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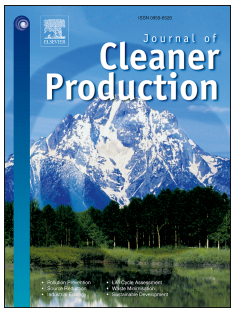

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Understanding cost reduction of China's biomass direct combustion power generation—A study based on learning curve model

Tao Wang[a], Hao Huang[a], Chunjiang Yu[a], Kai Fang[b], Menglian Zheng[a,c,*], Zhongyang Luo[a,*]

[a] State Key Laboratory of Clean Energy Utilization, Zhejiang University, China

[b] School of Public Affairs, Zhejiang University, China

[c] Institute for Thermal Science and Power Systems, Zhejiang University, China

[*] Co-corresponding author

Abstract

During the critical transition towards cleaner production (CP), the developing and transition countries should pay extra attention to displace traditional biomass utilization with CP concepts such as biomass direct combustion power (Bio-DCP). China has witnessed impressive growth in its Bio-DCP sector from 2006 to 2014. The further industrial expansion and policy making of Bio-DCP in China and other countries in transition call for a deeper understanding of cost reduction mechanisms. In this study, the learning curve models (i.e., electricity production cost as a function of mutiple factors including cumulative installed capacity, operation & maintenance costs, feed-in-tariff, and cogeneration) were developed to (i) empirically estimate the learning rates of China's Bio-DCP, and (ii) investigate the impacts of past technological developments and policies on the cost development. Main findings include: (i) The overall learning rate of China's Bio-DCP is 4.54% over the period 2006-2014; (ii) The raised feed-in-tariff in 2010 shows a positive effect on the learning of Bio-DCP; (iii) The circulating fluidized bed projects show a higher learning rate compared to that of the grate boiler projects. Based on the above results, suggestions regarding the Bio-DCP's future development are offered, including discriminative subsidies, biomass waste supply chains, cogeneration, and multi-industry parks.

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