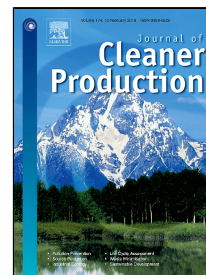


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Scenario-based System Dynamic Modeling for the Cost Recovery of New Energy Technology Deployment: The Case of Smart Metering Roll-out



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*Keywords:* System Dynamics, Smart Metering Roll-out, Cost Recovery, Dynamic Pricing Policy, Technology Deployment

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## **Abstract**

Smart meters are crucial technologies for enabling smart grid solutions and applications. Although smart metering deployment has been started at the national and regional levels, there is still the question that how should the costs of deployment be allocated among stakeholders. Cost-Benefit Analysis (CBA) is the common method for analyzing the economic feasibility of the deployment process. Starting from the CBA approach, this paper argues an efficient cost recovery scheme depends not only on the costs and benefits for each actor, but also on the interdependencies between the behavior of different actor groups. By taking a dynamic modeling approach and using System Dynamics models, this study examines the dynamics of interaction between different actors in the technology deployment process, and proposes scenarios for an efficient cost recovery. It is claimed that a dynamic view to the common Cost-Benefit Analysis approach has three advantages. First, the possibility of including actors benefiting from positive externalities or actors that can contribute to system efficiency is provided. Second, a balance can be found between the short term and long term consequences of system interventions; and finally, the development of innovative solutions, in the forms of business and policy scenarios is facilitated. The results may explain why reluctance to participate in the technology deployment process persists even after introducing dynamic pricing policies, and what factors are more critical in analyzing the cost and benefit structures of the technological system.

## **1 Introduction**

How should the costs of new technology deployment be allocated among stakeholders? What are the proper mechanisms to incentivize these stakeholders to invest in novel technologies? These are the central issues in the smart metering deployment process,

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