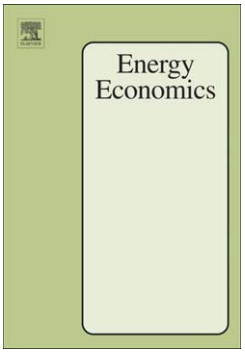

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Measuring National Energy Performance via Energy Trilemma Index: A Stochastic Multicriteria Acceptability Analysis

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Abstract

The World Energy Council annually releases the Energy Trilemma Index to measure the country-level energy performance. However, the preferences among the trilemma can change from country to country, which always is a undetermined issue and full of controversy. This paper comprehensively considers all possible preferences, and formulates interval evaluation results under certain preference. Such formulations are motivated by the observations that it is difficult to reach a consensus about the weights associated with the trilemma, since different weight elicitation methods inevitably produce different weighting schemes. Therefore, we propose an interval decision making problem and apply a Stochastic Multicriteria Acceptability Analysis to present a holistic measurements of the country-specific energy performance. This differs from the conventional wisdom that assigns exact values to corresponding weights, but explores the weight space to make each country the most preferred one. Our analysis is demonstrated by measuring the energy performance of top 10 countries based on 2015 Energy Trilemma Index.

Keywords: Energy performance, Stochastic Multicriteria Acceptability Analysis, Rank

1. Introduction

Recently, the terminology "Energy performance" has been extensively advocated and universally cited by environmental policy analysts and public stakeholders. At the level of company operations and management, a fast-increasing number of energy-related regulation mechanisms, for instance, tradable green certificates [1], carbon emission permits [2], significantly affect their strategic and operational decisions. An official indicator to measure energy performance, namely, the Energy Trilemma Index (ETI), is annually prepared and published by the World Energy Council (WEC) cooperated with global consultancy Oliver Wyman, in partnership with the Global Risk Center of its parent Marsh & McLennan Companies. Countries are comparatively ranked via the ETI in terms of their ability to provide

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