 2023).

5. CONCLUSION

Analysis of successful examples from the practice of the above-mentioned organizations, which financed the renovation of equipment with the support of GEF Leasing Serbia, confirmed the hypotheses. The observed organizations modernized and improved their operations and influenced the reduction of the costs of using energy and other resources, as well as the reduction of carbon dioxide emissions. By investing the funds from the fund, these companies acquired new, more modern, and

energy-efficient business equipment, which enabled the reduction of carbon dioxide emissions from 1.8 tonnes to 94 tonnes per year. The new equipment made it possible to achieve financial savings from 10,815 euros to 55,000 euros per year, mainly due to savings in electricity and fuel consumption. Green finance and GEF's professional and advisory support enabled the observed companies to build the image of socially responsible organizations. The results of the empirical analysis clearly show that the businesses of these organizations establish a balance between the economic and ecological dimensions of development and strive for sustainable development in the future.

Despite some progress made by the observed organizations, Serbia is a country that is still in the initial phase of green economy and green finance development. In order to encourage faster transformation and achieve the goals of sustainable development, it is necessary to create a green financial system and influence the awareness of people and organizations about the need for environmental protection and the concept of sustainable development through means of public information and programs in educational institutions.

Although the data on the reduction of carbon dioxide emissions and the achieved financial savings of these organizations unequivocally show that green finance has a positive effect on the management of sustainable development in Serbia, it should be borne in mind that a small number of organizations are included in the analysis. Therefore, it is necessary to expand the existing analysis by including a larger number of organizations in the analysis, as well as the public sector, and analyze the remaining instruments of green finance that were not the subject of analysis in this paper to create a comprehensive picture of the impact of this finance on the management of sustainable development.

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