

Cite This Article:

Shashkov S. V. Cost management of small hydro objects [Online] // *Economic Processes Management: International Scientific E-Journal*. 2015. № 3. Available: http://epm.fem.sumdu.edu.ua/download/2015_3/2015_3_12.pdf

Received
August 18, 2015

Accepted
August 25, 2015

УДК: 621.311.213:005:337
JEL Classification: C13, P48

COST MANAGEMENT OF SMALL HYDRO OBJECTS

Shashkov Serhiy Valeriyovych

*Postgraduate Student of Management Department,
Sumy State University, Ukraine*

This article is devoted to study cost management aspects of small hydro objects. Analyzed main cost forming indicators of economic object. The most applicable models of revenue property predictive state, which are of small hydro objects, are reviewed. Factors and risks of affecting the overall profitability, and accordingly, market value of small hydro complex are identified. Proposed organization of multi-purpose use of small hydro plants natural and economic systems as an integral resource in order to increase their functioning from additional, don't contradictory for main, ways, well as ways of reducing the risks of their activity. Presented price-determining factors, which form the cost of small hydro objects in case organizing such multi-purpose management.

Keywords: *area, complex, cost, energy, income, multi-purpose, ownership, production recreational, small hydro, use.*

Introduction. One of the major tasks, which faces Ukraine energetics, is increasing part of renewable energy, one of whom is energy of small rivers. At the same time, in relation with several factors, caused by unstable economic situation the imperfection of current legislation, substantially increased risks of small hydro plants functioning. Besides that, only electricity production business orientation does not always result in it is economically feasible. To minimize such risks and improve efficiency of small hydro plants activity, and in order to increase the investment attractiveness this industry, it is necessary not only most accurate, but also comprehensive approach for identifying profitability ways and cost management of such power facilities.

Analysis of recent research and publications. The definition of the basic concepts and techniques as well as decision of theoretical and practical issues of cost management production enterprises, in the researches takes a lot of domestic and foreign scientists: A. Chirkin, G. Desmond, M. Fedotova, J. Friedman, V. Grigoryev,

A. Gryaznova, H. Harrison, R. Kelly, N. Ordway, Y. Panasovsky, L. Simonova, E. Tarasevich, S. Valdaytsev, etc.

Previously unsettled problem constituent. For today practically absent approaches and methods of cost management in the small hydropower, which take into consideration features of functioning enterprises in the industry, all features of doing business for small hydro objects, which necessitates further, more deep researches on this subject.

Main purpose of the article. The purpose of this article is to determine the ways and methods of increasing profitability the operation of small hydropower plants, as well as increasing the market value of small hydro complexes.

Results and discussions. The index that most closely reflects the economic importance of economic entity functioning is its market value, basic forming factors which are:

- amount of disposable object rights from point of view existing direction and level of its use at the time of valuation;

- possibility of using objects property rights from point of view potential buyers plurality and their representations about possibilities of participation in it, possible forms and directions profitable property using, as well as lower production and other risks while using it [1, 7].

Currently is actively formed interest to such form of administrative and economic activity as cost management of the property. To manage the cost ownership, which brings revenue, means to plan and to take certain measures, associated with maintaining activity and increasing the level of business profitability, and a decrease manufacturing and other costs or losses [6, 8].

The practice of definition size the market value of property profitable revealed the possibility of determining its value for any forecast models of the future their condition. This allows to formalize each variant of future developments. Given that determined by income approach cost based on the expected representations about upcoming versions condition profitable property in the future, predictive models should be presented as follows [5]:

- indirect capitalization:

$$C = \sum_{k=1}^n \frac{D_k}{(1+i)^k}, \quad (1)$$

where:

C – cost;

D_k – annual revenue;

i – discount rate.

- direct capitalization:

$$C = \frac{D}{i}, \quad (2)$$

where:

C – cost;

D – revenue;

i – discount rate.

$$C = \frac{D}{R_0} = \frac{D}{i + PIIK(SFF; SFF_{n/r})}, \quad (3)$$

where:

C – cost;

D – revenue;

R₀ – capitalization rate;

i – discount rate;

RRC (SFF; SFF n/r) – rate of return on capital.

with the distribution by physical interests:

$$C = \frac{D}{M \cdot R_M + (1 - M) \cdot R_E}, \quad (4)$$

$$C = \frac{D}{M \cdot R_M + (1 - M) \cdot i_E}, \quad (5)$$

$$C = \frac{D}{M \cdot i_M + (1 - M) \cdot i_E}, \quad (6)$$

where:

C – cost;

D – revenue;

M – proportion of borrowed capital in the total ownership cost;

1-M – proportion of own capital in the total ownership cost;

R_M – capitalization rate of borrowed capital;

R_E – capitalization rate of own capital;

i_E – discount rate for borrowed capital;

i_M – discount rate for own capital;

revenue models (linear, exponential);

ownership models (linear, exponential);

mortgage investment Ellwood model.

However, all variants of the profitable ownership future state, the situation remains unchanged, that the increase in the value predetermined by two factors: increase profitability and decrease in using the property risks.

Electricity production in the hydro objects is always connected with the necessity to maintain the reliability and safety of the hydro complex. Hydropower facilities in process of depreciation are losing their functional qualities and reduce the production efficiency of the work. At the same time rising costs of maintenance and operation of the complex, which requires an implementation systematic scheduled maintenance and repair regenerative works.

On the one hand, repair and overhaul of involved technological equipment and constructions aimed at maintaining the stability of the target functioning – energy production. With another, considering varied, especially environmental, significance of hydro complex, large-scale repair regenerative actions on them should be defined as environmental protection measures, which aimed at the stability of natural systems maintaining and the prevention of negative consequences of anthropogenic impact on them.

The cost of ownership, which is in the sight of the interests of economic entity, is determined by current and future profitability and disposal of objects and rights to them [2, 3, 4]. At the establishment and functioning of small hydro plants, the only factor that determines their profitability, still decided to recognize the energy which generated and sold. At the same, not consider and not taken into account others, existing and potential folding possibilities to operate with disposable objects and rights to them.

In general, factors that shape cost of ownership of small hydro station at the organization of multipurpose business presented at Fig. 1.

The study showed, that ownership, which administered by hydroelectric company, can be used not only by its intended functional purpose – for electricity generation. Being in charge of small hydropower station natural – economic complex includes not only artificially created objects, but also acquired or leased for carry out its production activities in the project under a functional purpose natural formations. In fact, such comprehensive object is a territorial area, whose market value formed the ability and capacity of its profitable use. Thus, such territory is an integral resource, which endowed with the resource functions, which development predetermined by the possibility of multipurpose use organization this complex in order to maximum benefits obtain. In more cumulative specific income generates from using of allocated territorial area, so more the economic efficiency of its usage and, respectively, higher its cost. In multi-purpose usage organizing of small hydro stations disposable territorial resources, increase incoming considered the following ways:

- income from the functional purpose usage;
- income from the compensation payments receipt from outside business entities due to maintaining stable water level in the river through acting small hydropower

plants, condition the water body and coastal zones, environmentally safe, equilibrium, sustainable ecosystem condition in the area of its location;

- income from recreational, and possibly other entrusted territorial complex uses, which do not contradict the use of its energy and recreational potential.

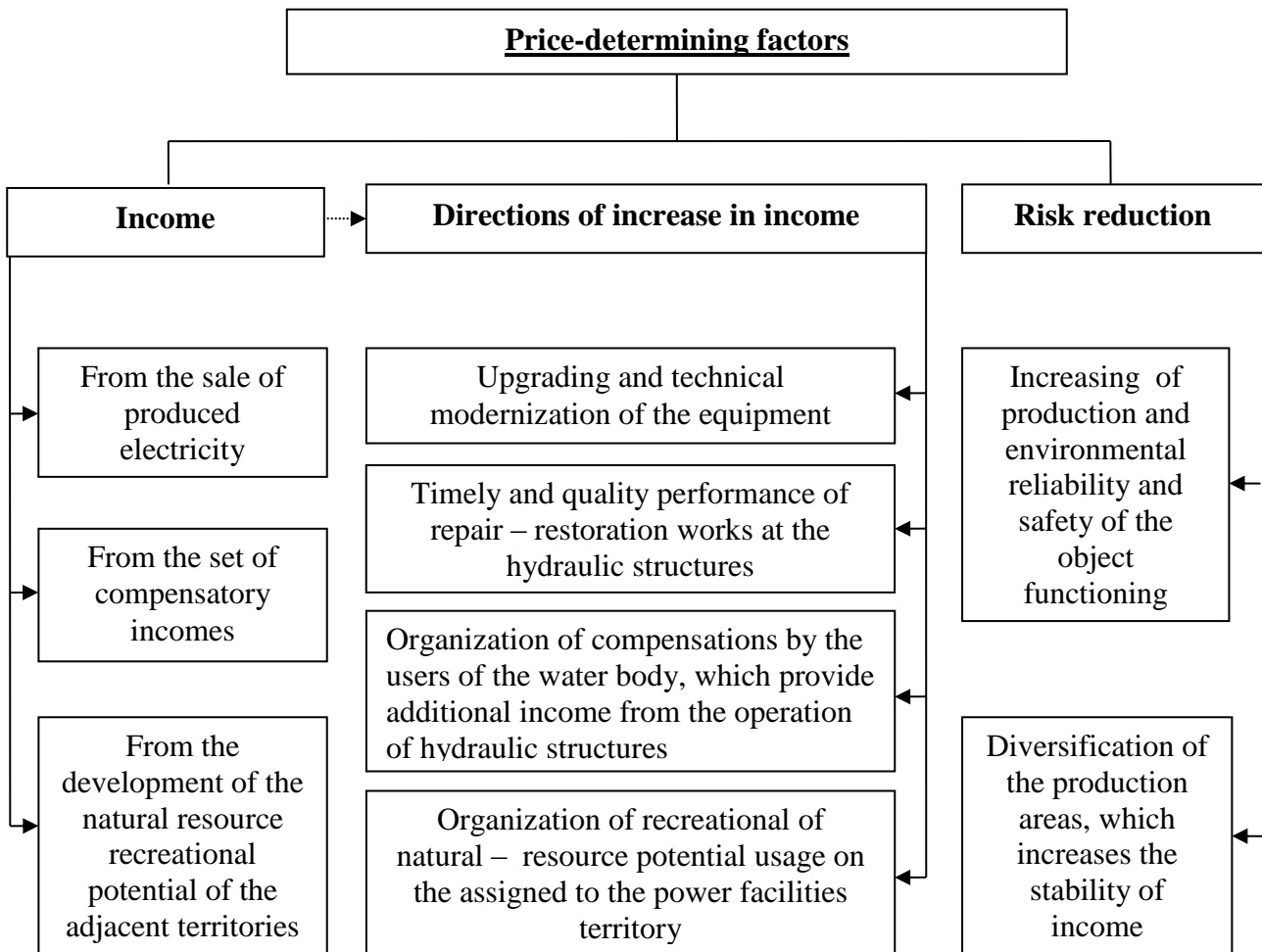


Fig. 1. The main price-determining forming market price factors of small hydro object income ownership in the multi-purpose use (author’s development)

The study showed, that ownership, which administered by hydroelectric company, can be used not only by its intended functional purpose – for electricity generation. Being in charge of small hydropower station natural – economic complex includes not only artificially created objects, but also acquired or leased for carry out its production activities in the project under a functional purpose natural formations. In fact, such comprehensive object is a territorial area, whose market value formed the ability and capacity of its profitable use. Thus, such territory is an integral resource, which endowed with the resource functions, which development

predetermined by the possibility of multipurpose use organization this complex in order to maximum benefits obtain. In more cumulative specific income generates from using of allocated territorial area, so more the economic efficiency of its usage and, respectively, higher its cost. In multi-purpose usage organizing of small hydro stations disposable territorial resources, increase incoming considered the following ways:

- income from the functional purpose usage;
- income from the compensation payments receipt from outside business entities due to maintaining stable water level in the river through acting small hydropower plants, condition the water body and coastal zones, environmentally safe, equilibrium, sustainable ecosystem condition in the area of its location;
- income from recreational, and possibly other entrusted territorial complex uses, which do not contradict the use of its energy and recreational potential.

In its turn, risk reduction consists in:

- increasing production and environmental safety as well as safety of the facility;
- diversification of the production process, which improves stability of income.

Conclusions and further researches directions. The research makes it possible now to form the main directions and models of profitable small hydro complexes functioning on small rivers. Furthermore, these directions should also be considered as the main pricing factors, which form the total cost of such complexes.

According to the author, profitability increasing of functioning small hydro object can only occur when implementing proposed approach of multipurpose use organization on fixed area in all possible directions, which satisfy the growing market demand and are potentially profitable.

References

1. Chirkin A.N. (2002). Otsenka biznesa. Voprosy teorii. Kyiv. [in Russian]
2. Desmond G., Kelly R. (1996). Guide to Business Valuation. Moscow, The Russian Society of Appraisers Academy of assessment.
3. Friedman Jack P., Ordway Nicholas O. (1981). Income property appraisal and analysis. Prentice Hall Professional Technical Reference, 300 p. (Russ. ed.: Fridman Dzh., Orduy N. Analiz i otsenka prinosyashhey dokhod nedvizhimosti. Moscow, Delo Publ., 1997. 480 p.)
4. Harrison Henry S. (1994). Otsenka nedvigimosti. Real Estate Appraisal. Tr. From English. – Moscow, RIO Mosobluprpoligrafizdat. [in Russian]
5. Panasovskiy Y.V. and others. (2009). Otsinka aktyviv pidpnyemstv. Sumy, Universytetska knyga. [in Ukrainian]
6. Simonova L.N., Markus J.I. (1995). Metodicheskie rekomendacii po otsenke rynochnoy stoimosti nedvigimosti. Kyiv. [in Russian]
7. Tarasevich E.I. (1997). Otsenka nedvigimosti. SPb.:SPbGU. [in Russian]
8. Valdaytsev S.V. (2008). Otsenka biznesa i upravlenie stoimostyu predpriyatiya. Moscow, UNITI – DANA. [in Russian]

УПРАВЛІННЯ ВАРТІСТЮ ОБ'ЄКТІВ МАЛОЇ ГІДРОЕНЕРГЕТИКИ

Шашков Сергій Валерійович

здобувач кафедри управління,

Сумський державний університет, Україна

Стаття присвячена вивченню аспектів управління вартістю об'єктів малої гідроенергетики. Проаналізовано основні показники, що формують вартість господарського об'єкта. Розглянуто найбільш застосовувані моделі прогнозного стану дохідної власності, якою є об'єкти малої гідроенергетики. Визначено фактори і ризики, що впливають на загальну дохідність, а відповідно, і вартість малого гідроенергетичного комплексу. Запропоновано організацію багатоцільового використання природно-господарських комплексів малих гідроелектростанцій як інтегрального ресурсу з метою збільшення доходу їх функціонування від додаткових напрямів, що не суперечать основним, а також шляхи зниження ризиків їх діяльності. Представлені ціноутворюючі фактори, що формують вартість об'єктів малої гідроенергетики при організації подібного багатоцільового господарювання.

Ключові слова: територія, комплекс, вартість, енергія, багатоцільове, власність, виробництво, рекреаційний, мала гідроенергетика, використання.

УПРАВЛЕНИЕ СТОИМОСТЬЮ ОБЪЕКТОВ МАЛОЙ ГИДРОЭНЕРГЕТИКИ

Шашков Сергей Валериевич

соискатель кафедры управления,

Сумский государственный университет, Украина

Статья посвящена изучению аспектов управления стоимостью объектов малой гидроэнергетики. Проанализированы основные показатели, формирующие стоимость хозяйственного объекта. Рассмотрены наиболее применяемые модели прогнозного состояния доходной собственности, которой являются объекты малой гидроэнергетики. Определены факторы и риски, влияющие на общую доходность, а соответственно, и стоимость малого гидроэнергетического комплекса. Предложено организацию многоцелевого использования природно-хозяйственных комплексов малых гидроэлектростанций как интегрального ресурса с целью увеличения дохода их функционирования от дополнительных, не противоречащих основному, направлений, а также пути снижения рисков их деятельности. Представлены ценообразующие факторы, формирующие стоимость объектов малой гидроэнергетики при организации подобного многоцелевого хозяйствования.

Ключевые слова: территория, комплекс, стоимость, энергия, многоцелевое, собственность, производство, рекреационный, малая гидроэнергетика, использование.