

# Green Energy Sources Selection for Sustainable Planning: A Case Study

Chiranjib Bhowmik , Sumit Bhowmik , and Amitava Ray 

**Abstract**—The aim of this article is to select the optimum green energy sources for sustainable planning for a region. This research presents an integrated model based on theoretical base of benefit, opportunities, costs, risks and a well-known multicriteria decision-making technique, i.e., the analytical hierarchy process, to evaluate the green energy sources from northeast India along with 16 local factors. The analyzed result shows that solar photovoltaic is the optimum green energy source having the highest score value followed by other sources, appraised by the integrated model. Based on the results this article, we suggest some policies for the energy managers, policymaker, and decision makers. This article has both theoretical and practical implications. Theoretically, it contributes holistic measures for designing and managing the green energy sources selection framework for sustainability, and, practically, it helps various organizations operating in the green energy sources selection sector to improve their sustainability dimension for the cleaner future. The proposed article considers not only various cost criteria, but also all other criteria, such as power generation, implementation period, and useful life, that are considered to select the optimum green energy sources for the better future. The findings of this article can provide useful information to energy decision makers and serve as a reference for Tripura's energy policy.

**Index Terms**—Analytical hierarchy process (AHP), benefit, opportunities, costs, risks (BOCR), green energy sources, sensitivity analysis, sustainability.

[For Full Article Click Here](#)

the need to switch from conventional resources to alternative green sources for sustainable energy production. Therefore, green energy planning for sustainable development can maintain the ecology, which, in turn, will help in meeting the energy demand in an optimal manner [1]. Energy sustainability was first highlighted by Brundtland report in 1987 [2], [3]. Thereafter, various researchers have made different efforts to capture different aspects of the energy sustainability combining renewable and conventional sources for revolutionizing the future [3], [4]. Sustainable planning is implemented in conjunction with sustainable design and incorporates the same emphasis on environmental, economic, and social sustainability, but, in general, looks at a development in a larger context and at how a development interacts with the surrounding environment. By taking energy sources into account at the primary stage, issues such as power generation, implementation period, useful life, cost factors, market stability, installation, lifestyle, surrounding environment, characteristics of the occupants, and management rules can be considered, and designed for. This will maximize the benefits to be gained, without entailing excessive cost in terms of energy sustainability [5]. In view of the current situation, green energy sources selection can drastically change the human life cycle that seeks to categorize the impact of sources and their