

Chapter 10

Using Soft Systems Methodology for the Analysis of Sustainable Energy Initiatives

ABSTRACT

The chapter is devoted to the energy efficiency analysis as a prerequisite for sustainable use of energy. In this regard, the current study is focused on the application of soft systems methodology (SSM) and its role as a problem structuring approach to analyze the energy efficiency initiatives. For this purpose, four research works were addressed. The mentioned researches employed a combination of multiple-criteria decision analysis (MCDA) and (SSM) to assess the energy efficiency initiatives. The obtained results included the role of key players in rich pictures with a potential interest in a system for energy efficiency initiatives evaluations, the definition of the root, CATWOE components, and a conceptual model. The results of such processes could be applied in the establishment of a sufficiently accurate decision model capable of offering structured support giving rise to a more informed decision in terms of the energy efficiency measures implementation.

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INTRODUCTION

As stated by Lemaire (2010), sustainable energy refers to the type of energy able to fulfill the requirements of the present generation with no interference with the future generations' ability to supply their own needs. Sustainable energy deals with the discovery of a clean and renewable source of energy instead of the depleting energy sources. In this definition, sustainable energy implies an inexhaustible type of energy that will never be used up or depleted. Sustainable energies can be found in various forms. Besides the most well-known sources (i.e. wind, solar, and water) bioenergy and geothermal energy can be also classified as sustainable energy. Sustainability is also achievable by improving energy conservation and efficiency. Although the common sources of energy (e.g. coal and natural gas) can undoubtedly supply the current energy requirements, they will be burned up leaving nothing for the next generation if we continue to consume them at this rate. Thus the next generations must do what we could already be doing—discovering new methods of energy exploitation.

The success of sustainable energy initiatives is highly probable upon their contribution to other social and economic development objectives (Ahuja and Tatsutani, 2009). It should be noted that the sustainable energy initiatives analysis is based on this assumption that the functions accomplished by people within a society can be sustained through the use of an underlying network involving sustainable energy. Moreover, a complex evolving system can be characterized by a proper balance between the efficiency improvements (in which the system inputs are converted to outputs in the cases of resource scarcity) and a diversification/intensification in the system outputs production (in cases with abundant resources). A complex system refers to a system in which the growing diversity and number of human functions can be reproduced (Labanca, 2017).

The use of soft systems methodology (SSM) in sustainable energy initiatives follows a classic seven-stage procedure involving the analyses to understand the problem condition and derive changes and recommendations to alleviate the problematic condition. Considering sustainable energy initiatives, the relevant stakeholders should be identified prior to the use of SSM. 3 major objectives can be envisaged for the decision-makers: (1) generating knowledge regarding a problematic situation; (2) the use of this knowledge to define the problem, and (3) establishment of a systemic plan. This triple configuration has provided a useful framework to understand the advantages of applying major SSM tools (Coelho et al., 2010).

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