PRESENTATION OF A MODEL FOR EXAMINING THE EFFECTS OF CHANGES IN THE TECHNOLOGICAL COMPOSITION OF NATIONAL ECONOMIC SECTORS ON EMISSIONS AND RETURNS

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1 INTRODUCTION

In the past decade and a half, the author and his co-authors have published several research papers and related articles on GHG calculations. One of these was a theoretical study that examined how the expected success of a GHG emission reduction project could be quantified. In this model, the authors combined the previous cost-benefit analysis methodology with a formula showing the effectiveness of a change, and proposed creation of a new formula [4]. This article was inspired by research that was taking place in parallel to the creation of the so-called carbon orientation matrix of national economic sectors, which can provide assistance in prioritizing decisions at a societal level. The summarization of the research at that time was never actually finished, so this article provides a retrospective summary that supports the justification for the creation of the new formula, thereby illustrating the possibilities of thinking about it further.

2 MATERIAL AND METHODS

The author's task was primarily to create the models necessary for the studies, his colleagues processed the necessary data and the results by sector. During the study, the author used the indicators of traditional investment economic studies (NPV, Payback-Time) and the cost-benefit (hereinafter referred to as C-B) study. The basis for creating the model was the establishment of technological variants and the direction and extent of possible changes in them. Therefore, first, a literature survey of this area and their practical comparison were carried out. The basis of the study was therefore the characterization of the technological composition of the given sector and the determination of its possible future development directions.

The basis of the studies were investment economics studies, so it was necessary to determine the method of time management. This can also be considered the first step, because the implementation and operation of development ideas in different branches of the national economy – and in the case of different technological variants – can be very diverse. Moreover, if we speak at the level of society as a whole, there may be a number of changes in the technological composition, the acceptance of which at the social level has raised additional problems. However, the research did not address the manageability of these problems at this stage, a possible solution to this was explained in an article of [5].

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Based on his previous work, the author considered it appropriate not to use the formula of the classic investment economic analysis, but a formula system that follows the cost-benefit principle more closely, which he has used so far primarily in agricultural situations and models. Another very important aspect of this latter line of thought is the appropriate level of calculation of cost changes occurring in the technology operation phase.

The basis of the C-B formula was the assessment of current practice (BAU) and the determination of the items that change it per entity and per technology.

3 RESULTS

The diagram below shows a summary of the various planned versions.

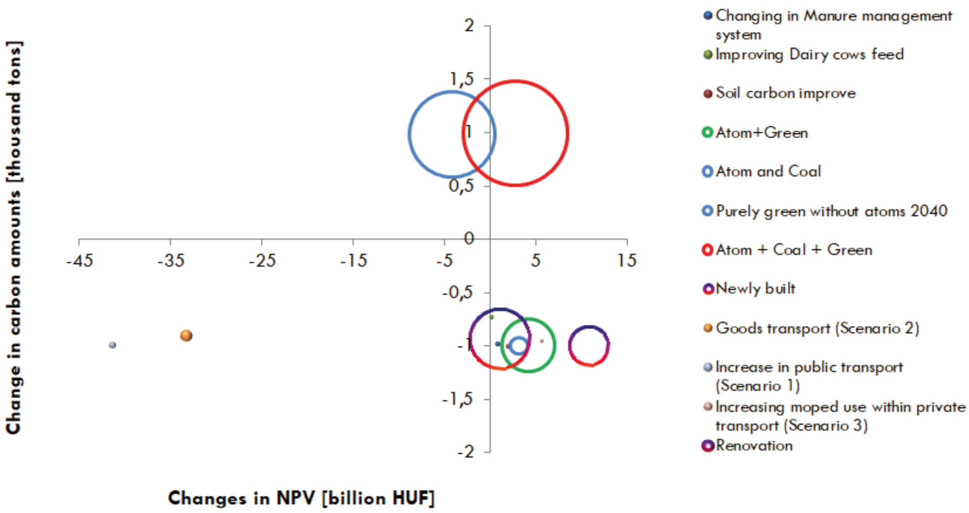

Fig. 1: The different Hungarian Industrial Sectors final results about the possible actions for GHG reductions

The figure shows the changes in the composition of the agricultural sector, residential buildings, transport, primarily the public transport sector, and the results of the tests related to the electricity supply.

The figure explains the definition of the size of the circle, which actually contains an inverse interpretation. Here we can see the R+D+I demand of a thousand tons of CO_2 emissions change, i.e. it shows the investment demand of the given change. If we were to take the reciprocal value of the same indicator and form the figure in this way, the priority order of the individual sectors would become visible. But this was immediately accompanied by thoughts about whether the area that could be read from this inverted diagram should really be given priority (in this case, it would be the agricultural sector and public transport, which are typical areas in society where the implementation of changes encounters serious resistance).

4 CONCLUSIONS

The results presented above focused on determining the cost-benefit changes of each scenario variant, and were less concerned with their feasibility at a social level. The research team at the time also perceived this, but due to the time and budget available at the time, we were not able to address this issue. This was the reason for including the further consideration of the research at that time in the article. Indeed, it can be seen from the above results that those sectors are disadvantaged in which the risks of feasibility are lower and their degree of climate damage mitigation can be better determined.

A further result could be to supplement previous studies by preparing technology portfolio clouds for the given sector.

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