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Energy transition or incremental change? Green policy agendas and the adaptability of the urban energy regime in Los Angeles

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HIGHLIGHTS

- Theory-guided case study on the transition of the urban energy regime in Los Angeles.
- Evaluation of the transformative capacity of environmental policies.
- Assessment of the adaptability and innovation patterns of urban infrastructure regimes.
- The policy changes have sustained the existing regime and unfold incrementally.

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ABSTRACT

Drawing on recent research in urban policy studies and social studies of technology, this paper examines the capability of urban energy regimes in adapting to environmental policy pressures. Focusing on the case of the City of Los Angeles, we critically analyze the transformative capacity of the city's recent energy and climate policies and the innovation patterns of its urban infrastructure regime. This case study suggests that despite considerable success in switching from coal to renewable energies, the patterns of sociotechnical change in Los Angeles still tend to supplement and sustain the existing regime. Sociotechnical change in Los Angeles tends to unfold incrementally through adjustments within the established patterns of the existing regime.

1. Introduction

Networked infrastructures critically shape the ecologically sustainable development of cities. As they are both a root cause of prevalent socio-ecological problems and an important key to solving them, the infrastructurally mediated supply of resources and the disposal of waste are vital spheres of activity for environmental policy. Particularly, the energy sector has become an experimental and vivid laboratory for low carbon transitions and green policy programs. In recent years, the urban dimension of climate mitigation polices and energy transitions has been the subject of a growing body of research in urban and environmental studies. This literature portrays cities as critical for both enabling and constraining energy transitions towards a more sustainable supply and use of energy resources. Particularly in the North American context, where the effectiveness of federal climate mitigation and renewable energy policies is low, this literature portrays cities (and states and provinces) as the key drivers of more sustainable energy solutions (e.g. Betsill and Bulkeley, 2007; Betsill and Rabe, 2009; Williams, 2013; Stone et al., 2012). However, the question as to whether local energy policies are actually capable of instigating a transition of existing sociotechnical regimes of energy supply and use is largely neglected.

In contrast to these rather optimistic debates, numerous social studies of technology illustrate that institutional and technological changes in urban infrastructure are shaped to a large extent by path dependencies and the inertia of established sociotechnical regimes to radical changes. Once in place, technical infrastructures and the built environment of cities become fixed and obdurate, as do the institutional arrangements shaping their governance, financing, maintenance, operation and renewal (Star, 1999; Summerton, 1994; Hommels, 2005).

In view of those skeptical appraisals, current initiatives to change urban energy regimes radically and to reduce their ecological footprint require critical assessment. That is particularly true for the City of Los Angeles (L.A.), where the modernist ideal of the "infrastructural city" has been fundamentally inscribed into the urban structure. In hardly any other city has rapid urban growth depended so heavily on the construction of infrastructures transporting far-away

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resources to the city. Instead of a comprehensive urban vision and integrated plans, the development of the City of L.A. region was long portrayed as being driven by competitive interests, fragmented government agencies, pressure groups and, above all, individual interests (Banham, 1971). However, during the last decade the city government has been trying to overcome L.A.'s infamous reputation as an "urban environmental dystopia" (Gottlieb, 2007: 107). Since 2005, the city government has been striving to develop L.A. as a global role model in urban sustainability. With various integrated plans and participatory efforts, the city government is planning to "transform Los Angeles into the cleanest and greenest big city in America" (City of Los Angeles, 2007, 2).

Based on an empirical case study of the energy regime in the City of L.A., the objective of this paper is to explain the challenges and obstacles of urban environmental change even with strong political leadership, and how a place-specific infrastructure regime shapes that change. By focusing on the question of whether (and if so, in what ways) green energy policies are actually able to alter the established patterns of L.A.'s energy regime, we analyze the transformative capacity of such policies and evaluate the adaptability of the existing regime. We answer that question in this article's four main sections and a conclusion. Building on an introduction into the debate on urban climate policies and energy transition in Section 2, we elaborate our conceptual framework for the empirical evaluation of urban energy and climate policies in L.A. in Section 3. Our research methods and data are outlined in Section 4. In Section 5, we present the results of our case study on the development of L.A.'s urban energy regime, recent environmental policy agendas and the politics of climate mitigation. We then discuss and evaluate the transformative capacity of environmental policies and the innovation patterns of the regime in Section 6. Conclusions and policy implications are drawn in Section 7.

2. Urban climate policies and energy transitions

Low carbon transitions and policy efforts toward climate mitigation have been on the urban research agenda for two decades. Many studies have focused on agenda-setting processes, efficient policy instruments, institutional arrangements and the urban politics of climate mitigation. Numerous best-practice studies illustrate a "perspective of optimism, scope for hope and the opportunity for urban renewal, genuine prosperity and equity in livelihood generation […]" (Droege, 2008, 4). Early studies focused on showing what kind of urban policies are being adopted and which policy-areas are relevant (DeAngelo and Harvey, 1998; Collier, 1997). More recently, studies have addressed how urban energy policies have to be coordinated horizontally between different departments and the private sector within a city, vertically among multiple levels of government and territorially among neighboring communities within a region or within inter-municipal networks (Betsill and Bulkeley, 2007; Monstadt, 2007; Toly, 2008; Williams, 2013). While those analyses have been important in paving the way for climate policy studies, most of them disregard the sociotechnical conditions of innovation processes, e.g. the considerable obduracy of urban infrastructures and their ability to subvert intended policy objectives. By focusing predominantly on mitigation policies—what they are, why they are adopted (and under what conditions) and who is involved—scholars mostly neglect the policy impact on the transition of sociotechnical regimes. Particularly in light of the severe implementation deficits of many climate mitigation policies more attention has to be paid to their repercussions for urban technological development.

Building partially on these policy studies of urban climate mitigation, researchers from both social studies of technology and urban studies have started recently to bridge the gaps between their research areas by addressing the urban dimensions of infrastructural transitions (e.g. Bulkeley et al., 2011; Rutherford and Coutard, 2014). Those studies have been inspired by theoretical accounts in the social studies of technology—particularly earlier work on large technical systems (Hughes, 1983, 1987)[1]—and stress that urban and technology studies might complement, and benefit each other. Contrary to the rather optimistic debates in climate policy studies, they emphasize the path dependencies in the development of technical infrastructure and cities and their obduracy to rapid change (Hommels, 2005; Monstadt, 2009). These scholars argue that taking an urban perspective is especially appropriate for tracking and evaluating transitions, their spatial variability and distinctiveness but also the place-specific innovation pathways and obduracies. In those debates, *urban energy transitions* are understood as "radical, systemic and managed change towards 'more sustainable' […] patterns of provision and use of energy" (Rutherford and Coutard, 2014, 1354), "which fundamentally alter the nature of the sociotechnical configuration" (Bolton and Foxon, 2013, 2196), "encompassing not only new technologies but also corresponding changes in markets, user practices, policy and cultural discourses as well as governing institutions" (Coenen and Truffer, 2012, 968). In order to illustrate the path dependencies in infrastructural development, these studies mostly use the concept of sociotechnical regimes—defined as "relatively stable configurations of institutions, techniques and artefacts, as well as rules, practices and networks that determine the 'normal' development and use of technologies" (Smith et al., 2005, 149, cf. Geels, 2002). Once such configurations become stabilized and fixed, innovation processes are likely to occur in line with current regime requirements and therefore result from the advancement of existing solutions. Radical, path-deviant innovations (e.g. the shift toward systematic demand-side management or toward the use of more decentralized renewable energies) are often confronted with considerable challenges. "They prove much more risky and difficult to manage, have to overcome prevailing standards and to compete with the vested interests of incumbent system builders and with the network externalities of established products or technologies" (Monstadt, 2009, 1929f.). One of the assumptions in the transition debate is that most of the innovations structurally changing the incumbent regime initially do not go beyond "sociotechnical niches or experiments"—"protective spaces" from where they can later diffuse throughout the entire regime and induce path-breaking changes (Smith and Raven, 2012; critically: Hommels et al., 2007). Moreover, it is assumed that "more sustainable" and resource-efficient ways to provide and to use energy necessitate radical and systemic socio-technical change or "regime shifts" driven by niche developments. Inspired by experiences in European cities, energy transition studies have thus focused on the shift toward more decentralized forms of energy generation and localized distribution (Rydin et al., 2013; Bulkeley et al., 2014), community-based energy projects (Seyfanga et al., 2014), or the growing importance of independent energy service companies (Hannon et al., 2013) and other intermediary organizations (Rohracher, 2010).

The transition debate has been criticized for its absence of clarity about the spatial scales and the spatial embeddedness of sustainability transitions (Hodson and Marvin, 2011, 58), as well as for disregarding the politics of sustainability transitions and the competing interests, organizational arrangements and ideas in sociotechnical development (Meadowcroft, 2011). However, conceptual and empirical efforts have started to address these shortcomings

[1] Large technical systems (LTS) are defined as sociotechnical support systems in advanced capitalist societies that link physical technological artifacts, organizations, institutional arrangements, and knowledge in the provision of critical infrastructure services (Hughes, 1987; Summerton, 1994).