

A study on the coordinated development of China's digital economy and energy structure before and after the entry into force of RCEP

Topic: Input-Output Analysis: Energy policies (1)

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RCEP is the first large-scale regional trade agreement in the Asia-Pacific region to include a dedicated chapter on the digital economy. This forward-looking and leading institutional arrangement has established a unified and standardized framework for cooperation between China and other RCEP member countries in the digital economy field, greatly enhancing cooperation efficiency and providing strong guarantees for trade security.

In terms of digital infrastructure construction, cooperation between China and ASEAN countries under the RCEP framework has become increasingly close and fruitful. China's advanced technologies and ASEAN countries' needs for digital transformation have achieved a perfect match and positive complementarity. Moreover, the implementation of RCEP has created new opportunities for cooperation between China and ASEAN countries in technological innovation and industrial digital transformation. The two sides have focused on cutting-edge technology fields such as artificial intelligence, blockchain, and the Industrial Internet, actively carrying out joint research and development activities, injecting new development momentum into the upgrading of traditional industries and promoting the optimization and upgrading of industrial structures.

The entry into force of RCEP has also facilitated the deep integration and optimization of regional industrial and supply chains. Against this backdrop, Chinese manufacturing enterprises have accelerated their transformation and upgrading towards digitization, networking, and intelligence. The widespread application of digital technologies such as the Industrial Internet, big data, and artificial intelligence, while significantly improving production efficiency and product quality, has also inevitably led to a substantial increase in energy consumption. For example, smart manufacturing systems optimize production processes through real-time data collection and precise analysis. However, the continuous operation of hardware facilities such as sensors and edge computing devices requires a large amount of power support. Furthermore, digital technologies have also actively promoted the development of the new energy industry. For instance, key links such as the grid connection, consumption, and intelligent dispatch of renewable energy sources like wind power and photovoltaics highly rely on digital technologies. However, at the same time, the manufacturing, installation, and operation and maintenance processes of new energy equipment also consume a large amount of energy resources.

Given the differences in the entry-into-force times of the trade agreement among RCEP member countries, this study has carefully selected China and 11 other countries (Australia, Japan, Republic of Korea, Malaysia, Thailand, Viet Nam, Lao People's Democratic Republic, Brunei Darussalam, Cambodia, Singapore, New Zealand, The People's Republic of China) as the key research objects. The research data mainly adopts the MRIO tables meticulously prepared by the Asian Development Bank, while also incorporating data from the National Bureau of Statistics of China and relevant data from the China Statistical Yearbook as the fundamental support for the research. Based on this, it reconstructs the MRIO tables of the digital economy covering these 12 countries. By conducting precise calculations based on this input-output table, it deeply analyzes the changes in China's energy consumption before and after the entry into force of RCEP, providing scientific basis and decision-making references for relevant policy formulation.

The research findings indicate that from 2020 to 2024, China's energy exports to Vietnam demonstrated a significant upward trend and reached a peak in 2023. Despite a slight decline in 2024, they remained at a relatively high level. China's energy exports to South Korea and Australia also showed notable growth, particularly the exports to South Korea, which exhibited a favorable growth trend between 2022 and 2023. China's energy exports to countries such as Japan and

Thailand were relatively stable, with fluctuations but little overall change. In contrast, China's energy exports to countries like Malaysia and Laos were relatively low and grew at a slow pace. China's energy imports from South Korea have consistently remained at a high level and shown an overall upward trend, approaching the highest value by 2024. China's energy imports from Australia were also substantial and remained relatively stable between 2022 and 2024. Japan also had a relatively high level of energy imports, although there were some fluctuations between 2021 and 2022. China's energy imports from other countries such as Malaysia and Thailand were relatively low, with little variation.