Model for Evaluating the Performance of Investments in Regional Energy Saving Projects when Changing Tax Rates

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Abstract: The goal of the article is that on the basis of existing or forecast data on the cost of the project and indicators of energy saving, as well as the specifics of the tax system of the Russian Federation (values of tax rates, distribution of tax revenues by budgets of different levels) to fully assess the impact of the implementation of measures in energy saving. The findings can be used to develop and implement a model for evaluating the performance of innovative technologies in energy saving.

1 INTRODUCTION

The authors believe that it is possible to regulate tax rates and introduce tax incentives for various types of taxes in order to optimize the volume of revenues and cash outflows to budgets of various levels in the implementation of energy saving measures. The sum of the budgets for the selected observation period, taking into account the discounting of income by year, should not be reduced. It should be borne in mind that the implementation of energy saving measures can be carried out using own, borrowed or borrowed funds, or a combination of them.

In accordance with the concept of the «three-sector model» of the economy of the Russian Federation, which is legally enshrined in the Budget Code of the Russian Federation, it is necessary to allocate the following sectors: the enterprise sector, the household sector and the service sector, financed by regional funds (budget and extrabudgetary funds) and federal funds.

In the article, the authors developed a methodical apparatus that describes the reproduction process in the region in terms of energy saving and energy consumption of economic entities. In accordance with the adopted approach, the implementation of innovative energy saving projects can be initiated by various economic entities: commercial organizations, both small and non-members; non-profit organizations, individual enterprises; households, organizations of the budgetary sphere.

2 MANUSCRIPT PREPARATION

The following types of financing are generally used for innovative energy-saving projects: own enterprise funds (own resources, resources of investors/partners), loans provided by banks and private investors; attracted funds. In this situation, the enterprise implementing the project does not have any special conditions for repayment of the borrowed or

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borrowed funds, except for the terms of the credit agreement (loan agreement).

To assess the effectiveness of the introduction of innovations in energy saving, the author proposes to introduce a coefficient of easy return on investment in energy saving technologies. This coefficient is defined as the ratio of the cost of energy saved by the company for the year to the volume of investments in the energy saving technology under consideration.

$$KO = \frac{D}{I}$$

where:

D - the cost of the saved year resources;

I - the volume of investment in energy saving technology.

The higher the ratio, the higher the efficiency of energy saving investments, and vice versa.

Accordingly, the value, the inverse of the ROI, shows the simple period of return on investment due to energy saving:

$$Tp_{OK} = \frac{1}{KO}$$

The advantages of this coefficient lie in its simplicity and simplicity of calculation. The disadvantages include the opacity of the coefficient relative to taxes.

Therefore, to analyze the impact of tax deductions on the return on investment for taxpayers and to analyze the completeness of budgets at different levels, depending on the different tax scenarios of taxpayers, the authors propose to introduce a rate of return on investment, which is calculated as the ratio of the net annual profit remaining after taxation from the introduction of energy saving technology to the amount of investment in this energy saving technology.

$$KV = \frac{P_C}{I}$$

$$P_C = D - Am - \sum_i N_i - Kr_{\%}$$

P_C – additional net profit of the company from energy savings for the year;

Am – depreciation charges;

$\sum_i N_i$ - the sum of all taxes on energy saving income;

$Kr_{\%}$ - annual interest rate payments within the regulated limits.

The following relationship exists between the simple return on investment and the return on investment:

$$KV = \frac{P_C}{I} = \frac{D - Am - \sum_i N_i - Kr_{\%}}{I} = KO - \frac{Am + \sum_i N_i + Kr_{\%}}{I}$$

Accordingly, when a taxpayer is exempted from all taxes and implements a project without borrowing, the KV coefficient becomes KO minus depreciation costs.

It is in the interest of taxpayers that the rate of return on investment be as high as possible. This is possible when all taxes are reduced or the cost of energy savings increases.

On the other hand, it is in the interest of budget holders at all levels to ensure that their budgets are as full as possible. And this is possible in the case of high tax revenues.

Thus, on the one hand, the State has an interest in stimulating investment in energy conservation and, to that end, to introduce various incentives for enterprises that innovate in energy conservation. On the other hand, the provision of tax incentives reduces budget crowding.

One way of resolving the above contradiction is to separate the objectives of the parties in time and the recipients of tax revenues. To do this, it is necessary to allow taxpayers at the first stage to receive incentive incentives, which will entail some decrease in tax revenues, And then, with additional tax revenue from increased energy-saving profits, return the funds that were not allocated to budgets.

Another way to stimulate innovation in energy saving is to compromise the efficiency of innovation from the point of view of the taxpayer who introduced the innovation, and the budget content. There may be situations where the budget may reasonably incur some deficits to stimulate, which can then be compensated from the budget of a higher level or by reducing the energy saving component in the expenditure items of the corresponding budget. These situations will be discussed below.

To analyze the efficiency of the investment project in terms of budget revenues from its implementation, the author proposes to introduce another coefficient - the coefficient of budgetary efficiency of the project, which characterizes the ratio of taxes, paid by the company before and after implementation for one year.

$$Kb = \frac{Nv}{N0}$$

where: *Nv* – amount of taxes to be paid by the company after implementation of the project;

N0 – amount of taxes paid by the company prior to implementation.

This coefficient is multidimensional and has four coordinates: Consolidated - *Kbk*, федеральную - *Kbf*, regional - *Kbr* and local - *Kbm*.

The project's budget efficiency ratios are relatively easy to calculate and are sufficiently convenient and illustrative to plan budget revenues in the short and medium term. Their disadvantage is the fact that they do not say anything about the energy saving component of the project, but are focused on any investment project. Therefore, these coefficients should be considered in relation to the simple return on investment and the return on investment coefficients in energy saving.

Now let's look at the dependence of the coefficients of budgetary efficiency of the project on the volume of investments and the cost of energy resources saved. In fact, we will only be interested in additional revenues to the federal and regional budgets from the implementation of the project, which will consist of VAT, increased profit tax and tax on the increased assets of the company.

First, consider the federal component of the project's budget efficiency ratio. It will include VAT and profit tax, which will be 2% of the amount remaining after deduction of all expenses and other taxes and payments specified in the Tax Code.

$$Po = D - \Delta Am - \Delta Neq - KR\%$$

where: Po – operating profit of the company before deduction of income tax;

D – additional income from energy savings;

ΔAm – difference in depreciation between new and replacement equipment;

ΔN_{eq} – property tax difference between payments for new and replacement equipment;

$KR_{\%}$ - payment (in the permitted regulated amount) of interest for using the loan for the implementation of the investment project ($KR_{\%}$,$= 0$, if implemented without credit).

To simplify the calculations, let's assume that new equipment has been purchased, which does not replace the old one, and the implementation is carried out without attracting credit funds. The impact of the loan is considered later. In this case, the formula will look more compact. Let's take the cost of equipment in the total investment for C_q, a depreciation will be calculated in a linear way with a depreciation period of 10 years. Then:

$$\Delta Am = \frac{C_q}{10} = 0{,}1 * C_q$$

$$\Delta N = 0{,}02 * C_q$$

Substituting these values in formula we get:

$$Po = D - 0{,}1\ Cq - 0{,}02\ Cq = D - 0{,}12 * Cq$$

Then the additional revenue from the tax on profits from the introduction of energy-saving technology to the federal budget will be:

$$\Delta Nf = 0{,}065 * Po = 0{,}065(D - 0{,}12 * Cq)$$

These revenues will be deducted by the taxpayer. When calculating the projected total revenue for several years, this component needs to take into account the increase in the cost of energy savings by increasing energy tariffs by year and reducing the property tax by reducing the residual the cost of the equipment purchased. In addition, the federal component will contain VAT, which comes to the budget once when buying and commissioning equipment. The VAT value is 18%. Then:

$\Delta Nf = 18 * I/118$ – budget revenue growth due to VAT.

Let's determine the federal component of the budget efficiency of the project for the first year:

$$Kbf = \frac{Nfv}{Nf0} = \frac{Nf0 + \Delta Nf}{Nf0} = 1 + \frac{\Delta Nf}{Nf0} = 1 + \frac{\Delta Nf_{\text{ïðèá}} + \Delta Nf_{\text{ÍÄÑ}}}{Nf0} =$$
$$= 1 + \frac{0{,}065(D - 0{,}12C_q) + 0{,}18 * I / 118}{Nf0}$$

The federal component of the budget efficiency ratio of the project for the first year will be the greater the cost of energy savings and investment during the year, and the less the higher the share of equipment in the investment, and the impact of the cost of equipment is 0.12 of the impact of the cost of energy saved.

We will make similar calculations for the regional component of the budget efficiency of the project. The additional profit of the regional budget will consist of a profit tax of 18% of the profit and a property tax of 2% of the value of the purchased equipment. The second component will decrease annually due to the decrease in the residual value of the equipment.

Note the general formula for this coefficient:

$$Kbr = \frac{Nrv}{Nr0} = \frac{Nr0 + \Delta Nr}{Nr0} = 1 + \frac{\Delta Nr}{Nr0} = 1 + \frac{\Delta Nr_{\text{ïðèá}} + \Delta Nr_{\text{èìóù}}}{Nr0}$$

Further, from the formula for the regional component of additional income from income tax we have:

$$\Delta Nr = 0{,}175\ Po = 0{,}175\ (D - 0{,}12\ Cq)$$

For additional component on property tax we have:

$$\Delta Nr = 0{,}02\ C_q$$

As can be seen from the formula the regional component of the project's budget efficiency factor for year 1 will be the greater the cost of the year's energy savings and the lower the higher the equipment cost share of the investments, and the impact of the cost of equipment is 0.001 of the impact of the cost of energy saved.

For the service sector, budget financing is a traditional source of investment in energy-saving projects. Another form of receipt of funds by the municipality is credit by commercial banks. About 80 per cent of commercial bank credit is used to cover the gap. The remaining 20% are medium-term, more than one year of borrowing, which can be associated with the implementation of urban investment program projects.

3 CONCLUSIONS

This method is recommended primarily for innovative investment projects because of methodological difficulties in predicting the results of the "innovative" component effect when planning innovations.

However, the cost of bank loans to municipalities is higher than the cost of borrowing bonds at the risk of liquidity at the same risk premium. In some cases, however, a commercial bank loan to a municipality is the only way to raise additional resources. This is largely determined by the fact that transaction costs play a big role in the issuance of debt securities: with the size of the bond loan less than 200-500 million rubles, depending on the existing offers of banks, It might not be profitable for the city. Municipal bonds and credit can only be raised by increasing the budget deficit.

Thus, the amount of funds that municipalities can raise, limited: in accordance with the Budget Code of the Russian Federation, the municipal debt limit should not exceed the revenue without taking into account financial assistance from the budgets of other levels of the budget system of the Russian Federation

In addition, financing energy-efficient public infrastructure projects requires significant investments that are difficult to make solely from profits. Such funds should be attracted to financial markets. Since public sector investment projects pay off on average over five years, long-term borrowing is necessary given this factor. The time factor also makes it difficult to finance energy saving projects out of profits.

Also, according to the current Budget Code of the Russian Federation, the draft federal budget and draft budgets of the State off-budget funds of the Russian Federation are drawn up and approved for a period of three years - the next financial year and the planned period. The draft budget of a subject of the Russian Federation and drafts of territorial State extrabudgetary funds (draft local budgets) are drawn up and approved for a period of one year (for the next fiscal year) or for a period of three years (for the next fiscal year and planning period) in accordance with the law of the subject of the Russian Federation (municipal legal act of the representative body of the municipal entity), except for the law (decision) on the budget.

Correction of mechanisms of attraction of financing for realization of energy saving projects is an actual scientific-theoretical and organizational-practical problem, fully in line with the ongoing reform of budgetary legislation in the regulation of the collection and expenditure of federal, regional and local budgets and the transition to a three-year budget planning cycle.

As a rule, financing of energy saving projects is carried out within the framework of the targeted programs of the respective budgets. Therefore, on the one hand, the results of such energy-saving projects should meet the criteria for evaluating the effectiveness of the programme and, on the other hand, contribute directly or indirectly to filling the relevant budget and/or reducing its expenditures.

One of the main criteria for evaluating the efficiency of the implementation of targeted energy-saving programmes is the quantity of tons of conventional fuel and, accordingly, its cost, which was able to save per unit of energy saving costs. This is very close to the ROI rate discussed at the beginning of this paragraph for businesses.

Since budgets at all levels have expenditure items related to grants, compensation, subsidies and other expenditures that support the activities of both the regional and municipal structures themselves and the social and social organizations, as well as organizations of health, culture, sports, etc. then the author proposes to introduce another criterion of efficiency of implementation of energy saving projects at the expense of budgets of different levels - a coefficient of reduction of budget load, which shows the cumulative decrease in budget expenditures per unit of energy saving investment.

Thus, the higher the reduction factor, the higher the efficiency of the energy saving project.

In order to predict budgets for several years it is necessary to extend the volume of annual budget savings R, taking into account the projected changes in energy tariffs.

Thus, the main difference between the introduction of energy-saving projects in the enterprise sector and in the budget services sector is that in the first case there is an increase in budget revenues, and in the second - a decrease in the expenditure lines of the respective budgets. In the former case, relatively only a small part of the value of the energy saved falls into the form of taxes in the respective budgets as their income part, while in the latter case, The reduction in expenditures of the respective budgets is based on the full cost of the energy saved. Therefore, the efficiency of energy-saving projects can be considered to be higher in the second case than in the first.

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