

IRENA KOCISZEWSKA\*

## ASSESSMENT OF PRO-ECOLOGICAL INVESTMENTS AND THEIR IMPACT ON ONE OF THE PARTNERSHIPS IN THE POLISH STATE RAILWAYS CAPITAL GROUP

As a result of restructuring of PKP S.A. a venture was created which gives the possibility of making decisions about the scope and development of the business, the methods and conditions of providing the services and the assignment of income. These decisions along with the decisions about pro-ecological investment projects are made on the basis of economic analysis. This paper presents some methods of such an analysis. Both investment projects described in the text prove to be effective and beneficial for the company.

### 1. CHARACTERISTICS OF THE PARTNERSHIP

Test and evaluation of pro-ecological investment projects were carried out in Wagem Sp z o.o. with headquarters in Kluczbork. WAGREM Sp. z o.o. (limited liability company) was launched on the basis of fixed assets and human capital of Zakład Taboru PKP S.A. (joint stock company). The capital stock of the company according to the notary act totalled 2 879 500 zł and was divided into 5 759 equal and undivided shares, 500 zł each. The sole owner of these shares, Polish State Railways Joint Stock Company, has its headquarters in Warsaw.

The partnership was created on October 1<sup>st</sup> 2001. The primary activities of the company are:

1. Providing services like repairs, conservation and overhaul of the railway including:

- major and routine repairs of freight, company and technical carriages,
- repairs and regeneration of spare parts to the railways,
- periodical inspections and routine repairs of passenger coaches.

2. Tests and technical analysis, including carrying out of periodical, technical inspections of vehicles, excluding doing of repairs.

---

\* Oskar Lange Academy of Economics in Wrocław, Chair of Economy and Environment Management, 50-345 Wrocław, ul. Komandorska 118/120, Poland.

## 2. PRO-ECOLOGICAL INVESTMENTS OF THE PARTNERSHIP

The investment project was supposed to enable the firm to repair freight carriages taking into account air protection from hazardous substances which are formed during the outdoor painting of carriages and limiting water and energy consumption.

The priority of the partnership was to minimize formation of hazardous substances which are released to the air during technological processes. The usage of an appropriate cabin-dryer suitable for painting carriages was intended to fulfill the task. It is important to note that due to this machine the emission of harmful substances to the air will be reduced to 10%. An increase in water demand and simultaneous depletion of reserves of underground water suggest the necessity of its protection. For this reason the partnership, in order to rise to the challenge, bought a new screw compressor which reduced the usage of water by 100%. As a result, the installation of the machine reduced the energy consumption by 46% and reduced damaging impact of noise by 30%.

The economical effects of the purchase of the new machine, i.e. screw-compressor, stem from a better organization of functioning and the reduction of energy and water costs. The ecological effects, on the other hand, are: the reduction of water and energy consumption and the reduction of noise to the level not posing a threat to the employees. In order to calculate the index of effectiveness of the investment project, a simplified formula was used because of the short completion period (1.5 months) and immediate effects. The simplified method of calculation of the index of ecological effectiveness:

$$E = \frac{P + S}{I(r + s) + K}$$

where:

$P$  – positive effects of functioning of ecological machines (33.3 thousand zł),

$S$  – effects stemming from the reduction of pollution (none),

$I$  – cost of the project (50.4 thousand zł),

$r$  – interest rate (6%),

$s$  – rate of depreciation (14%),

$K$  – an average annual current costs excluding depreciation (15.7 tys. zł)

$$E = \frac{33.3 + 0}{50.4 \cdot 0.20 + 15.7} = 1.16.$$

The index of effectiveness is higher than unity. The project is effective. The higher the index  $E$ , the higher the cost effectiveness of the undertaking.

Economic effects of the planned pro-ecological investment project (painting machine) also lead to a better functioning, reduction of charges and possible ecological fitness and an increase in energy and oil consumption. According to technical data

of the project the emission of pollutants to the air will decrease by 90%. Ecological fees will be also reduced by 90%. So far the partnership has not been obliged to pay ecological fees.

As the completion of the investment will take much longer time compared to the first project, the index of effectiveness will be calculated using dynamic method which takes time into account.

This method encompasses the whole duration of the investment project, i.e. both the period of execution and operation.

To determine whether the project is viable the following elements were taken into account:

1. Capital expenditures.
2. The time span of measurement of viability – 7 years (2003–2009).
3. The reduction of costs (measured as the difference between costs of operation before and after the completion of the project, excluding depreciation and charges).
4. The reduction of ecological charges, that is the multiplication of the difference between the amount of emission before and after the execution of project by specific rates.
5. Straight-line depreciation.

The capacity for reducing air pollution caused by paints, petrol, and asphalt lacquer is a material effect of the planned investment (painting machine). The effects amount to 40.1 t/year.

Ecological effectiveness can be calculated from the following formula:

$$E = \frac{NPV}{eRz},$$

where:

- $E$  – ecological effectiveness,
- $NPV$  – expenses to carry out an investment project,
- $eRz$  – a material effect of project in natural units (tons),

$$E = \frac{17.7}{40.1} = 0.44 \text{ zł/kg.}$$

The index of effectiveness is higher than zero. The lower the index, the more ecologically effective project and its cost effectiveness is higher.

### 3. SUMMARY

The establishment of the partnership as a consequence of the restructuring process of PKP had a positive effect on the environment, especially within the range of operation of the partnership. When the investment decision is taken, we need an analysis

of discounted cash flow, on the basis of which it is possible to assess the viability of the pro-ecological investments. The analysis of ecological effectiveness of the investment projects enables us to establish what actual material effects were achieved due to the pro-ecological investments. The material effects in this case can be itemized as follows: the reduction of water consumption by 3024 m<sup>3</sup> per year and the reduction of air pollution by 40.1 t per year.

Understanding of these effects is a modern source of environmental information necessary for the society. This certainly gives the possibility of promoting positive image of the company among customers and strengthens the competitive advantage as a company will not be competitive without the support of the suppliers and pressure from the local rivals.

#### OCENA PROEKOLOGICZNYCH PRZEDSIĘWZIĘĆ INWESTYCYJNYCH I ICH WPŁYW NA JEDNĄ ZE SPÓŁEK Z GRUPY KAPITAŁOWEJ PKP

Oceniono proekologiczne przedsięwzięcia inwestycyjne spółki WAGREM z siedzibą w Kluczborku. Analiza dotyczyła dwóch projektów inwestycyjnych: zakupu sprężarki śrubowej oraz malarni. W zależności od długości horyzontu czasowego inwestycji zastosowano uproszczoną bądź dynamiczną metodę liczenia efektywności. Badanie pokazało, że pierwsza inwestycja jest efektywna ekologicznie, podczas gdy efektywność ekologiczna drugiej (malarnia) wynosi 0.44 zł/kg.