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Designing viable multi-commodity energy business ecosystems: corroborating the business model design framework for viability

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Abstract

In this paper, a multi-commodity energy business model for an industrial park is designed and evaluated using the extended “business model design framework for viability”. The framework has been validated earlier for mono-commodity energy systems. Our goal is to examine the application of the business model design framework for viability for multi-commodity energy systems as they are more complex. The framework was applied to an industrial park, integrating heat and electricity networks. The business model was designed iteratively to harvest and exploit the flexibility embedded in the industrial processes of the heat consumers. The first iteration showed that the business model design framework for viability was largely successful. However, adding two extensions to the framework helps to deal with the complexity of designing and evaluating viable business models for multi-commodity energy systems in a better way. First, the configuration techniques in the framework are extended to include reference business models. Second, the evaluation criteria in the framework are extended to include the capabilities of the stakeholders. The extended business model design framework for viability better enables the design of complex business models and allows to evaluate the capabilities of the stakeholders to implement the designed Business model. The extended business model design framework for viability successfully facilitated the design and evaluation of a viable multi-commodity energy business model and therefore is corroborated.

Key Words: Business model design, Business ecosystem, Flexibility, multi-commodity energy systems, Business ecosystem design, energy business model.

Abbreviations

APX – Amsterdam power exchange
BM – Business model
BMDFV – Business model design framework for viability
BMO – Business model ontology
EDSN – Energy data services Netherlands
MES – Multi-commodity energy systems
PRP – Programme responsible party
USEF – Universal smart energy framework
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