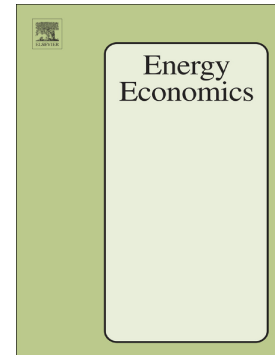


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Getting ready for future carbon abatement under uncertainty – key factors driving investment with policy implications

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Abstract

Carbon capture and storage (CCS) is considered a key technology option for abating CO₂ emissions in carbon-intensive sectors, e.g. the power sector. However, high investment costs and risk hinder the diffusion of CCS. To avoid stranded assets or high future costs for retrofitting, new plants can be made carbon capture ready (CCR) to enable them to accommodate future CCS retrofitting at low additional costs. Current CCR investment decisions are closely related to future CCS retrofitting and CCS operation decisions in subsequent stages, all of which would be affected by uncertainties. We develop a three-stage CCR investment decision model under multiple uncertainties which allows for investment and especially operating flexibilities. Applying this model to China shows that CCS operating flexibility under the carbon-pricing scheme may actually lower the probability of investing in a CCR plant, and neglecting it may overestimate the propensity for investing in CCR. Moreover, learning effects, which reduce the costs of future CCS

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