https://doi.org/10.18559/ref.2018.1.5

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

Compensatory financing of energy saving projects in construction: modification of „TIF"

Volodymyr Tkachenko[1], Iryna Ivakhnenko[2], Maryna Klimchuk[2], Hanna Ploska[2]

[1] Kyiv National University of Construction and Architecture, Ukraine
[2] Kyiv National University of Civil Engineering and Architecture, Ukraine

ABSTRACT

The purpose of the article is to create a mechanism for making investments by enterprises and institutional participants in the building energy cluster. The authors explore the possibility of attracting additional financial resources for implementing energy saving measures through issuance of municipal bonds and compensatory financing on the basis of tax deductions (Tax Increment Financing – TIF). The study of the practice of local borrowing in Ukraine has demonstrated the fragmented nature of the existing system. However, provided the appropriate regulatory and legal framework and the experience of other countries are taken into account, the development of the local borrowing market can be a source of financial resources for the implementation of energy saving projects. According to the results of the study of the financial compensatory technology „Tax Increment Financing" (TIF), proposals for the formation of a mechanism for making investments by enterprises and institutional participants in the building energy cluster are provided, where its structure identifies the levers, tools, methods of funding energy-saving measures, the coordination center of the energy cluster has been determined and participants of this integration formation are proposed.

Keywords: energy saving, municipal bonds, investments, emission, building energy cluster.

1. Introduction

During the last decade there has been an increase in the rate of investment in fixed assets, with the priority being energy-efficient projects in the economy of most countries, which are among the most important directions of development of the economic potential of society, but is problematic in terms of funding, due to their scale, high cost, complexity of implementation and duration of payback. The search for effective compensatory type tools for the cost of business entities 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 – the problem is complicated due to the allowed gaps and fragmentary management decisions in the process of attraction of investments, both on the macro and micro levels. One of the most promising forms of compensatory financing for energy conservation projects within the framework of cluster interaction is the use of the Tax Increment Financing (TIF) mechanism.

The purpose of the article is to create a mechanism for making investments by enterprises and institutional participants in the construction energy cluster on the principles of TIF, which will explore the possibility of attracting additional financial resources for implementing energy saving measures through the issue of municipal bonds and the implementation of financial compensating technology, „Tax Increment Financing" (TIF).

2. Literature review

The presented issue updates the study of using the Tax Increment Financing (TIF) mechanism in the process of financing energy saving projects. Thus, D. Huddleston describes the application of the TIF method to the Wisconsin example, focusing on the change in the structure of taxes received additionally from other budgets (Huddleston 1986, pp. 11-17). In their study, D. Williams and R. Blende tried to identify the circumstances under which the TIF project would be an effective means of developing municipal economies (Williams, Blende 1989, pp. 123). T. Stinson and D. Huddlston calculated the financial sustainability of individual projects, based on the expected growth rates of property value (Huddleston 1986, pp. 194-198; Stinson 1992 pp. 241-248). J. Klemański, along with financial aspects, assessed the effects of TIF in the political and legal plane (Klemanski 1990, pp. 23-28). J. Mean and M. Rosentraub analyzed the relationship between the increase in the value of property and the adoption of TIF (Mean, Rosentraub 1994, pp. 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 (Dmitrieva et al., 2016) makes it expedient to study the prospects of incorporation of this financial compensatory technology in domestic practice of implementing energy-efficient measures. The economic justification for the use of the TIF mechanism and its practical application under the fiscal system will make it possible to identify new vectors for the growth of the national economy, among which investment of energy saving projects can be considered (Karpenko et al., 2018; Lakhno et al., 2018, pp. 1802–1812; Mazurkiewicz et al., 2015, pp. 11-20; Melnychenko et al., 2017, pp. 66-80; Pająk et al., 2016, pp. 204-217; Pająk et al., 2017, pp. 122-138).

3. Methodology

The theoretical, scientific and methodological bases of the study were the methods of scientific knowledge, general scientific principles and work experience in the field of energy saving management of enterprises. The following scientific methods are used in solving the tasks: theoretical generalization, comparison, conceptual positions of „Passive House", „Triple Zero", „Green Lease".

4. Results and Discussion

The essence of TIF is to provide the investor with compensation through special funds replenished at the expense of tax revenues from created incomes and infrastructure objects put into operation (Dmitrieva, Bazhenova 2016, p. 23). The basis of this mechanism is redevelopment, which is financed by an investor who invests in construction and reimburses his expenses from the special fund, which accumulates taxes paid by the owners of new consolidated facilities.

That is, TIF is a mechanism that involves covering the investor's expenses on the implementation of energy-efficient projects from the budget at the expense of taxes paid to the budgets of all levels coming from the implementation of the investment project upon completion of the construction and commissioning of infrastructure objects. In essence, this is one of the variants of regional application of compensatory tax models for the decision of investment tasks. After all, TIF assumes that the investor's costs invested in the investment project will be offset by the tax exemption calculated in the future.

We propose to introduce the mechanism of TIF in the implementation of energy saving projects in the framework of the building energy cluster, since clustering is becoming the most popular form of organization of production and commercial activity, which is conditioned by trends and challenges in the real sector of the economy. As the authors point out, globalization and the potential symbiosis associated with it are an expression of benefits and opportunities that can be gained as a result of pooling of forces and the competitive advantages of collaborating actors. Confirmation of the above hypothesis is the results of studies conducted by S. Fabiani and J. Pelligrini in 1998, which show that enterprises operating in isolation, that is, outside the clusters operating in close proximity to them, receive up to 40% less revenues (Fabiani, Pellegrini 1998, pp. 23).

In Ukraine, according to the forecast of experts in the baseline scenario, the total consumption of heat energy by 2030 will increase to 271 million Gcal, 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 levels of consumption of natural gas through increased efficiency of its use, the development of heat supply systems on the basis of renewable energy sources. Taking into account that 59.3% of natural gas in

Ukraine is consumed for heating of buildings, implementation of the research and applied results of financing of energy saving projects will allow optimizing the energy consumption of the building by 50-55% from the initial level of expenses at the design stage for residential and public buildings (Dmitrieva, Bazhenova 2016, pp. 23).

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 the implementation of the energy saving project and assessing its compliance with the regional development strategy;
– reflection in the plan of the energy saving project using financial compensating technology „TIF" costs of its implementation and organization of the management system.

We conducted a thorough study of international practices of financing energy saving projects by the leading countries of the world in terms of adaptation of modern management and regulatory technologies to the conditions of operation of construction enterprises of Ukraine, which 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 on the basis of energy efficient technologies;
– effective management of financing energy saving measures;
– effective regulatory regulation of energy consumption;
– integration of financial resources (clustering);
– realization of conceptual foundations "Passive House", "Triple Zero", "Green Lease" (Klymchuk 2016, p. 65). Based on these studies, there was a need to study the advantages and disadvantages of financing energy saving projects through the issue of municipal bonds and the use of TIF (Tax Increment Financing) in the context of financing energy saving projects.

The mechanism of investment of enterprises-institutional participants in the construction energy cluster on the basis of TIF is a set of methods, forms, tools and levers of financial support for the process of functioning of the building energy cluster, taking into account the implementation of measures on energy conservation and energy efficiency, as well as state (municipal) regulation of these processes (Fig. 1).

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

According to the current legislation, local authorities can attract local borrowing following certain requirements:
– the total amount of borrowings to the local budget can not exceed the amount of budget deficit for the local budget for the relevant year;
– funds from the placement of bonds received by the issuer are attracted to financing only the budget of development of the corresponding local budget;
– expenditures for 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 schedule of repayment of the principal amount and payments for its servicing due to the guilty borrower, depriving the relevant council to carry out new borrowing in the next 5 years (Ivashchuk 2007, p. 70).

Identify the benefits of financing TIF-based projects: the distribution of risks between the members of the construction energy cluster; protection against default of other assets and increase of level of financial and credit obligations of project owners; growth of the coefficient of financial leverage, that is, the ratio of debt capital of the enterprise to its own funds, which leads to an increase in the profitability of shareholder capital and reduce its value in the aggregate capital.

In addition to the benefits, the basic mechanism of risk realization of deferred payments include:
– low level of motivation of private investors to finance energy saving projects at their own expense;
– withdrawal of private investors' capital from economic turnover, which leads to losses and inability to generate profit;
– increase in the cost of debt sources for investment, which is conditioned by market conditions, inflation processes;
– low quality of forecasting of additional revenues from the implementation of the energy saving project, and hence uncertainty of the parameters of the project payback.

Potentially, these risks can lead to an increase in the timing of returning invested funds

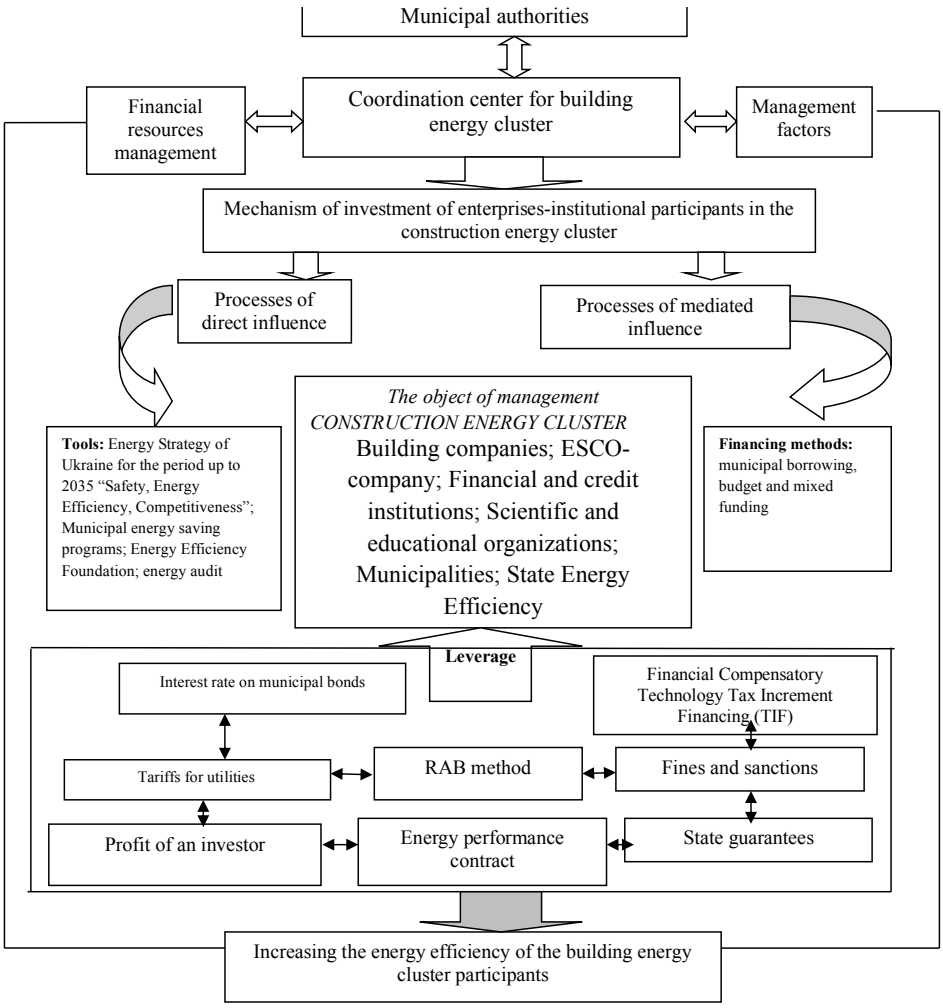

Figure 1. The mechanism of investment of enterprises-institutional participants in the construction energy cluster on the principles of TIF
Source: own study

to the energy saving project, and to change the current tax conditions, reducing the return on investment. In this regard, stability is an important condition for the success of the TIF mechanism state tax policy that increases the quality of forecasting. Most often, TIF bonds are used, which are provided with additional revenues of the TIF zone. For three years, when revenue from taxes in the TIF zone is insignificant, interest on such bonds is usually capitalized. Upon achievement of the stabilization of income, payment of interest and servicing of the principal debt are carried out.

The attractiveness of this funding scheme for local authorities is that investors are taking the risks of project implementation and revenue in a sufficient amount and with a certain periodicity of income. And TIF bonds are not assigned a rating, which makes them more profitable, but at the same time more risky financial asset.

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 below the required one, etc.), the pay-as-you-go mechanism, which can be financed through programs of reconstruction or modernization in the territory of the TIF zone or through issuance of

securities, including bills of exchange, is used. In some cases, bonds may be issued in amounts that exceed the amount of debt. The reason for such a release is the expectation of income from tax payments in connection with the commissioning of new infrastructure.

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

A comprehensive approach to financing energy conservation projects and improving energy efficiency will provide an opportunity to create conditions for improving the quality of life of the population, economic development and social areas of the city, increase environmental security area, improve the functioning of energy infrastructure and increased improvement of urban areas, improving the management of state property.

The advantage of bonds is also the fact that they are a kind of a long-term loan for the issuer, in which nobody can restrict its independence, as is the case of a bank loan. At the same time, it is an instrument for increasing the return on equity of the issuer, provided that the rate of return on the investment funded by the bonds will be higher than the interest rate on the bonds. In this case, the return on capital will increase. Income from municipal bonds in most foreign countries is exempt, provided that they are issued for the purpose of financing social rather than private activities (Ivashchuk 2007, p. 70).

5. Conclusions

In our opinion, the incorporation of foreign experience in the implementation of projects based on TIF in Ukrainian reality requires some adaptation processes, taking into account the problems of finding sources of funding, 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 of most regions. The international financing models of infrastructure projects and risk insurance used in international practice should be adapted to the specifics of our economy development formats.

The study of the practice of local borrowing in Ukraine has demonstrated a fragmented nature of the existing system. Yet, provided the appropriate regulatory and legal framework and taking into account the experience of other countries, the development of the local borrowing market can be a source of financial resources for implementing energy saving projects through compensatory financing on the principles of TIF. According to the results of the study, proposals for the formation of a mechanism for making investment by enterprises and institutional participants in the construction energy cluster on the principles of TIF, in which the structure, levers, tools, methods of funding energy-saving measures are identified, the coordination center of the energy cluster has been determined and the participants of this integration formation have been proposed.

References

Bland Robelt L. (1989). *A revenue guide local government. International City Management Association*, Washington.

Dmitrieva, V., Bazhenova, A. (2016). *The mechanism of deferred tax payments as a way of financing infrastructure projects: foreign experience*. Research Institute of Finance, Moscow.

Dzhezhyula, V. (2014). *Energy saving of industrial enterprises: methodology of formation, control mechanism*. VNTU, Ukraine.

Fabiani, S., Pellegrini G. (1998). *Un'analisi quantitative della imprese nei distretti industriali italiani: redditvitá, produttivitá e costo del lavoro*. „L'Industria. Rivisita di economia e politica industriale", Spain.

Gilika, A. (2009). *Does Tax Increment Financing (TIF) Favor Properties Adjacent to the Development Site?* Award Winning Economics Papers, Chikago.

Huddleston, J. R. (1986). *Distribution of development costs under tax increment financing*. Journal of the American Planning Association, 52(2), pp. 194-198.

Ivashchuk, N. (2007). *The Role of Banks in the Market of Municipal Securities*. TNEU, Ukraine.

Karpenko, L., Serbov, M., Kwilinski, A., Makedon, V., Drobyazko, S. (2018). *Methodological platform of the control mechanism with the energy saving technologies*. Academy of Strategic Management Journal, 17(5), 1939-6104-17-5-271: pp. 1-7. https://www.abacademies.org/articles/Methodological-platform-of-the-control-mechanism-1939-6104-17-5-271.pdf.

Klemanski, J. S. (1990). *Using tax increment financing for urban redevelopment projects*. Economic Development Quarterly, 4(1), pp. 23-28.

Klymchuk, M. (2016). *Management of Energy Saving Finance at Construction Companies: International Experience*, Business-Inform 2, pp. 65-70.

Kulikov, P., Klymchuk, M. (2016). *Management of energy saving in construction enterprises: theory, methodology, practice*. "Foliant", Ukraine.

Lakhno, V., Malyukov, V., Bochulia, T., Hipters, Z., Kwilinski, A., & Tomashevska, O. (2018). *Model of managing of the procedure of mutual financial investing in information technologies and smart city*. International Journal of Civil Engineering and Technology, 9(8), pp. 1802–1812. http://www.iaeme.com/MasterAdmin/UploadFolder/IJCIET_09_08_181/IJCIET_09_08_181.pdf.

Man, J.Y., Rosentraub, S. (1998). *Tax increment financing and its effects on property values*. Center for Urban Policy and the Environment, USA.

Mazurkiewicz, J., & Lis, P. (2015). *Ocena bezpieczeństwa energetycznego w wybranych krajach Unii Europejskiej. Rynek Energii*, 4, pp. 11-20. https://www.researchgate.net/profile/Piotr_Lis/publication/281110415_Ocena_bezpieczenstwa_energetycznego_w_wybranych_krajach_Unii_Europejskiej/links/55e07b7508ae2fac471baf2d.pdf.

Melnychenko, O., & Kwiliński, A. (2017). *Energy management: analysis of the retrospective in the perspective context for economic development*. European Cooperation, 7(26), pp. 66-80.

Order of the Cabinet of Ministers of Ukraine of 13.07.2016 "On Approval of the Concept for the Implementation of Mechanisms for Sustainable Financing of Energy Efficiency Measures", Ukraine.

Pająk, K., Kamińska, B., & Kvilinskyi, O. (2016). *Modern trends of financial sector development under the virtual regionalization conditions. Financial and credit activity: problems of theory and practice*, 2(21), pp. 204-217. https://doi.org/10.18371/fcaptp.v2i21.91052.

Pająk, K., Kvilinskyi, O., Fasiecka, O., & Miśkiewicz, R. (2017). *Energy security in regional policy in Wielkopolska region of Poland*. Economics and Environment, 2(61), pp. 122-138. http://ekonomiaisrodowisko.pl/uploads/eis%2061/11_pajak.pdf.

Ruth, A. (2013). *Community Redevelopment Tax Increment Financing Projects Tax Year 2012*. Report to the Legislature Nebraska Department of Revenue Property Assessment Division Property Tax Administrator, Lincoln. http://www.revenue.nebraska.gov/PAD/research/TIF_Reports/TIF_REPORT_2012.pdf.

Stinson, T. F. (1992). *Subsidizing local economic development through tax increment financing: costs in nonmetro communities in southern Minnesota*. Policy Studies Journal, 20(2), pp. 241-248. https://doi.org/10.1111/j.1541-0072.1992.tb00152.x.