

THE IMPACT OF ENERGY TRANSPORTATION CONSTRAINT ON SPATIAL BALANCE OF ENERGY SUPPLY AND DEMAND AND REGIONAL ECONOMY IN CHINA

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Overview

Energy consumption in China is considered to increase rapidly with economic growth in the near future. Most of the huge needs will be satisfied by domestic supply. The severe spatial mismatch of energy production and demand brings an enormous challenge of energy transportation, so as to affect the spatial balance of energy supply and demand and regional economic development. In the past, this mismatch was mainly solved by mass transport of coal by railway, it's up to 57.9% of the coal shipment accounted for the total railway freight in 2011. Therefore, it is worthy to find out the impact of domestic energy transportation constraint on regional economic development via the spatial balance of energy supply and demand in China. Scenario analysis based on a dynamic multi-regional CGE model is used to examine this issue.

The paper is organized as follows: After the introduction the second section gives the methodology, including the features of the dynamic multi-regional CGE model. In the third section, a brief overview of inter-regional transportation flows of coal and electricity is presented, then the critical transportation line is selected. The fourth section are the prospect of china's regional energy demand and regional economic development without consideration of energy transportation constraint. We control some important economic variables which may impact the energy use, like total factor productivity, population increase, then we will discuss the energy transportation constraint setting, and provide the results of regional energy demand and regional economic growth under the constraint. In section five the construction of energy transportation corridors is discussed. In the final section some conclusion and policy implication will be derived.

Methods

The main method of this paper is the dynamic multi-regional CGE model, which includes 30 regions and 10 sectors, the model simulates the regional energy supply and the economic development situation. In addition, scenario analysis is used to control the energy supply ability under energy transportation constraint and the energy transportation corridors construction.

Results

First, the regional energy demand will grow rapidly due to the economic growth of the future years, in order to meet this demand, domestic production must be increased quickly as same as the overseas import.

Second, although the middle-west area develops more rapidly than other regions, its energy consumption share will rise. Considering the westward movement of the energy production base and the main share of energy consumption of the East, the situation of spatial separation will not be improved. The energy transport system should be adapted to the needs of energy transport among the regions.

Third, The inter-regional energy transportation should be growing fast to sustain the inter-regional energy supply and demand and the regional economy growth. If new energy transport corridors not to be constructed, the energy demand of some regions will not be satisfied, and the regional economy will suffer a negative impact.

Conclusions

On the whole, if the economic growth pattern and energy supplied structure will not change in future, the ability of energy supply cannot satisfy the energy demand of some regions due to energy transportation constraints, and the regional economy will suffer from the shortage of energy supply, the GDP growth rate will slow down compared with the scenario of adequate energy supply. At the same time, the coal production and the electricity production are also suffered due to the demand decline, and the regional economic development of the energy-output-oriented areas will slow down.

To solve the spatial mismatch problem, the construction of energy transport corridors should be considered. The choices of corridor type are the most important question, coal or electricity, which is more suitable. It depends not only the construction cost of railway or powerline, but also the stability of energy transportation and the operating costs. What's more, the environment impact is also a big deal.

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