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INVESTMENTS OF INDUSTRIAL ENTERPRISES FOR ENERGY SAVING

Problem statement, task in general form and their actuality and relationship to important scientific or practical tasks. The dependence of domestic enterprises from energy factor, high level of material and energy intensity, conditioned by the use of physically and morally worked-out fixed assets leads to increase production costs. As a result, appear a danger of decrease profit, which constitute the basis for providing further processes of economical activity. In these conditions the actuality the questions acquire of activation processes of implementation energy saving technologies on basis of renewal material technical base of production, reconstruction of productive assets, the introduction of innovative solutions oriented at reducing product costs while maintaining consumer characteristics and product quality. Special significance this problem acquires for industrial enterprises for which implementation of process of investment providing of energy saving on enterprise in manufacturing moves by slow temps due lack of investment. The causes of low investor interest in financing a process of investment of providing of energy saving on enterprise particularly are insufficient level of argumentation of investment decisions in consequence of lack of taking into account of specific of production, technical-economic conditions of realization of process of providing investment in energy saving on enterprise by using traditional indicators of valuation the effectiveness of investments – net present value, internal rate of return, payback period and so on. So vital task is refinement of the features substantiation investment decisions in sphere of energy saving, taking into account the pre-investment and investment phase on industrial enterprises.

Analysis of recent research and publications in which started solving this problem and on what the author leans. To the problems of describe the pre-investment and investment phase is devoted to the publication of domestic and foreign scientists-economists. In the works of S.A. Morozova investigated economic-mathematical model of optimization of financing schedule considering shifts of stages of investment project [1, P.76]. In works V.D. Bogatyrev developed optimization of economic-mathematical model of financing of the investment project taking into account the postponement of date of payment for work [2, P. 4]. In researches H.Z. Mahmudov attention is paid to the investment project as a form of realization the investment potential of the enterprise [3, P.132]. Works of B. O. Yazlyuka dedicated management of diversification in the context of realization of investment-innovative strategy of development enterprises [4, P.86]. E.A. Polishchuk developed theoretical aspects of the investment process [5, P.167]. In scientific works O.I. Sharova investigated instrumental support of processes making management decisions in educational projects [6, P. 146]. In the works N.B. Andrukhiv-Sadovska established features of accounting of financing investment projects in special economic zones [7, P. 9]. In researches Voronko O.S. developed the method of comparative analysis of alternative investment projects [8, P. 62]. Scientific works of Petrovska T.E. are dedicated to research of life cycle of project and its improvement during implementation the project [9, P. 293–298].

Allocation unresolved earlier parts of a common problem to which is dedicated this article. Noting the significant contribution of scientists should be noticed that not enough investigated conditions and features of decision-making of process of investment providing of energy saving on enterprise based on various schemes in industrial sector.

Wording of aim of article and setting individual tasks which are solved in the article The aim of article is substantiation of the pre-investment and investment phases for process of investment providing of energy saving on enterprise for assess the effectiveness of investing on enterprise through the coefficient of profit of energy saving in industry.

Statement of the main material research with full justification of received scientific results. The peculiarity of industrial enterprises is production articles of consumption and means of production. Given this problem of energy saving touches two aspects. The first aspect consists in produc-

tion articles of consumption with the least expenditure of energy, that will permit reduce cost price and while maintaining profit rate, reduce sales price what stimulating sales volume growth. At the expense of this the effect of scale production will lead to economies on conditional permanent part of costs and, as a result, permit increase the profit of enterprise. Within this aspect the assessment of economic efficiency of investment in process of investment providing of energy saving on enterprise will take into account the direct economic effects associated with the formation of the product costs of production of particular type of product and the profit obtained from the sale of this product. The second aspect is more complex and is in the production of means of production for other industries. Introduction of innovative technologies in the production process will allow produce equipment, machines and mechanisms for others, related with industrial sphere of enterprises with improved characteristics of energy saving. Thus in assessing the economic effect of investments it is necessary to take account of costs and revenues which arising from the system of cooperation of enterprises that are in a single technological link.

In addition, the making investment decision, taking into account both reviewed aspects of assess the economic effect of process of investment providing of energy saving on enterprise will considers the possibility of realization various schemes pre-investment and investment phases which affecting the order for determining costs and benefits of the process of investment. The first scheme – a reconstruction or replacement of equipment (simple reproduction of fixed assets). The second scheme include technical retooling (modernization), a new technology that form the basis of expanded reproduction of fixed assets enterprise.

Pre-investment phase can be divided into four stages: creation of process of investment providing of energy saving on enterprise (business ideas), preliminary preparation of process of investment providing of energy saving on enterprise, formulation investment process of investment providing of energy saving on enterprise and evaluation of economic efficiency and financial eligibility, final review of alternative processes of investment providing of energy saving on enterprise and decision making.

At the stage of creating the process of investment providing of energy saving on enterprise (business ideas) is carried out: the creation of ideas of process of investment providing of energy saving on enterprise, definition the objectives of process of investment providing of energy saving, substantiation of direction investment, analysis of market research, identifying investment activity risks, identifying investment opportunities, conducting the research of process of investment providing of energy saving on enterprise, feasibility assessment of process of investment providing of energy saving on enterprise. Within pre-project investigations decisions are taken relatively substantiation investment: required economic efficiency, design, technical-technological, legal, environmental and social impact. Pre-project investigations are implementing the assessment of opportunities of process of investment providing of energy saving: financing capacity, the definition of income and expenses, calculating payback of process of investment providing of energy saving, an analysis of the flow real funds. The sequence of such distribution of stage of creation of process of investment providing of energy saving (business ideas) is as follows: first, find the opportunity to improve the indicators of energy saving by means of investing. Then carefully all the components will worked out for the implementation of investment ideas scilicet the process of investment providing of energy saving on the enterprise is developed.

In carrying out a pre-investment investigations arises question the definition of volume of funding project. In conducting the preliminary economic substantiation, the enterprise must provide funding of analytical studies showing the advisability of realization of the process of investment providing of energy saving. In conducting the preliminary economic substantiation, the enterprise must provide funding of analytical studies showing the advisability of realization of the process of investment providing of energy saving. Stage of previous preparation of process of investment providing of energy saving consists in justification of advisability of investing which needs further revision of process of investment providing of energy saving, choosing the most acceptable process and investing. At this stage the investor when choosing the enterprise estimates the level of its investment attractiveness. In case of suitable level of investment attractiveness a investor proceeds to a detailed assessment of the economic efficiency and financial eligibility of process of investment

providing of energy saving. If not suitable level of investment attractiveness, the investor identifies reserve for raising investment attractiveness of enterprise, intermediaries of investment process could help in this him, attraction of which requires the determining of funding sources because for implementation of large investment process an investor often do not has enough of own means, therefore it can get other sources of funding. The most widespread criteria for deviation of variants of process of investment providing of energy saving are: high energy- and material consumption of products, insufficient demand for products, an ineffective technology, the high cost of process of investment providing of energy saving compared to income.

At the stage of formulation, evaluation economic efficiency and financial eligibility of process of investment providing of energy saving an enterprise assesses the profitability of investment process, analyzes alternative variants of investment process and selects suitable investment process. If the process of investment providing of energy saving interesting the potential investor then is conducted more in-depth research of process and detailed study of economic and financial indicators of investing. Then is carried out the selection of alternative process of investment providing of energy saving, which is selected for detailed development, also the preliminary estimate of proposals of the investor. In case of positive decision on process of investment providing of energy saving, an enterprise moves to final consideration of alternatives of investment process and decision making.

At the stage of final consideration of alternatives of process of investment providing of energy saving and making decisions are conducted: preparation of evaluative conclusion concerning investment process, the choice of technology, the engineering-technical design, carrying out negotiations with investors, the choice of suppliers of equipment and raw materials, the legal registration of process. If the results of research of evaluative conclusion concerning of process of investment providing of energy saving appear positive, then is accepted the final decision concerning development and implementation of investment process and the choice of (development) scheme attracting funding. At the end of pre-investment phase a detailed process of investment providing of energy saving is developing. In the case of making positive decision enterprise passes to investing. The passing through the stages of process of investment providing of energy saving creates a basis for decision-making and process implementation. Exactly the pre-investment stage activates process of investment providing of energy saving. The advantages of this stepwise approach is a turn-based implementation of the process of investment providing of energy saving.

The investment phase contains six stages: contracting, construction and installation of equipment, staff training for use of the facility, launch of process of investment providing of energy saving, implementation of process, process completion. Mass production of innovative products possibly at presence of sufficient quantity of investment that are required to construction of new production facilities or the reconstruction of old. This phase is risky because not yet known market reaction to the new product.

At the stage of contracting carried out: coordination of contracts, creation of project-construction documents, scientific-technical preparing, acquisition and transfer of technologies, formation legal, organizational and financial bases realization of process of investment providing of energy saving, concluding agreements, tendering, organization providing scientific, material, technical, labor bases.

At the stage of construction and installation of equipment passes an investing in assets: reconstruction or re-equipment, purchasing equipment in accordance to energy saving technologies, solving of technological and technical aspects of the process of investment providing of energy saving, works of building and assembly, carrying out of supply of equipment, purchase of shares, to wit real and financial assets is created with purpose generate income.

At the stage of personnel training for use object is carried out: recruitment and personnel training, formation of the administration. Especially important for large enterprises that attract a significant number of workers to carry out preparation and retraining of personnel, because process of investment providing of energy saving require serious professional and qualification requirements, new working methods, special skills, which increases the efficiency of investment process generally.

The stage of launch process of investment providing of energy saving includes works in area of management commissioning of investment process and advisory work. At this stage the most

important is providing funding of expenditure in a given time interval. Launch of process of investment providing of energy saving starts with defining functions and structure of working group on elaboration of investment process. Formed a collective for project management. It creates a mechanism for project management. Agreements are concluding, negotiations with suppliers are carried out, documents are accepted.

At stage of realization of process of investment providing of energy saving is carried out: realization of process activities, monitoring and evaluation of process, adjustment of realisation process, costs for operational supervision and control.

At the stage of completion of the process of investment providing of energy saving is carried out: decision finish a process, evaluation of results process, a report of process, spreading best practices of investment process.

To assess the effectiveness of investing on enterprise and definition of need for new investment process will be carried out a comparative analysis of coefficient depreciation of fixed assets and coefficient of profit of energy saving.

Coefficient of profit of energy saving define by the following formula:

$$K_{P.E.} = \frac{N_{I.E.S.} \times |\Delta S| - INV_N}{N_{I.E.S.}} = \frac{N_{I.E.S.} \times |S_{E.S.} - S_{E.T.}| - INV_N}{N_{I.E.S.}} = \quad (1)$$

$$= \frac{N_{I.E.S.} \times \left| \frac{F_{E.S.} \times C_{E.S.}}{N_{I.E.S.}} - \frac{F_{E.T.} \times C_{E.T.}}{N_{I.E.T.}} \right| - INV_N}{N_{I.E.S.}}$$

where $N_{I.E.S.}$ i $N_{I.E.T.}$ – net income in accordance at energy saving and existing technology, thousand uah; ΔS – the size of energy saving uah/uah; INV_N – demanded investment in fixed assets for introduction of energy saving technologies, thousand uah; $S_{E.S.}$ i $S_{E.T.}$ – specific energy consumption in accordance at energy saving and existing technology, thousand, uah/uah; $F_{E.S.}$ i $F_{E.T.}$ – share energy in production costs in accordance at energy saving and existing technology, %; $C_{E.S.}$ i $C_{E.T.}$ – production cost of goods sold in accordance at energy saving and existing technology, thousand uah.

Coefficient of depreciation fixed assets define by standard formula:

$$K_{D.F.A.} = \frac{D_{F.A.}}{PC_{F.A.}} \quad (2)$$

where $D_{F.A.}$ – amount depreciation of fixed assets, thousands uah; $PC_{F.A.}$ – primary cost of fixed assets, thousand uah.

Using of this methodics was processed on PJSC «Energomashpetsstal». Comparison of coefficient of profitability of energy saving and coefficient of depreciation of fixed assets is listed in Table 1.

Table 1

Comparison of coefficient of profitability of energy saving and coefficient depreciation of fixed assets (developed by the author based [10,11,12,13,14])

Coefficients	Enterprises			
	PJSC «Energomashpetsstal»			
	Years			
	2012	2013	2014	2015
Coefficient of profitability of energy saving	0,0066	0,0319	-0,0926	0,0813
Coefficient depreciation of fixed assets	0,0682	0,0453	0,0451	0,0408

As shown in Table 1 on PJSC «Energomashspetsstal» the coefficient of profitability of energy saving exceeds coefficient of depreciation fixed assets only in 2015 year, and in other years coefficient of profitability of energy saving below, that testify about identifying need of new process of investment providing of energy saving technologies on enterprise.

CONCLUSIONS

Investigation of experience of domestic and foreign economic scientists showed necessity substantiation pre-investment and investment phase for process of investment providing of energy saving in industry. Given the possibility of implementation of various schemes of the pre-investment and investment phase, were developed features of realization of pre-investment and investment phases based on the stepwise approach. Passage through the stages of the process of investment providing of energy saving provides a basis for decision making and stepwise realization of the process that will give possibility affect the procedure for determining the costs and revenues of the process. The developed coefficient of profit of energy saving will allow to compare the coefficient of depreciation of fixed assets and coefficient of profit of energy saving for identifying the need for new process of investment providing of energy saving. In perspective of further research is necessary to develop a procedure to substantiation of decisions of investing in the renewal of material-technical base on industrial enterprises for energy saving.

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