

Analysis of low carbon production chains towards modified forward coefficient

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To achieve the target, the Chinese government announced their pledge to reduce carbon intensity (the amount of CO₂ emitted per unit of GDP) by 40%-45% of the 2005 level, by 2020, it is usual to allocate emission reduction tasks based on industrial sectors. However, it is visible that this allocation approach by sector is unfair and unfeasible due to all sectors are correlated with each other. Firstly, industrial sectors do not exist independently in the complexity of economic system. It has relationship between two Industrial sectors, backward and forward partnership, based on certain technical and economic linkages. Secondly, an effective emission reduction allocation is to minimize the reduction cost under a specific target, emphasizing the global optimum rather than local optimum. Thirdly, the adjustment of the industrial structure is shown by the structure of production chains to reduce emissions effectively. Only by evaluating the profit distribution and emission characteristics of the whole production chain, can we upgrade the traditional industrial structure effectively. This will help accelerate the development of low carbon production chains, encourage alternative traditional energy.

This paper establishes the price multiplier model to calculate the major production chains in non-serviced sectors. However, the traditional forward coefficient cannot be reflected the exact forward relationship between service sectors, and there is backward relationship in non-service sectors. So this paper proposes the modified forward coefficient based on input-output model and choose the integrated transmission paths in service sectors. The empirical results show that sectors with high emissions located at the downstream such as electricity sector are key sectors to reduce carbon emissions. Policies to enhance low carbon production chains (LCPCs) should be considered seriously.