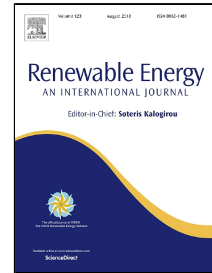


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The effect of Research and Development incentive on wind power investment, a system dynamics approach

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ABSTRACT

Due to high and unstable fossil fuel prices, air pollution arising from conventional power plants, and the need for higher levels of energy security, the necessity of using renewable energy, especially wind power have increased. But barriers such as high investment cost and uncertainty in generation, limit the participation of investors in this respect. Therefore, different incentives have been considered to speed up the development of renewable energy units. Most of these incentives focus on compensating the high investment cost and uncertainty in the future revenue of these units. On the other hand, this paper proposes a new approach based on supporting research and development activities to reduce the investment cost of wind units. Accordingly, a fixed amount is paid to the wind units proportional to their installed capacity but they should spend this fixed amount on research and development activities. These activities lead to lower construction costs due to technology maturity.

In order to study the performance of the proposed incentive, the long-term behavior of electricity market was simulated by a dynamic model followed by a sensitivity analysis to investigate the effect of different factors. The results indicated the effectiveness of the proposed incentive compared to other known incentives.

Key words: Electricity market, capacity investment, system dynamics, wind units, investment incentive, research and development.

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