DESIGNING A MANAGEMENT MODEL FOR ACHIEVING ECONOMIC-ENVIRONMENTAL BALANCE IN INVESTMENT PROJECTS

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This paper describes a method for achieving the economic-environmental balance based on the assessment of environmental and/or pollutant factors in connection to community option on the evaluation of investment projects having a major impact on environment. This assessment is based on the concept of welfare, the distinction between satisfaction and dissatisfaction and implies a practical approach including the scientific aspects of environment pollution degree and the community position on developing an investment project, by assuming responsibility for negative and positive aspects of such a project, respectively for satisfaction and dissatisfaction, in order to fulfill the supreme goal of preserving the environment and ensuring human welfare.

Keywords: welfare, Pareto optimum, satisfaction/dissatisfaction, model, economic-environmental balance
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1. Definition of welfare and the historical evolution of the welfare concept

Social welfare indicates the satisfaction or utility degree gained by each participant, but is not equal to the sum of individual welfare.[717]

Pareto concept of welfare represents a milestone in economics history. Until then it was considered that the welfare is the sum of communities' quantifiable cardinal utilities, the optimal resource allocation maximizing the welfare.

As noted before, Pareto optimum is defined as the point that allows the improvement of a certain individual welfare, meaning his movement to a preferred position by adjusting goods or services through production or exchange without affecting someone else's welfare. In order to remove the need for interpersonal utilities' comparison, Pareto has refused to assess any other changes of welfare. Therefore, his definition drops the concept of unique social optimum, providing instead an infinite number of unmatched optimums.[718] The comparability area can be extended by introducing the concept of compensatory payment. This concept was mentioned first by Enrico Barone in his famous article called "The Ministry of Production in the Collectivist State" (1908). Barone suggested that all individual welfare changes can be expressed using the real equivalent income an individual agreed to receive or pay in order to regain his original welfare.

A change that favors certain individuals in the detriment of others can still generate an improvement of global welfare, if those who earn can compensate the losers, so they voluntary accept this change, after compensatory payment is made, and the winners are better off, but also the losers are not in a worse situation. In order to better understand this statement, we consider the example of coexistence of an airport and its surrounding areas. The airlines company and its

[717] Gilbert Abraham-Frois -" Political Economy' Editura Humanitas Bucureşti, 1994, pag. 312.

[718] X* vector is the optimum solution if from the equations: $f_i(x) \geq f_i(x^*)$ (i=1,2..., m) we have $f_i(X) = f_i(X^*)$ (i=1,2..., m). When $f_i(X)$ are concave, and the admissible set of solutions x is closed and convex, then for each Pareto optimum x* we have weighting coefficients that maximize the amount at x*. This point provides the best available welfare.

passengers are the winners, while the neighbors are the ones that lose because of sonic pollution. The inhabitants have nothing to lose if they are compensated for their loss, finally obtaining an increased community welfare.
The Pigovian economy of welfare implies a Pigou analysis of the divergence between private marginal profit and social marginal profit. It is the problem of real external economies or diseconomies in relation with income marginal benefits. Pigou describes in his work „The Economics of Welfare" social losses such as: industrial accidents, professional diseases, child and women employment, air and water pollution, technological unemployment. The measuring of such diseconomies is a difficult task because of their pretty difficult "internalization" as they are considered outside the price system by definition.
A reward of Pigovian economics of welfare when the society goal is to maximize the difference between global benefits and global costs, shows that in a market where the price equals the marginal social cost of a product, the Pareto optimum condition is met. This can be better explained in the case of an economic activity generating external effects (diseconomies).

2. Practical considerations on designing an economic-environmental balance model for investment projects

The investment projects for fixed assets having a major impact on environment must be assessed and classified according to models that lead to their approval or rejection. Tha major pollutant investment projects are thermal plants, electric plants, power stations, nuclear plants, etc., but also investments in the chemical, petrochemical, steel and rubber fields. The development of a model implies, besides scientific and theoretic issues such as the acceptable pollution level, eco, green and clean technologies, also a responsible involvement of all parties involved in the positive and negative outcomes of an investment project development. These parties can be the beneficiary of the investment, the environmental agency, the developer, local administration, population, farmers from the affected area, other individuals or legal entities affected by the investment project development. Therefore, in taking the approval or rejection decision, the parties involved must assume a point of view based on a scale derived from the one suggested by the theoretic model, that can be a Stapel scale, as follows::

Stapel scale

Maximum pollution Null pollution

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

In addition to assessing the pollution level on the main environment components – air, water, soil, etc. – we need to quantify the importance of each type of pollution and/or pollutant, using a weighting or importance scale (similar to the one included in the theoretical model). Through this practical approach we can determine the degree of satisfaction and/or dissatisfaction for each issue of the analyzed investment project. For example: noise level, level of suspended particles in the air, radioactivity level, thermal pollution, chemical substances soil pollution, water pollution, etc.. Such an approach facilitates the classification of suggested project alternatives, the decision-taking process regarding mutually exclusive projects and the collectivity involvement in assuming both benefits (satisfactions) and pollution (dissatisfactions) generated by such an objective.
Its practical implementation implies an active collaboration with the Environment Agency, environment experts and professionals in investment projects' design, in order to develop a model for pollutants that allows the measurement of the perceived satisfaction or dissatisfaction level, and finally to achieve a global level of satisfaction or dissatisfaction regarding the

development of an investment project, based on weighting these elements with the importance assigned to each pollutant.
The main equation is:

$$B_j = \sum_{i=1}^{k} AB_i \cdot p_i$$

where:
B_j- is the j party score for a project or project alternative, which indirectly expresses a certain level of welfare as a result of project development;
AB_i- is the welfare level influence degree generated by the influence factor or pollutant i
p_i- is the weight of the influence factor or pollutant i
i=1,.., k is the number of pollutants

$$B = \frac{\sum_{j=1}^{n} B_j}{n}$$

where:
B- is the global score of a project or a project alternative, which indirectly expresses a certain level of welfare asa a result of project development;
j=1,..,n is the number of parties involved in assessment.

For each investment project, the Environment Agency identifies the parties involved in preserving the environment and the parties affected by the project development, on the basis of an impact study. The Environment Agency provides the assessment applications to the beneficiary and the parties involved, and requires their response before the final notice of the project. The assessment application can also be provided to a representative sample of the affected population; in the case of major investment projects having complex implications on the economic-environmental balance, a full research can be done.

3. Case study CET Arad

"Centrala Electrică de Termoficare Arad" company, under the authority of Arad City Council (CMA), administers by concession the assets of the former Electrocentrale Branch Arad, founded on the basis of Governmental Decision 105/2002 from S.C. Termoelectrica S.A. Bucureşti. S.C. CET Arad S.A. provides electricity and heat through two thermal plants: CET Lignit Arad and CET Hidrocarburi Arad. From the perspective of heat production necessary to cover the needs of Arad city inhabitants, the two stations are interconnected in order to ensure a continuous provision of heat to consumers. Considering the local meteorological conditions, and especially the directional wind frequency, we consider the location of Centralei Electro-Termice (CET) Hidrocarburi Arad downtown and of Centralei Electro-Termice (CET) Lignit Arad in the north of the city of Arad inappropriate.
In order to obtain the values on the Stapel scale, presented in the table below, we considered the air pollution, water pollution and soil pollution (including underground waters , especially groundwater) with carbon oxide (CO), sulfur oxide (SO), nitrogen oxide (NO), lead and lead composites (Pb), hydrocarbons (HC), sedimentary and suspended particles + noise. The results are far from encouraging, with particular focus on air pollution (value -3) and soil pollution (value -2), according to the data provided by the Environment Preserving Agency (APM) Arad. Regarding other dissatisfactions and discomforts generated by Centrala Electro-Termică (CET) Arad, we notice human health in general and respiratory diseases in particular, according to the data provided by the Public Health Department (DSP) Arad.

Company /Indicators	Weight	Environment Preserving Agency (APM) Arad	Public Health Department (DSP) Arad	Land Reclamation Department (DIF) Arad
Air pollution	0,5	-3	-2	-1
Water pollution	0,3	-1	-1	-1
Soil pollution	0,15	-2	-1	0
Noise	0,05	+2	+3	+4
Global score per party involved		-2		
Project global score				

Stapel scale

-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5

A more analytical assessment approach for an investment project, based on the model described above, involved the following data:

Identification data _____

_____

No.	Pollutant	Satisfaction level										
		Maximum pollution	-4	-3	-2	-1	0	+1	+2	+3	+4	Null pollution
1												
2												
…												
n												

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