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Scripts in transition: Protective spaces of Indonesian biofuel villages

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ABSTRACT

This paper studies the development of biofuel village pilot projects in Indonesia. Despite the central government's political and financial commitment to the projects, the projects failed to survive and produce sustainable effects. In order to understand why the projects were stalled, this paper traces how the design of Indonesia's biofuel policies shaped the actual socio-technical configurations of the projects. To trace this relationship between the policies and the actual project configurations, we develop a framework that combines the concept of protective space from transition studies and the concept of script from actor-network theory. The concept of script allows us to investigate how the designs of protective spaces and of the experimental projects are enacted through non-coherent processes involving misunderstandings and shifts in meanings between narratives and things (e.g. between policies implemented and the machines put in place). Our analysis makes manifest the non-linearity of the relation between the design of a protective space and the actual practices engendered. This non-linearity emerged through changes in direction brought about by the central government's inability to stretch and transform the local environment in accordance with the policy design and through changes in individual actors' interests in the projects.

1. Introduction

Strategic niche management (SNM) approach was introduced as a policy strategy to develop protective spaces that allow the experimentation for certain applications of a new environmentally sustainable technology (Kemp, 1994; Kemp et al., 1998; Schot and Geels, 2008). The approach assumes that if such protective spaces (or niches) were constructed properly, they would become building blocks for a socio-technical transition towards sustainable development. Smith and Raven (2012) suggest that despite emphasis on protective spaces, little attention has been given to the concept of protection in the transitions literature. Therefore, they propose a framework that conceptualises protective space as operating through the three processes of shielding, nurturing and empowering. Shielding provides temporary relief for niche innovations against selection pressures from the incumbent regime; nurturing focuses on learning, articulating expectations and networking between actors; while empowering focuses on activities that make niche innovations competitive vis-a-vis existing dominant regimes.

Verhees et al. (2013), Kern et al. (2014) and Smith et al. (2014) use this framework to show how proponents of a particular technology (e.g. solar PV, offshore wind) try to shield, nurture and empower innovations in different contexts (e.g. R&D labs, off-grid locations and the built environment). In this article, we aim to investigate not only the effectiveness of protective spaces in shaping the desired socio-technical configurations in different contexts, as done by previous studies, but

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also the relationship between the socio-technical configuration *prescribed* by the design of protective space and the actual socio-technical configuration that is *materialized*. Akrich (1992) suggests that designers of a technology make assumptions about the behaviour and environment of future users, the specific group of actors at which the technology or product is directed. These assumptions together with designers' interests are scripts (or scenarios) inserted by the designers into a technology or, more generally, into a thing. The concept of script highlights the reciprocal relationship between in-scription, i.e. activities of embedding a script into a technology, and de-scription i.e. activities to interpret the technology and to materialize this interpretation in practice (Akrich, 1992).

Building on these insights, this paper develops a framework to study how policy designers' plans for shielding, nurturing and empowering biofuel technology relate to the users' interpretation and materialization of the policies (and the technology) in practice. In the transitions literature, a similar analysis of the recursive relationship between a 'global' vision and local practice has been done by Raven et al. (2011), using Callon's (1986) concept of translation. They study different mechanisms through which local actors are able to contest and to negotiate development directions of a 'global' project. Through the concept of script, we extend the articulation of recursive relationships between design and (local) use not only as a process of achieving coordination or of building shared interest as suggested by Raven et al., but also as a process of interacting while misunderstanding (cf. Star and Griesemer, 1989; Brown, 2002; Stark, 2009). Stark for example argues that actors interact (and collectively act) without necessarily having to agree on the meaning of the objects (things or words) exchanged (e.g. countries may disagree over a 'global' climate change framework but develop clean energy technologies anyway for economic growth reasons). The concept of script avoids the requirement of a shared problem-definition or shared expectations since it focuses on things (in which the scripts are inscribed) that facilitate actors' interactions and how these things shape actors' practices (through de-scription).

Using a framework based on scripts, we analyse the development of Indonesian biofuel villages program. In 2006, the central government issued a presidential instruction requesting 13 government institutions, governors and district-heads to promote biofuel development as an alternative energy source. In 2009, this instruction allowed the central government to initiate three pilot projects of 'Calophyllum-based Energy Self-sufficient Village'. For these projects, the central government provided a 'biofuel package' composed of a biofuel processing unit, chemicals to process biofuels, operational funds for 3 months and technical training to farmers. By early 2011, none of these pilot projects had survived. At the end of 2011, when the local government of Purworejo involved an entrepreneur from Yogyakarta, one of the pilot projects started to operate again. The different protection mechanisms in the form of political and financial support and activities of including and excluding actors in the projects make this an apt case for examining the relationship between design of a protective space and its actual practice.

The conceptual framework and methodology are explained in the next section before we present the analysis of an energy self-sufficient village (Section 3). We end this paper with a discussion and conclusions section.

2. Conceptual framework

Transition studies focus on shifts from one socio-technical regime to another (Geels, 2011). A regime is a set of rules embedded in socio-technical practices, formal/informal institutions and existing infrastructures (Rip and Kemp, 1998). Transition studies assume that radical innovations develop within protective spaces (often called niches) in which they are nurtured and improved. These protective spaces (e.g. R&D laboratories, demonstration projects, market niches) are necessary because regimes select against radical innovations that have a mismatch with incumbent interests, infrastructures and institutions. By facilitating experimentation, protective spaces allow for modification and deviation from practices of the existing regime. The notion of protective space thus offers an analytical tool to understand how new technologies can (and are able to) survive despite hostile selection environments of the regime. In this paper, by combining the notion of protective space with in-scription and de-scription, we aim to provide an insight into how the design of protective space shapes actual socio-technical configurations.

2.1. Protective space

Smith and Raven (2012) define protective space as being constituted by the three processes of shielding, nurturing and empowering. Shielding focuses on how support for an innovation came into place, who lobbied for it and how it was agreed upon. Nurturing foregrounds how financial as well as cognitive support improves the innovation by expanding the actor-networks and shaping their expectations and learning. And empowering focuses on how the different types of support were institutionalized by reconfiguring the incumbent regime. The three processes of shielding, nurturing and empowering may be initiated at the same time. Thus they do not have to sequentially follow each other, but may be coterminous and intertwined with each other (see also Verhees et al., 2013; Kern et al., 2014). Boon et al. (2014) for instance, introduce the notions of niche creation, niche maintenance and niche phasing out to regroup activities referred in shielding, nurturing and empowering. Despite this interdependence, the three concepts are meant to help innovation analysts in delineating different processes that make up the protection of a 'sustainable' innovation.

Smith and Raven (2012) define shielding as the work to ward off competitive pressures from existing regimes and to create and sustain a space for experimentation. Shielding covers activities such as mobilizing pre-existing financial resources and lobbying for subsidies (Verhees et al., 2013) and performing policy that enables early research, experiments and pilot/demonstration projects (Verhees et al., 2015). Based on its relationship to a targeted innovation, two types of shielding can be distinguished—active and passive. Active shielding refers to the mobilization of financial support for an innovation and its further development. It could also include promotion of the innovation's use despite (temporary) poor performance. Passive shielding refers to mobilization of non-targeted spaces that indirectly support an innovation such as implementing research in favourable geographical locations (Verhees et al., 2013).