Available online at www.sciencedirect.com

ScienceDirect

Energy Procedia 128 (2017) 418–422

Energy Procedia

www.elsevier.com/locate/procedia

International Scientific Conference "Environmental and Climate Technologies", CONECT 2017, 10–12 May 2017, Riga, Latvia

Novel tools to study socio-technical transitions in energy systems

Lelde Timma, Andra Blumberga*, Gatis Bazbauers, Dagnija Blumberga

Institute of Energy Systems and Environment, Riga Technical University, Azenes iela 12/1, Riga, LV−1048, Latvia

Abstract

As the response to the financial downturn and arising social problems, eco-innovation flagship was elaborated as one of the main building blocks for sustainable, smart and inclusive growth. Nevertheless, the experts are increasing pointing out, that we are missing one important link, while focusing mainly on technical innovations and natural environment, social aspect is mostly disregarded. This social aspect includes human, economic, policy, organisational and other interactions in the system. By bringing together these three sectors – social, technical and natural environment – studies on so called socio-technical system is created. Currently, the studies using social and technical aspects for the research on transition processes are fragmented, both in terms of studied sectors, used methods and scientific fields. Especially, in the field of energy research the majority of the works study techno-economic aspects of the systems, while only few attempts have been made to incorporate socio-technical perspective as well. There are also identified clear lack of a holistic methodology, therefore the aim of this paper is to attempt to link engineering and social science study field to create such modelling approach. Socio-technical transitions are viewed from the perspective of various sectors, such as energy use, energy production and management, innovation diffusion and other. Also the transitions are looked from the scientific lenses of various possible methods and combinations of those. And last but not least, theses transitions studies are considered from the perspective of various scientific fields, both engineering and social science.

Peer review statement - Peer-review under responsibility of the scientific committee of the International Scientific Conference "Environmental and Climate Technologies".

Keywords: socio-technical systems; energy systems; sustainability; novel modelling tools; mixed and combined research methods

* Corresponding author.
E-mail address: andra.blumberga@rtu.lv

1876-6102
Peer review statement - Peer-review under responsibility of the scientific committee of the International Scientific Conference "Environmental and Climate Technologies".
10.1016/j.egypro.2017.09.048

1. Introduction

As the response to the financial downturn and arising social problems, eco-innovation flagship was elaborated as one of the main building blocks for sustainable, smart and inclusive growth [1]. Nevertheless, the experts are increasing pointing out, that we are missing one important link, while focusing mainly on technical innovations and natural environment, social aspect is mostly disregarded [2]. This social aspect includes human, economic, policy, organizational and other interactions in the system. By bringing together these three sectors – social, technical and natural environment – we studied so called socio-technical system, see Fig. 1.

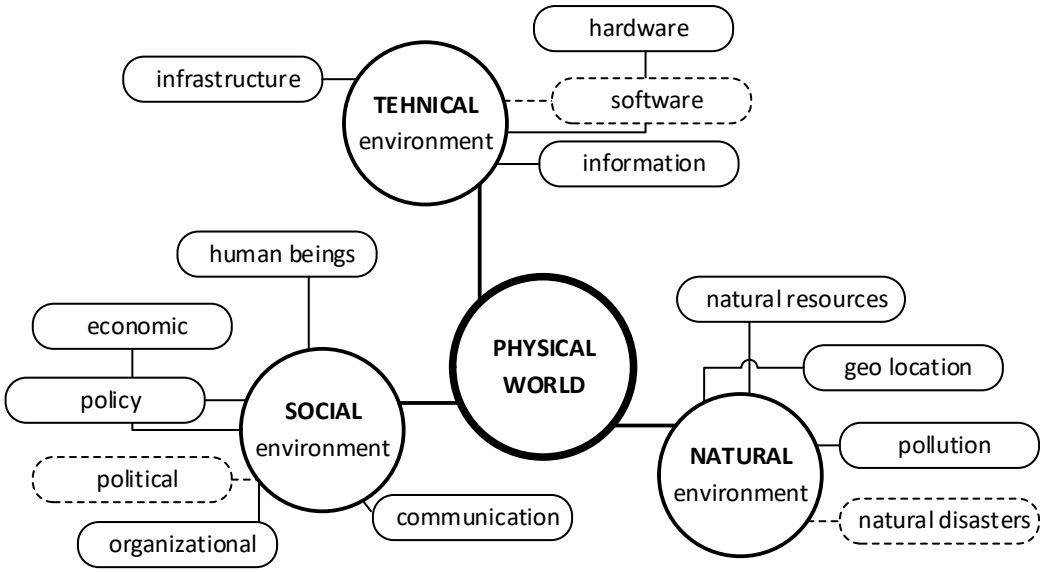

Fig. 1. Hierarchy of socio-technical systems adopted from [2].

The research on the socio-technical transitions analyses the causes of social and technological changes, where the main study questions are how these transitions initial, unfold and finish. Sociotechnical transition pathways are given by Geels & Schot [3]. Here the first challenge is to replicate and study historical transitions and second – to develop tools for the analysis and finally propose policy interventions [4].

2. Novel tools

In t the complexity of the applied methods was developed over the time, to match the growing complicatedness of studied research questions, see Fig. 2 and for more details see Thesis [5].