

10.可再生资源利用与可持续发展

Mapping the carbon mitigation potential of photovoltaic development in the Gobi and desert regions of China

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摘要: The Gobi and desert regions (GDRs) have significant advantages and enormous potential in the development of solar resources. Based on the GEE platform and multi-source datasets, this study used the random forest algorithm to identify the current distribution of GDRs in China, analyzed the carbon mitigation potential (CMP), and further explored the layout optimization strategies for the future development of China's GDRs photovoltaic (PV) industry. Research has found that only 2.25% of the five provincial-level administrative units involved in GDRs have already undergone PV development, and there was still a large amount of land suitable for PV development; Regional solar energy resources were crucial for PV development, but policy support and terrain characteristics could not be underestimated; When the proportion of PV installation in the most suitable regions for GDRs reached about 50%, it can met the electricity consumption of China's entire society in 2022. At this time, the CMP was about 5.39×10^{12} kg CO₂. Research identifying priority areas for further development of the PV industry. The research results can provide decision-making basis for the development and layout of China's PV industry, and the research framework is also applicable to other similar regions.

关键词: photovoltaic; carbon mitigation potential; suitability analysis; Gobi and desert regions; development strategies