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COMPENSATORY FINANCING OF ENERGY-EFFICIENT PROJECTS
IN CONSTRUCTION: MODIFICATION OF «TAX INCREMENT FINANCING»КОМПЕНСАТОРНЕ ФІНАНСУВАННЯ ЕНЕРГОЕФЕКТИВНИХ ПРОЄКТІВ
В БУДІВНИЦТВІ: МОДИФІКАЦІЯ «TAX INCREMENT FINANCING»

The article presents a study of the application of financial compensatory technology "Tax Increment Financing" (TIF) and provides suggestions on the prospects for attracting investment in energy saving projects. Attracting financial resources in energy efficient projects is one of the most pressing problems of the modern economy due to the expansion of socio-economic infrastructure in different regions of the country. Under these conditions, the search for new sources and mechanisms of project financing is of particular interest. One such mechanism is the use of deferred tax payments (TIF), which is quite common abroad. Prospects for the implementation of the mechanism of compensatory financing in the current conditions are considered, the foreign experience of using Tax Increment Financing is analyzed. Management technology of compensatory financing of energy efficient projects will provide an opportunity to make effective management decisions to attract sources of funding, the formation of their rational structure, as well as to distribute risks among project stakeholders; protect other assets from default and increase the level of financial and credit obligations of project owners; to ensure an increase in the financial leverage ratio, which will increase the return on equity and reduce its value as part of total capital. The peculiarity of the use of "Tax Increment Financing" is to ensure the reimbursement of investor costs through special funds, which are replenished by tax revenues from the income created and put into operation of energy-efficient infrastructure. The main component of this mechanism is redevelopment, which is financed by an investor who invests in construction and reimburses its costs from a special fund, which accumulated taxes paid by the owners of new buildings. This scheme of financing energy efficient projects uses the effect of tax increases as a result of projects aimed at increasing the value of real estate or land. On the example of the construction energy cluster the "Investment mechanism of enterprises (institutional participants in the construction energy cluster) using" Tax Increment Financing "was developed, where in its structure the methods, levers, tools of financing of energy saving measures on the basis of compensatory technology are singled out.

Keywords: investments, compensatory financing, energy efficiency, management technologies, passive construction.

У статті представлено дослідження проблематики застосування фінансової компенсаторної технології «Tax Increment Financing» (TIF) та надані пропозиції щодо перспектив залучення інвестицій в проєкти енергозбереження. Залучення фінансових ресурсів в енергоефективні проєкти є однією з найбільш актуальних проблем сучасної економіки внаслідок розширення масштабів розвитку соціально-економічної інфраструктури в різних регіонах країни. За цих умов особливий інтерес представляють пошуки нових джерел і механізмів проєктного фінансування. Одним з таких механізмів є застосування відкладених податкових платежів (Tax Increment Financing, TIF), який є доволі поширеним за кордоном. Розглянуто перспективи імплементації механізму компенсаторного фінансування в нинішніх умовах, проаналізовано зарубіжний досвід використання Tax Increment Financing. Управлінська технологія компенсаторного фінансування енергоефективних проєктів надасть можливість приймати ефективні управлінські рішення щодо залучення джерел фінансування, формування їх раціональної структури, а також розподіляти ризики між стейкхолдерами проєкту; захищати від дефолту інші активи і підвищувати рівень фінансово-кредитних зобов'язань власників проєкту; забезпечувати зростання коефіцієнта фінансового левіриджу, що призведе до зростання прибутковості акціонерного капіталу і зменшення його вартості в складі сукупного капіталу. Особливість використання «Tax Increment Financing» полягає в забезпеченні відшкодування витрат інвестора через спеціальні фонди, що поповнюються за рахунок податкових надходжень від доходів створених і введених в експлуатацію енергоефективних об'єктів інфраструктури. Основною компонентою цього механізму є редевелопмент, фінансування якого відбувається за участі коштів інвестора, що вкладає їх в будівництво та відшкодовує свої витрати зі спеціального фонду, куди акумулювали податки, що сплачуються власниками нових зведених об'єктів. Наведена схема фінансування енергоефективних проєктів використовує ефект зростання податків у результаті реалізації проєктів, метою яких є збільшення вартості нерухомості або землі. На прикладі будівельного енергокластеру розроблено «Investment mechanism of enterprises (institutional participants in the construction energy cluster) using « Tax Increment Financing »», де в його структурі виокремлено методи, важелі, інструменти фінансування заходів енергозбереження на засадах компенсаторної технології саме в рамках такого інтеграційного утворення.

Ключові слова: інвестиції, компенсаторне фінансування, енергоефективність, технології управління, пасивне будівництво.

Introduction. One of the main factors in transition to sustainable social and economic development of the country is to increase the level of energy efficiency and to create the necessary conditions for the implementation of an energy-saving economy in all spheres of society. Energy saving is an important factor in increasing economic efficiency and energy security. The introduction of energy saving processes at all levels of the economic system contributes to the diversification of economic and management practices and institutional forms, revealing the fundamental heterogeneity of the economic environment for the implementation of production and commercial activities of the enterprise. The peculiarities of the development of the energy saving management system dictate the need for the introduction of the latest conceptual provisions contributing to the formation of an effective mechanism for the implementation of the country's economic strategy [4; 18].

Determination of optimal ways to solve an important scientific issue, consisting of the development of theoretical and methodological foundations, from scientific and methodological support and the development of practical recommendations for managing energy saving at construction enterprises, is one of the priorities of the post-industrial development of society. This will reduce the energy consumption of construction products, solve ecological and resource challenges, increase the level of competitiveness, energy efficiency, energy independence, and energy security of the construction industry.

Within the last decade there was an increase in the rate of investment into fixed assets. The prioritized ones are energy-efficient projects in the economy of most countries, which considered to be among the most important directions of economic potential development of the society, although problematic in terms of funding due to their scale, high cost, complexity of implementation and duration of investments return [10; 12].

The search for effective compensatory means for the cost of businesses related to the re-equipment of the factors of reproduction and introduction of new energy-efficient technologies, as well as the formation of an effective system of energy saving management. This issue is complicated due to the gaps and fragmentary management decisions in the process of investments attraction, both on macro and micro levels. One of the most promising forms of compensatory financing for energy saving projects within the framework of cluster interaction is the use of the Tax Increment Financing (TIF) mechanism.

Setting objectives. The purpose of the article is to create a mechanism for investing enterprises on the principles of TIF which are institutional stakeholders of the construction energy cluster. We will explore the possibility of attracting additional financial resources for implementation of energy saving measures through the issue of municipal bonds and the implementation of financial compensating technology, namely „Tax Increment Financing” (TIF).

Methodology. The theoretical, scientific and methodological basis of the study were the methods of scientific knowledge, general scientific principles, as well as work experience in the field of energy saving management of enterprises. The following scientific methods are used: theoretical generalization, comparison, concepts of “Passive House”, “Triple Zero”, and “Green Lease”.

To achieve the goal of the scientific article, abstract-logical analysis and the method of comparative studies

were used to investigate the categorical apparatus of the theory of energy saving in construction; content analysis of existing practices of compensatory financing of energy efficient projects; cluster analysis – in the development of the investment mechanism of enterprises (institutional participants in the construction energy cluster) using “Tax Increment Financing”; logical generalizations – to formulate the conclusions of scientific research.

Research results. Ukraine is forced to search ways to increase GDP. One of them is the intensification of innovation in production sphere of the regions, because it is there that additional value is created product. The regional aspect of innovative development is explained by the fact that on the ground, the difficulties and problems of reactivation are most clearly traced national activity. At the local level, it is easier to identify specific factors innovation, so the state industrial policy, directly on related to innovation, it is advisable to build on trends where centralization, which is one of the key mechanisms of self-development of territories. The relevance of this provision is due to the fact that, on the one hand, development enterprises rely on resource, production and consumer potential region, and on the other – under favorable conditions and adequate state measures support they are able to make a significant contribution to further build-up general potential of the region, modernization of the regional part of the economy in general [1].

We agree with the opinion of leading scientists O. Amosha and L. Salomatina and propose to investigate the compensatory technology of project financing on the basis of Tax Increment Financing in order to intensify the innovative activity of enterprises.

This issue updates the study of using the Tax Increment Financing (TIF) mechanism in financing of energy saving projects. Thus, D. Huddleston describes the application of the TIF method to the Wisconsin example, with an emphasis on the change in the structure of taxes received additionally from other budget [9, p. 11–17].

D. Williams and R. Blende in their study made efforts to identify the circumstances when the TIF project would be an effective means of developing municipal economies [6, p. 123]. T. Stinson and D. Huddleston calculated the financial sustainability of certain projects, based on the expected growth rates of property value [9 p. 241–248]. J. Klemański, along with financial aspects, assessed the effects of TIF in the political and legal field [11 p. 23–28]. J. Mean and M. Rosentraub analyzed the relationship between the increase in the property value and the application of TIF [14 p. 23–26].

The overwhelming majority of scientists investigate the critical factors when applying the TIF method and discuss the possible impact of different variables on the probability of project success. The application of the TIF mechanism in the field of financing infrastructure projects abroad [5] makes it reasonable to study the prospects of incorporation of this financial compensatory technology into domestic practice while implementing energy-efficient measures. The economic argumentation for the use of the TIF mechanism and its practical application within the tax system will make it possible to identify new vectors for the national economy growth and consider investment of energy saving projects.

How to notice scientist B. Schneider the compensatory technology of «Tax Increment Financing» is a powerful

and controversial force in American urbanism. Every state except Arizona currently allows it, as does the District of Columbia, and it has become the most popular incentive tool for economic development in the United States as the federal government has decreased its urban development spending. TIF plays a role in megaprojects such as Chicago's Lincoln Yards and Amazon's HQ2 in Arlington, Virginia, as well as in smaller-scale neighborhood improvements, affordable housing, and transit projects. With its application in vastly different contexts across nearly every state, TIF is used to fund a broad range of projects. Currently, the method is most popular in post-industrial, Rust Belt cities and towns [16].

Tax Increment Financing (TIF) creates special tax districts around targeted redevelopment areas from which future tax revenues are diverted to finance infrastructure improvements and/or development. At the beginning of the TIF period, tax revenues in the TIF district going to general city services are frozen at a certain rate. All additional tax revenues go toward directly funding new development or servicing debts related to new development until the end of the TIF period, which usually lasts 20 to 30 years. Supporters say the new tax revenues generated by TIFs would not have taken place "but for" the investment that the TIF enabled, and that they are a valuable tool for neighborhood revitalization [16].

TIF is aimed to provide the investor with compensation through special funds replenished by tax revenues from incomes which were obtained after construction and putting into operation the infrastructure objects [2–3]. The basis of this mechanism is redevelopment, financed by an investor who invests in construction and reimburses his expenses from the special fund, accumulating taxes paid by the owners of new consolidated facilities.

That is, TIF is a mechanism covering the investor's expenses into implementation of energy-efficient projects from the budget by tax revenues from incomes which were obtained after construction and putting into operation the infrastructure objects. In fact, this is one of the variants to apply compensatory tax models for investment purposes across the regions. After all, the TIF envisages that the investor's costs put into the investment project will be compensated by a tax exemption calculated in the future.

We suggest to introduce the mechanism of TIF in energy saving projects within the building energy cluster, since clustering has become the most popular form of manufacturing and commercial activity, which is conditioned by trends and challenges in the real sector of the economy. We believe that globalization and the potential symbiosis associated with it are an expression of the benefits and opportunities that can be gained as a result of the joining forces and the competitive advantages of collaborating actors. The above hypothesis was confirmed in the studies conducted by S. Fabiani and J. Pelligrini in 1998, which show that enterprises operating in isolation, that is, outside of the clusters, receive up to 40% less income [7, p. 23].

In Ukraine, according to the forecast of experts in the baseline scenario, the total consumption of heat energy will increase to 271 million Gcal by 2030, or slightly more than 15% compared to the base year. In order to meet the forecasted demand, based on current realities in any scenario, the main direction of development of the systems of generation, transport and distribution of heat should be

the reduction of natural gas consumption through increased efficiency of its use, the development of heat supply systems using renewable energy sources. Considering that 59,3% of natural gas in Ukraine is consumed for central heating, implementation of the research and applied results on financing the energy saving projects will allow to optimize the energy consumption of the residential and public buildings by 50–55% [5].

The main functions of the organizational structures of management and provision of energy saving projects using the TIF mechanism within the building energy cluster are:

- multilateral consultations with stakeholders (municipalities, public organizations, investors, developers);
- drawing up a plan for energy saving project implementation and assessment of its compliance with the regional development strategy;
- reflection the costs of its implementation and organization of the management system in the plan of the energy saving project using financial compensating technology „TIF”.

We conducted a thorough study of international practices on financing energy saving projects by the developed countries in terms of possible adaptation of modern management and regulatory technologies to Ukraine's realities in construction. This made it possible to identify applied vectors that can be implemented in the real sector of our country's economy:

- introduction of non-traditional and renewable energy sources;
- modernization of housing stock through energy efficient technologies;
- effective management of energy saving measures financing;
- effective regulation on energy consumption;
- integration of financial resources (clustering);
- realization of concepts "Passive House", "Triple Zero", and "Green Lease" [13; 17]. Based on these studies, there was a need to study the advantages and disadvantages of financing on energy saving projects through municipal bonds and the use of TIF (Tax Increment Financing) for financing energy saving projects.

The mechanism of investment of enterprises which are institutional stakeholders in the construction energy cluster on the basis of „TIF” is a set of methods, forms, tools and levers of financial support to stimulate functioning of the building energy cluster, considering energy saving and energy efficiency measures, as well as regional (municipal) regulation of these processes (Fig. 1).

In the suggested mechanism, the methods of financing are identified. Methods and techniques that help to substantiate and control specific management decisions related to the search for financing, their rational structure and use: municipal energy bonds as well as the introduction of financial compensatory technology based on deferred tax payments (Tax Increment Financing – TIF) are as follows:

According to the current legislation, local authorities can attract local borrowings with certain requirements met:

- the total amount of borrowings can not exceed the amount of budget deficit for the local budget in a relevant year;
- funds from the bonds received by the issuer are attracted to finance only the corresponding local budget;
- cost of servicing the debt of local budgets can not exceed annually 10% of expenditures from the general

fund of the corresponding local budget during any budget period, when the debt service is planned;

- violation of the repayment schedule of the principal amount and payments for its maintenance in favor of the guilty borrower, which deprives the relevant council to take new borrowings in the next 5 years [8].

Let us identify the benefits of financing TIF-based projects: the distribution of risks between the actors of the construction energy cluster; protection against default of other assets and against increase in financial and credit obligations of project owners; growth of the leverage ratio, that is, the ratio of the company's borrowed capital to its own funds, which leads to an increase in the return on equity capital and a decrease in its value in total capital.

The basic mechanism for realizing the risk of deferred payment includes:

- low level of motivation of private investors to finance energy saving projects at their own expense;
- withdrawal of private investors' capital from economic circulation, which leads to losses and the impossibility of making a profit;
- an increase in the cost of borrowed resources for investment, which is due to market conditions and inflationary processes;
- low quality of income forecasting from the implementation of the energy saving project, as a result, the uncertainty of the project payback parameters.

Potentially, these risks can lead to an increase in the return period for investment in an energy saving project, as

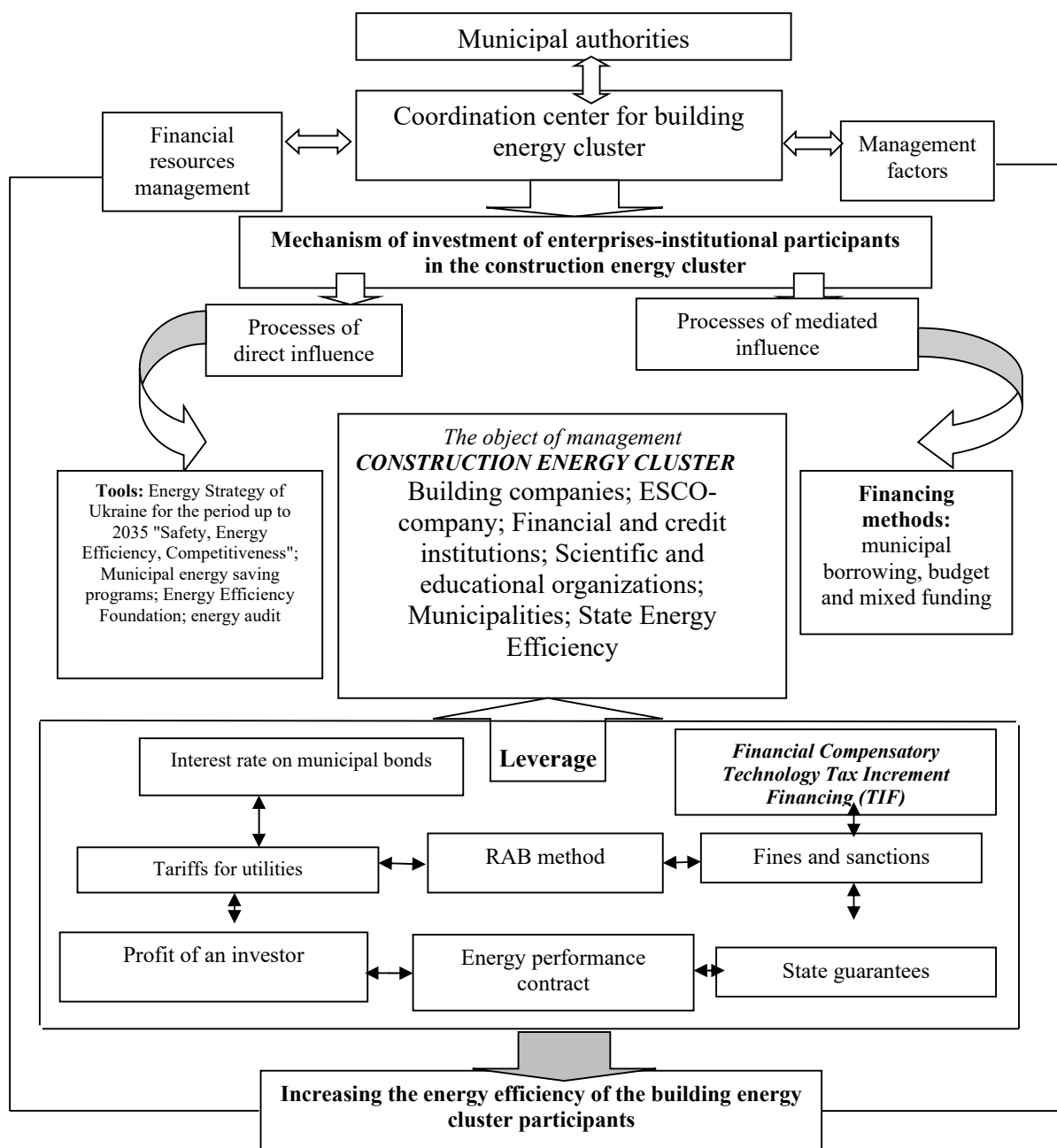


Figure 1 – Investment mechanism of enterprises (institutional participants in the construction energy cluster) using „Tax Increment Financing”

well as to a change in the current tax conditions, which will reduce the return on investment. In this regard, stability is an important condition for the success of the mechanism of state tax policy, which improves the quality of forecasting. The most commonly used TIF bonds provide additional profits for the TIF zone. For three years, when tax revenues in the TIF are insufficient, the interest on such bonds is usually capitalized. When income stabilization is achieved, interest is paid and the principal is serviced.

The attractiveness of this financing scheme for local authorities lies in the fact that investors take on the risks of implementing the project and receiving income in a sufficient amount and with a certain frequency of income. And TIF bonds are not assigned a rating, which makes them more profitable, but at the same time more risky financial assets.

If it is not possible to place bonds on the market at the initial stage of the implementation of an infrastructure project (for example, private investors do not want to buy bonds, the nominal amount of financing is lower than required, etc.), a distribution (pay-as-you-go) mechanism is used, which can be financed through reconstruction or modernization programs within TIF zones or by issuing securities, including bills of exchange. In some cases, bonds may be issued for amounts in excess of the amount owed. The reason for this exemption is the expectation of income from tax payments in connection with the commissioning of the new infrastructure.

In general, it should be noted that the construction energy cluster through TIF plays an important role in the development of energy-efficient technologies, since in the context of budgetary constraints by attracting funding from non-budgetary sources, additional opportunities are used to increase investment in production and social infrastructure.

An comprehensive approach to financing energy saving and energy efficiency projects will make it possible to create conditions for rising the quality of life of the population, economic development and social sphere of the city, ensuring the environmental safety of the territory, improving the functioning of the energy infrastructure and urban areas as well as the management of state property.

Bonds also have the advantage of being a kind of long-term loan for the issuer, in which no one can limit its independence, unlike in the case with a bank loan. At the same time, it is a tool to increase the return on the issuer's capital, provided that the return on investments financed by bonds is higher than the interest rate on the bonds. In this case, the return on equity will increase. In most countries, revenues from municipal bonds are exempt from paying taxes, provided that they are issued for the purpose of financing social rather than private activities [2; 4; 10].

The study of local borrowings in Ukraine has shown their fragmented nature, but when the appropriate regulatory and legal framework is created and the best international practices are used, the development of the local borrowing market can become a source of financial resources for implementing energy saving projects through compensatory financing on the principles of TIF [4; 17].

Conclusions. The possibility of attracting additional financial resources to energy efficient projects through the technology of compensatory financing based on deferred tax payments (Tax Increment Financing – TIF) was studied.

In our opinion, the introduction of foreign practices in the implementation of TIF-based projects in the Ukrainian realities requires some adaptation processes that consider the issues of finding sources of financing, including the interest of private investors in long-term capital investment, the risks of using the mechanism of deferred tax payments, as well as the weakness of the financial base in most regions. International models of financing infrastructure projects and insurance of risks used in international practice must be adapted to the specifics of the development formats of our economy.

Based on the results of the study, proposals are presented on the formation of an investment mechanism for enterprises – institutional stakeholders of the construction energy cluster based on the principles of the TIF, using the structure, levers, tools, methods of financing the energy saving measures. The coordination center of the construction energy cluster has been determined and the players of this integration formation have been proposed.

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