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.

DOI: 10.4018/978-1-7998-4504-1.ch010

Copyright © 2021, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

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 wellknown 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 (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).

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart"

button on the publisher's webpage: www.igi-

global.com/chapter/using-soft-systems-methodology-for-the-

analysis-of-sustainable-energy-initiatives/259201

Related Content

Sensitivity Analysis on Linear Programming Problems with Trapezoidal Fuzzy Variables

Seyed Hadi Nasseriand Ali Ebrahimnejad (2011). *International Journal of Operations Research and Information Systems (pp. 22-39).* www.irma-international.org/article/sensitivity-analysis-linear-programming-problems/53468

The Use of Companion Applications to Support Instructor-Led Training

Stephanie R. Johnson (2020). *Cases on Performance Improvement Innovation (pp. 156-172).*

www.irma-international.org/chapter/the-use-of-companion-applications-to-support-instructor-led-training/255969

Algorithms for Selecting the Optimum Dataset While Providing Personalized Privacy and Compensation to its Participants

Rajeev Kumar (2017). International Journal of Operations Research and Information Systems (pp. 43-58).

www.irma-international.org/article/algorithms-for-selecting-the-optimum-dataset-while-providing-personalized-privacy-and-compensation-to-its-participants/188371

On Reserve Money for a Fuzzy EOQ Model in an Inflationary Environment Under Supplier Credit: Reserve Money Policy for a Retailer

Nirmal Kumar Duariand Tripti Chakrabarti (2018). *Handbook of Research on Promoting Business Process Improvement Through Inventory Control Techniques* (pp. 327-348).

www.irma-international.org/chapter/on-reserve-money-for-a-fuzzy-eoq-model-in-an-inflationaryenvironment-under-supplier-credit/198698

Note on Assignment Algorithm with Easy Method of Drawing Lines to Cover All Zeros

Sarbjit Singh (2012). International Journal of Operations Research and Information Systems (pp. 87-97).

www.irma-international.org/article/note-assignment-algorithm-easy-method/69180