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12 Abstract

In conjunction with the European Union (EU) targets, the United Kingdom (UK) Government 13 has introduced a range of mechanisms to foster the development and deployment of low carbon 14 energy technologies and markets. This study focuses on the three main financial incentive 15 schemes to promote renewable energy sector in the UK for electricity, heat and fuel production 16 from renewables, namely feed-in tariff (FiT), Renewable Heat Incentive (RHI) and Renewables 17 Obligation Certificate (RoC), considering the fact that optimal policy design depends on 18 effective analyses of the impacts of incentives on the performance of renewable energy systems. 19 The effects of potential changes in these incentive schemes on the economic and environmental 20 performance of bioenergy sector are investigated using an analytical methodology. The 21 methodology integrates fuzzy decision making and multi objective mathematical modelling in 22 the same framework to capture uncertainties in the system parameters as well as economic and 23 environmental sustainability aspects. Computational experiments are performed on bioenergy 24 production using the entire West Midlands Region in the UK as case study region. The results 25 reveal that the changes in incentive policies have a significant impact on the profitability of the 26 supply chain, whereas environmental performance of the supply chain in terms of total GHG 27 emissions is the least affected performance indicator by the changes in the incentive policies. 28

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