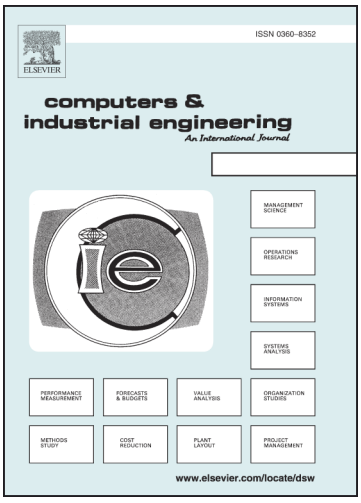


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# Modelling intervention policies of government in price-energy saving competition of green supply chains

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**Abstract.** Energy saving efforts decrease the demand of energy services, and it can yield improvement in the environmental protection, national security, financial benefits, and social welfare. In this research, we investigate the effects of various governmental regulation policies on competition of green supply chains. We consider six regulation policies of deregulation, direct tariff, direct limitation, government certificate, government permit, cooperative energy saving as well as two decision making structures of centralized and decentralized green supply chains. We formulate twelve mathematical programming models using Stackelberg game between government and supply chains. A comprehensive analysis of brick production supply chains reveals some managerial insights. We find that all intervention policies are advantageous because they result in more social utilities than deregulation policy; however, the policy should be chosen regarding the effects on consumers, green supply chains, and the environment. In particular, cooperative energy saving policy yields the highest social utility and energy saving level; meanwhile, it involves the highest government investment. Moreover, we know than profit seeking behaviour of government in all policies causes the decrease in social utility.

**Keywords:** Energy saving efforts; Governmental regulation polices; Game theory; Green supply chain; social welfare.

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