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Navigations and governance in the Danish energy transition reflecting changing Arenas of Development, controversies and policy mixes

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ABSTRACT

The article discusses transition dynamics towards a Danish low-carbon society based on studies of energy production and consumption. This article shows how the Arena of Development and policy mix approaches may inform the analysis of system transition to a low carbon society. The Arena of Development approach is an actor-centred approach that focuses on how path dependencies of socio-technical systems may be challenged when controversies and matters-of-concern produce ‘arenas’ where established governance configurations and policies of a socio-technical system are challenged. Re-organising actor-constellations are constitutional for arenas and define their boundaries and the policies employed. We discuss the historic transitions in relation to four focal areas of Danish attempts to become independent of fossil energy: wind-power integration in the energy system, energy savings, biomass and sustainable mobility. The analysis demonstrates the conflicts and mixes of policy measures that have moved transition processes forward, but sometimes also stalling them. The analysis shows how changing controversies, arena configurations and policy mixes move forward the energy transition process.

1. Introduction

In 2005 the Danish government decided upon an ambitious goal of making Denmark a low-carbon society, independent of fossil fuels in 2050 [1]. This decision was part of a transition process pertaining to the energy system and originally triggered by the energy crisis in the 1970s and the recognition of global energy supply challenges.

However, while energy became a societal matter of concern during the 1970s, the pathway of the Danish energy system transition has been open-ended and contested. While some actors articulated renewable energy as the solution to the energy crisis, others primarily identified the dependency and vulnerability of the Danish energy supply from oil provisions from the Middle East as the main matter-of-concern. Consequently, to identify these early controversies as the initiation of a broader energy transition, as many actors view this today, is a backwards projection in history. There were actors viewing this as a start of a larger transition process but also those seeing this as a phase of controversy where nuclear power and other new energy technologies had to take over.

Even after the challenges from climate change have come to the fore from the late 1990s, the means and ends of the energy system transition are today continuously scrutinised. The energy transition is a battlefield where new and competing agendas and policies perform and stage the space and agenda of the transition. Instead of rationalising the

transition process, research that supports the actors involved in the transition need to understand the continuous changes in frames and actions.

Consequently research aiming at making sense and learning from this process must take starting point in a study of changes promoted by socio-technical ‘arenas’ that stage the transition processes in different historic periods of time. While some concerns have remained on the agenda throughout this long period of transition, like the focus on renewable energy production, energy-savings in households, urban mobility and in the later phases the integration of power and heat systems, their specific meaning and role have changed over time. Actors’ interventions including policy measures and new interactions between energy technologies and services have been reconfiguring the energy system at large.

The article argues that system transitions – and in this specific case the Danish energy transition – seldom simply can be described by conflicts between incumbent actors with well-defined socio-technical constituencies and challengers aiming to promote radical niche innovations. Neither can an existing, dominant technology substituted by new, innovative technology satisfy as a model of the broader energy transition process. The article outlines a perspective that is sensitive to how actors from within and from outside established arenas that operate socio-technical constituencies continuously construct and transform ‘arenas’ through their engaged actions. This also leads to policy

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interventions that in periods are not coherent and even may be conflicting in scope and impact.

In the article, we demonstrate and discuss the fruitfulness of this research approach to understand and learn from the temporal and changing periods of controversies, socio-technical configuration and governance with emphasis on the policy mixes and their adjustment to support (or counter) an energy transition. The empirical material originates from the Danish energy transition studied in different research projects (see acknowledgement at the end of the article). It is not least interesting to learn from the Danish position concerning the rapidly growing integration of wind and solar power into the energy system that addresses challenges concerning integration and flexibility and gives the country a leading position in the next phases of transition. The same challenges will in future decades meet the energy transition of many countries in Europe and worldwide. The strength of the Danish energy system lies in its capacity and potential ability to handle these challenges, but not without a need for further changes and renewed policies cutting across the individual markets and institutional frameworks that characterize the energy sectors of today.

The structure of the article is as follows: The next section introduces the Arena of Development approach as the theoretical foundation of our analysis. Section 3 presents how the energy crisis in the 1970s resulted in very different and conflicting visions and responses and contrasting policies focusing on security of energy supply, including an emerging focus on renewable energy. Section 4 demonstrates how climate change intensified as political concern and influenced the framing of transitions with emphasis on renewable energy and efforts to phase out fossil fuels in power and heat production while changing matters of concern lead to new arenas aiming at re-configuring established governance arrangements in line with neoliberal ideas of efficiency of provision and privatisation. In Section 5, we analyse the contemporary arenas that comprise controversies of how to integrate transportation, the different energy forms and infrastructures to make possible the transition towards a fossil-free, flexible, adaptive and ‘smart’ energy future. The article concludes in Section 6 with a discussion of how the Arena of Development approach and the analyses of policy mixes contribute to the study of the energy transition in a larger societal context.

2. The Arena of Development and policy mix approaches

The research approach in this article is taking outset in the emerging field of transition studies. This field of research emphasizes the need to understand how transitions in socio-technical systems evolve in relation to wider societal changes including governance and professional as well as every-day life practices.

There are several approaches in the field of transition studies of which the most known is the ‘multi-level-perspective’ (MLP) that operates at its core with the transition of socio-technical regimes [2,3]. With its focus on socio-technical regime shifts based on the co-substitution of technologies and institutions, this approach tends to stay within a sector configuration of societal functions. In contrast, the ongoing energy transition illustrates the need to include analysis of how influences from non-regime policies and different stakes within institutions shape and frame what is core to specific, temporal phases in the transition process. In these situations the stylised model of dynamics in MLP ‘niche’ actors are driving regime shifts by challenging dominant regimes while largely exogenous ‘landscape’ changes redefine the overall governance framework. The multi-level approach tends to overlook that most actors engaging in transition processes often operate at all levels at the same time though maybe by different means due to their access to respectively policy and energy institutions [4].

A problem similar to MLPs focus on regime shifts appears with the theoretical approach of ‘technical innovation systems’ (TIS) that tends to emphasise those societal institutions and knowledge networks that foster new innovations [5,6] placing innovation and technology as the core drivers of the transition.

The Arena of Development (AoD) approach to studying transitions applied in this article cultivates sensitivity towards actor’s engagement in the creation, operation and governance of socio-technical systems. It emphasises how actors operating within different networks (e.g. at a local, national and international scale) hold different and sometime conflicting understandings of the focus, boundaries and politics of the socio-technical system. In line with e.g. Smith and Stirling [7] as well as Shove and Walker [8], Jørgensen [4] thus claims that any definition of a socio-technical system is the outcome of politically motivated sense-making processes that ‘operates by constructing boundaries, purifying dynamics and assigning agency’. Different from the MLP and TIS approaches it opens for including a variety of experiences and performed interventions by actors to influence transitions.

Consequently, networks of actors comprising of social groups, institutions, technologies, imaginaries, etc. constitute arenas through their performed interventions in relation to a common matter-of-concern [9,4]. This research approach focuses on how continued processes of actions on temporarily stabilised arenas as well as re-alignments of these arenas modulate transitions. Actor interventions reframing the boundaries of the arenas create the flux of continuation, change, diversification and merger that is characteristic to transition processes and the politics involved. Ongoing transition processes are thus periodically characterised by alignment processes that stabilise technologies, relations and coordinate actions as well as controversies that proves instrumental in destabilizing the established relations and power-asymmetries within the socio-technical system. In both situations, the boundaries of arenas are setting the stage for action and define which actors are core respectively marginal to a specific arena in response to their performed actions.

In terms of studying arena dynamics, Jørgensen [4] argues for a focus on actual events and actor performances that are constitutive for the matters-of-concern on an arena. Such performance may involve interactions (for example in the public debate), demonstration projects, and other ways of creating presence in relation to other actors (e.g. visions, policy interventions, sense making or materialized interventions). The observation of actions and their alignment respectively juxtapositions provides the empirical grounding for the identification and analysis of arenas and how they evolve and transform. This provides a broader basis for understanding transitions and their dynamics, but also adds to the empirical details needed to substantiate research results.

Arenas exist as empirical entities (in a similar way as e.g. institutions) that can be studied by researchers, but they function at the same time as the researcher’s tool to structure, magnify and punctualise the processes involved in the transitions studied to be able to handle the diversity and complexity of transformative processes. Thereby the AoD approach offers a scalable tool for detailed studies of changes in socio-technical systems as well as broader cross-sector and international changes, which are in focus in this article. It also offers an approach that emphasise processes that weaken dominant arenas by interactions with other arenas having at the outset quite different matters-of-concern but colliding on specific parts. Such collisions leading to changes are e.g. illustrated in transitions concerning heating [10], transport planning [11] and storm water management [12].

Coming from the idea of policy being a designed and rational way of supporting change, policy studies have shown that single policies often do not turn out as efficient as proponents may expect, while different, co-ordinated and long term supported policies demonstrate more efficient impacts [13]. This has led to an interest in policy mixes as a way to govern and make the impact of policies more efficient, not least in the field of energy transitions that is characterised by the complexity of changes involved [14,15]. In this perspective, interactions between strategies, processes and instruments within an area of policy can be analysed for their consistency. In studies of transitions policies often reflect a variety of areas involved and thereby need to be analysed for the coherence of given policy mixes. As policies often originate from

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