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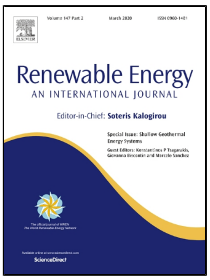

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Uncovering the dynamic complexity of the development of small–scale biogas technology through causal loops

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Highlights

- This paper uses an innovative approach that uses system dynamics.
- A system dynamics complex model is proposed according to the motivation of farmers to well-functioning biogas plants.
- The causal loop diagrams will serve as a decision support and policy-making tool for influence assessments of various measures and decisions.

Abstract

The objective of this study is to identify the system of implementation of small-scale biogas technology from the farmer's perspective, presenting all of the major stakeholders, factors and processes involved and to establish the principle relationships and feedbacks among them. This paper uses an innovative approach to the problems using the methodology of system dynamics and employing causal loop diagrams elaborated using data collected from the target groups (biogas plant owners, facilitators, key informants) in Vietnam from 2016 - 2017. The results show the complete causal loop diagram, where the motivation of farmers is a key variable that influences the final decision regarding purchasing (or not) a biogas plant and keeping it (or not) functional. The important variables and relationships are clustered into technical, financial, and satisfaction aspects. The causal loop diagrams will serve as a decision support and policy-making tool for influence assessments of various measures and decisions.

Keywords: small-scale biogas; biogas development; biogas technology; system dynamics; biogas policy