

INVESTMENT IN RENEWABLE ENERGY DEVELOPMENT IN CHINA¹

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Renewable energy is closely related to economic sustainability. This paper discusses the status of renewable energy development and investment in China based on data from 2011–2020. The research results are as follows. First, China's renewable energy consumption and generation are on the rise, with wind and solar energy growing at a significant rate. Second, investment and uptake capacity of power generated constrain the development of renewable energy in China. To this end, this paper proposes suggestions.

Keywords: renewable energy; sustainable development; investment; uptake capacity of power generated; China.

ИНВЕСТИЦИИ В ВОЗОБНОВЛЯЕМЫЕ ИСТОЧНИКИ ЭНЕРГИИ В КИТАЕ

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Возобновляемые источники энергии тесно связаны с устойчивым экономическим развитием. В данной статье рассматривается текущее состояние развития воз-

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обновляемых источников энергии и инвестиций в Китае на основе данных за 2011–2020 гг. Результаты исследования показывают следующее: во-первых, потребление и производство электроэнергии из возобновляемых источников энергии в Китае растет, причем темпы роста ветровой и солнечной энергетики значительны. Во-вторых, мощность поглощения электроэнергии и инвестиции сдерживают развитие возобновляемой энергетики в Китае. С этой целью в данной работе даются рекомендации.

Ключевые слова: возобновляемая энергия; устойчивое развитие; инвестиции; поглощающая способность производства электроэнергии; Китай.

Introduction. Energy is an important strategic resource that affects national economic development. However, with the rapid economic development, the conflict between energy supply and demand is becoming more and more prominent, and the ecological environment is deteriorating. In response, renewable energy has become a hot topic around the world. Renewable energy is green and low-carbon energy, which is important for improving energy structure, protecting ecological environment and achieving sustainable development.

To achieve sustainable development, more and more governments are incorporating renewable energy into their energy strategies and actively promoting the development of the renewable energy industry. According to the "Renewables 2022 Global Status Report", the global renewable energy investment in 2021 is 365.9Billion USD, reaching the peak of the historical investment.

In recent years, renewable energy investments are shifting to developing countries [1]. Among them, China is outstanding. In 2021, China accounts for 38.4 % of global renewable energy investment [2]. Moreover, China is a major country in terms of energy demand and CO₂ emissions [3]. Therefore, studying the current status of renewable energy development and investment in China has positive relevance to global sustainable development and environmental improvement.

Based on this, this paper studies the status of renewable energy in China from 2011 to 2020, including consumption, generation, uptake of power generated and investment of renewable energy. Among them, since power generation is the most important application area of renewable energy, this paper focuses on renewable energy from the power perspective.

The share of renewable energy in energy consumption has increased, but its share is still low. In 2020, of China's total energy consumption, fossil energy, nuclear energy and renewable energy accounted for 83.51 %, 2.25 % and 14.24 % respectively. Of these, the share of renewable energy consumption showed a significant increase compared to 2011, with an increase of 7.16 percentage points over the decade [4].

In the consumption of renewable energy, hydroelectric energy dominates, wind and solar energy growth rate is obvious. During the decade, hydroelectric energy consumption accounted for the largest share of total renewable energy consumption. However, the growth rate of hydroelectric energy consumption is lower than that of other renewable energy sources. The growth rate of solar and wind energy consumption is relatively high between 2011 and 2020 (Figure 1).

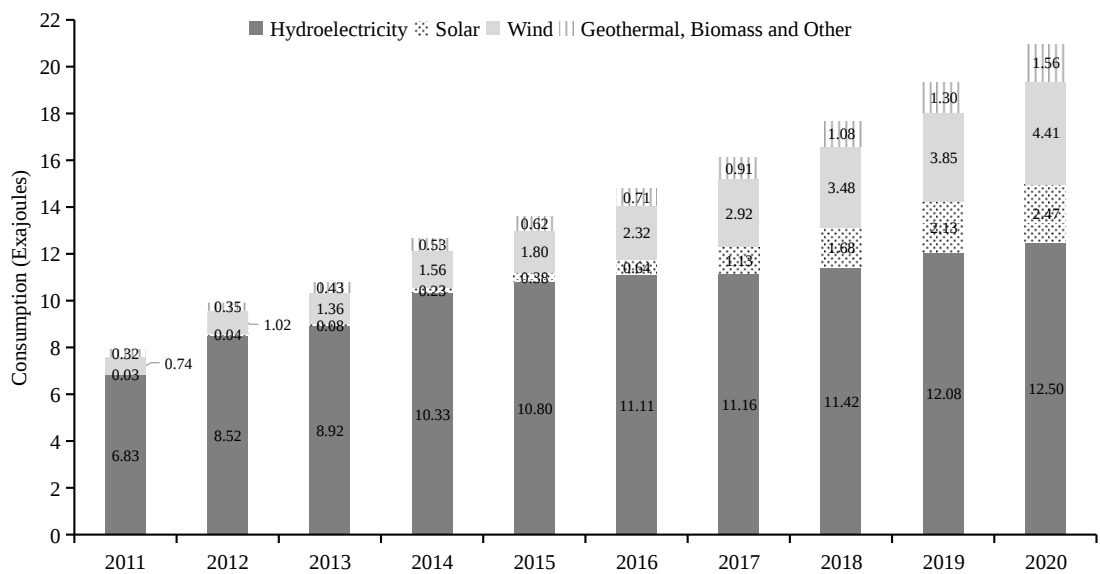


Fig. 1. Consumption of different types of renewable energy in China, 2011–2020

Source: compiled by the author according to bp Statistical Review of World Energy [4].

Renewable energy generation continues to increase, with solar and wind power generation increasing at a significant rate. The generation of renewable energy sources in China has increased from 792.39 TWh in 2011 to 2184.93 TWh in 2020, showing a significant upward trend [4]. Hydroelectric remained the dominant form for renewable energy generation in 2020, with its share decreasing from 96.83 % in 2011 to 60.49 % in 2020^[4]. From 2011–2020, wind and solar generation has grown rapidly, while biomass and geothermal energy generation have grown steadily. Specifically, in terms of the share of renewable energy generation, the share of solar energy increased from 0.33 % to 11.95 %, the share of wind energy increased from 9.35 % to 21.35 %, and the share of biomass and geothermal energy increased from 3.49 % to 6.21 % [4].

There is a lack of uptake capacity of power generated from renewable sources. In 2010, the phenomenon of wind abandonment emerged in China and then spread rapidly, becoming a stubborn problem for the industry. In 2015, China lost about 20 billion kWh of hydroelectricity, 33.9

billion kWh of wind power, and 4.9 billion kWh of solar power [5]. Subsequently, China's policy was adjusted in time and the issue of uptake of power generated from renewable sources was alleviated. In 2020, China abandoned about 30.1 billion kWh of hydropower, 16.61 billion kWh of wind power, and 5.26 billion kWh of electricity [5].

The total amount of renewable energy investment fluctuates greatly, with a significant decline in 2020. According to Figure 2, it can be seen that amount of renewable energy investments have been fluctuating over the decade, peaking in 2019. There is a significant decline in renewable energy investment in 2020, with a decline of 78.98 %. This may have been influenced by factors such as the economic slowdown following the COVID-19 outbreak and the declining cost of renewable energy investments.

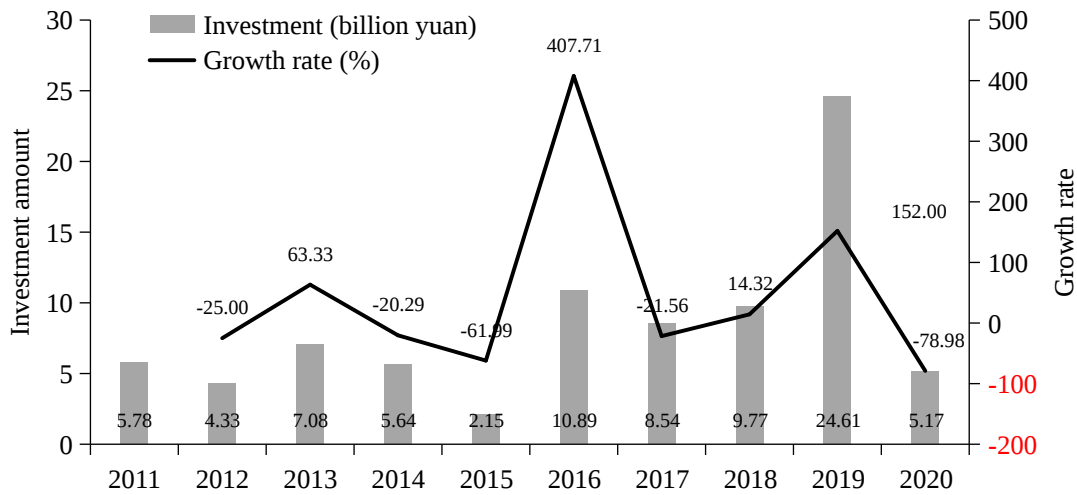


Fig. 2. Investments in different categories of renewable energy in China, 2011–2020
Source: compiled by the author according to Finance Yearbook of China [6].

Conclusions. This paper studied the status of renewable energy development and investment from 2011–2020, and the findings are as follows: Firstly, in terms of China's renewable energy consumption and generation, hydroelectric energy dominates, while wind and solar energy are growing at a significant rate. Secondly, the problem of the uptake of power generated from renewable sources is restricting the development of renewable energy in China. Thirdly, the amount of renewable energy investment is fluctuating. Moreover, due to economic, costs and other reasons, there is a significant decline in investment in 2020.

Hence, this paper argues that the Chinese government should guide the market to increase investment in the renewable energy sector through encouraging policies and incentives. In particular, focus on promoting investment in new renewable energy sources such as wind and solar energy

and expanding effective production capacity with a view to achieving economies of scale and thereby expanding market share. In addition, increase investment in energy storage technology and related application fields, while promoting the local uptake of power generated from renewable sources, so as to solve the challenge of uptake of power generated.

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