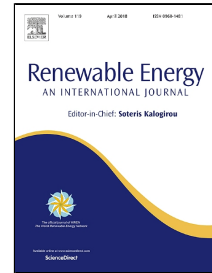


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Comprehensive evaluation of regional clean energy development levels based on principal component analysis and rough set theory

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1 **Title:** Comprehensive evaluation of regional clean energy development levels based on principal  
2 component analysis and rough set theory

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13 **Abstract:** After the strategic concept of global energy Internet constructed, it has produced a strong  
14 response in the world. In recent years, countries around the world are actively promoting energy  
15 transformation and have developed clean energy development goals and plans. This paper constructs a  
16 comprehensive evaluation index system for the level of clean energy development by considering  
17 policies and regulations, energy supply, environmental impact, energy consumption, technology,  
18 economy and so on. At the same time, China, Germany, the United States and 17 other countries are  
19 selected as evaluation objects. On the basis of searching, processing and analyzing a large number of  
20 data, firstly, the research uses the principal component analysis method to carry out the correlation  
21 cluster analysis of the index and then uses the rough set method to assign the weight of the extracted  
22 principal components. Finally, the weight of each index in the index system is calculated. The results of  
23 the comprehensive evaluation of each country are compared and analyzed, which shows that the weight  
24 determination method based on rough set theory and principal component analysis is more reasonable  
25 and objective. At the end of the paper, some suggestions are proposed to promote the development of  
26 clean energy.

27 **Keywords:** Regional clean energy development level; Index system; Principal component analysis;  
28 Rough set theory

29 **The first author's resume:** Professor of North China Electric Power University. The main

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