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China's nuclear power under the global 1.5 °C target: Preliminary feasibility study and prospects

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Abstract: This paper explores the measures to achieve the global 1.5 °C temperature rise target (1.5 °C target) by analyzing the feasibility and obstacles of nuclear power in China. The 1.5 °C target imposes stricter requirements on China's nuclear power. Considering the available nuclear power plant sites, nuclear power layout, equipment manufacture & supply, nuclear power plant construction capacity, supportive operation & management talents, investment, cost effectiveness, and public acceptance, the achievement of the development objectives of nuclear power in China considering the 1.5 °C Target is difficult. However, it is possible if favorable decisions and policies are made.

Keywords: 1.5 °C target; Nuclear power in China; Solutions; Feasibility; Decision-making

I. Introduction

As concluded in the Paris Agreement, global temperature rise should be controlled below 2 °C by 2100. However, it is a world target to further limit it to below 1.5 °C, but the measures to achieve the 1.5 °C target have not yet been much studied. In recent years, some scholars researched the 1.5 °C target and reported simulation results, which indicate that the 1.5 °C target requires global carbon emission to get close to zero within 2050–2060 and become negative thereafter (van Vuuren et al., 2016). Based on these conclusions and the carbon emission budget, Jiang et al. (2016, 2018) analyzed the major changes needed in the power mix of China by 2050 to realize the 1.5 °C target. In this major change trend, China's nuclear power development has a high level expectations (Jiang et al., 2018), This paper analyzes the nuclear power capacity needed in China by 2050 to realize the 1.5°C target, as well as the feasibility, necessary measures, and difficulty.

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