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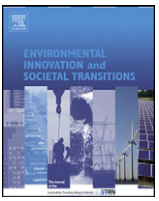

# Sustainable urban development and the multi-level transition perspective

Petter Næss*, Nina Vogel[1]

*Aalborg University, Department of Development and Planning, Skibbrogade 5, DK-9000 Aalborg, Denmark*

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ABSTRACT

This article discusses some challenges and possible adaptations of transition theory as a framework for analyzing the prospects for environmentally more sustainable development of urban land use and transport infrastructure. Rather than depending first and foremost on niche innovations, a transition toward sustainable urban development is a matter of changing the composition of existing multi-segmented land use and transportation regimes. Those well-experienced forms of built environment and transport infrastructure that are in line with sustainability objectives should be strengthened while those that are not should be actively constrained and reduced. Urban development in a Danish provincial city is used as a case to illustrate some of the points made in the theoretical part of the article. Due to the wide gap between present conditions and those required to realize a sustainable urban development, more attention should be directed toward landscape level conditions and possibilities for changing them.



## 1. Introduction

The topic of the present paper is to discuss a number of challenges arising when trying to apply the multi-level perspective of transition theory to sustainability-oriented studies of urban development and mobility, and to suggest some possible adaptations of the perspective in order to cope with these challenges. By urban development we here refer to the development of building stock, land use and

* Corresponding author. Tel.: +45 99408373.
*E-mail addresses:* petter@plan.aau.dk (P. Næss), nvogel@plan.aau.dk (N. Vogel).
[1] Tel.: +45 99408328.

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transport infrastructure within functional urban regions. Our focus is thus not limited to particular districts within a city; what we are interested in is whether and how the functional city as a whole can develop in a way compatible with a low-carbon and environmentally more sustainable society.

Few previous studies have investigated transition toward sustainable urban development from the perspective of transition theory. During the latest decades, several studies have investigated the performance of different urban spatial structures against sustainability criteria (e.g. Næss, 1993; Tjallingii, 1995; Newman and Kenworthy, 1999; Williams et al., 2000; Næss, 2001; Schremmer et al., 2011), and some studies have also addressed conditions for implementing more sustainable patterns of urban development (e.g. Næss, ibid.; Banister, 1998; Næss et al., 2011; Schremmer et al., ibid.). The former group of studies draws on a broad range of theories illuminating how urban development impacts on the natural environment during construction and from subsequent human activities facilitated or necessitated by the resulting urban structures (e.g. space heating and travel). The studies of conditions for implementation draw on theories from fields such as planning, political science, political economy, and discourse theory, but have so far not made use of transition theory to any great extent. A few examples incorporating transition-theoretical concepts into urban studies exist, including Bulkeley et al. (2011) and Hodson and Marvin (2010). A few authors have also addressed urban mobility and transport within the framework of transition theory (Köhler et al., 2009; Zijlstra and Avelino, 2011; Sheller, 2011; Bertolini, 2011). None of the above-mentioned contributions inspired by transition theory have, however, dealt extensively with the development of urban land use and transport infrastructure nor have the various sustainability and climate-related impacts of this development been addressed in a comprehensive way. Coenen et al. (2012) criticize the ignorance in most transition theory literature of how transitions take place in spatial contexts/scales (local vs. international). While sharing this critique, our focus here is not so much on spatial conditions as *contexts* for transition, but rather on spatiality itself (i.e. the spatial extension and the internal spatial structure of cities/metropolitan areas) as the *object* of transition.

More precisely, the topic of this paper is the development of the building stock, land use and transport infrastructure in cities and the prospects of changing this development in a way compatible with a low-carbon and environmentally less unsustainable society. Section 2 will reiterate key sustainability challenges of urban development, which is followed by a brief account of the state of knowledge on sustainability-relevant impacts of urban spatial structures. Cities as objects of transition will then be discussed in the light of the multi-level perspective in Section 3. Next, Section 4 will consider some challenges of applying the multi-level perspective to sustainable urban transition, which will include proposals for possible adaptations of the theory to this field of transition. In Section 5, the use of some of the above-mentioned framework adaptations is illustrated in an empirical case study of the provincial city of Fredericia in Denmark. Finally, Section 6 will end this paper with some concluding reflections on limitations and prospects.

## 2. Sustainability and urban development

25 years have passed since the UN World Commission on Environment and Development put the issue of sustainable development on the international agenda as a common challenge for all nations. According to the Commission, the key tenet of a sustainable development is to meet basic human needs – especially the needs among the world's poor – in a way that sustains the possibilities for future generations to meet their own needs (WCED, 1987:43). Whereas raising housing standards and improving hygienic conditions may be important to meet basic needs among urban dwellers in poor countries, the most serious sustainability problems of cities in the affluent North are rooted in their high resource consumption and unsustainable ecological footprints. Based on this understanding of the concept, important challenges of a sustainable urban development in wealthy nations are to mitigate climate change, limit energy consumption, reduce pollution, protect natural areas and arable land, and provide a safe and healthy environment for its citizens, in particular the most vulnerable groups (UN/ECE, 1998).

A large proportion of $CO_2$ emissions worldwide stem from buildings and transportation in cities, and the magnitude of these emissions can be considerably influenced by the solutions chosen for the development of the urban built environment. Achieving sustainable mobility (Holden, 2007) is