



Mind the gap! Barriers and implementation deficiencies of energy policies at the local scale in urban China



Jing Wu*, Christian Zuidema, Katharina Gugerell, Gert de Roo

Department of Spatial Planning and Environment, Faculty of Spatial Sciences, University of Groningen, Landleven 1, 9747AD Groningen, The Netherlands

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ABSTRACT

Environmental concerns and potential social-economic impacts associated with fossil fuels have turned cities into indispensable entities for supporting energy transitions in China. Pursuing a transition towards a sustainable energy system has become a major policy concern for the Chinese central government. In response, and on the basis of a top-down and conformance-oriented system of policy implementation and evaluation, the Chinese central government has launched various policies and targets on energy efficiency and production that lower levels of government have to follow. However, the translation of top-down targets and the measurement of conformance-based targets have both proved to be problematic. This paper investigates Chinese state policy on energy efficiency through four empirical case studies. It identifies how policy design of target setting and evaluation is both impacting and driving the implementation of energy efficiency at the local urban scale. We demonstrate how local authorities are faced with constraining barriers that can inhibit the implementation of centrally issued targets and policies. These barriers may even undermine local performance in the pursuit of ambitious energy efficiency goals, resulting in potentially harmful consequences.

1. Introduction

Cities worldwide are currently estimated to use 75% of the world's energy and contribute to 70% of the global energy-related greenhouse gas (GHG) emissions from fossil fuel usage (Baeumler et al., 2012; Hillman and Ramaswami, 2010). In China, rapid economic growth and urbanisation have turned the country into the largest carbon emitter worldwide (IEA, 2013). Both phenomena are built on the foundation of fossil fuel usage, with coal and petroleum accounting for more than 80% of China's energy consumption in 2012 (EIA, 2015). As a consequence, significant environmental and health impacts are emerging, especially in urban areas (e.g., Liu et al., 2016). Moreover, at present less than one percent of China's 500 largest cities meet World Health Organisation (WHO) air quality standards (Liu et al., 2014; Zhang and Crooks, 2012). As illustrated by the example of China, cities are seen as vital research cases for energy transitions (Rotmans et al., 2001). It is research that means to understand how cities contribute to the development of sustainable urban energy systems characterised by renewable energy resources and efficient energy use (Droegge, 2011).

In response to these pressures, the Chinese central government has set ambitious targets to be achieved by 2020: (1) a reduction of CO₂ emissions per unit of GDP by 40–45% relative to 2005 levels, and (2) an increase of up to 15% in the non-fossil energy share of total primary

energy consumption (State Council, 2009). A number of different energy policies have been introduced by the central government with the aim of reaching these objectives. In this paper we will investigate the Chinese energy efficiency policy framework, which is central to Chinese energy transition policy making. The implementation and attainment of energy efficiency targets at a local level is compulsory, and is steered top-down by the central government. The central government issued compulsory energy efficiency targets in the 11th (2006) and the 12th (2011) Five-Year-Plan (FYP): Energy intensity, measured as CO₂ emissions per unit of GDP, should decrease by 20% between 2006 and 2010 (State Council, 2006) and by a further 16% during the 12th FYP (2011–2015) (State Council, 2011a). The central government's confidence was high when these mandatory energy intensity targets were translated to top-down implementation schemes for lower levels of government and were supported by a strict conformance-based measuring system to validate implementation at a local level. Xu Shaoshi, Minister of China's National Development and Reform Commission (NDRC), stressed the strict implementation regime during the 8th session of the 12th National People's Congress (NPC) Standing Committee saying: “we need to keep pushing energy efficiency policies with an ‘iron hand’ to ensure these binding targets are achieved” (NPC, 2014).

The strict energy targets and strong adherence thus far to pushing

* Corresponding author.

E-mail addresses: jing.wu@rug.nl (J. Wu), c.zuidema@rug.nl (C. Zuidema), k.gugerell@rug.nl (K. Gugerell), g.de.roo@rug.nl (G. de Roo).

with an ‘iron-hand’ regarding implementation, have resulted in creative but also rather problematic implementations at the local scale. To illustrate: in 2010 the local government of Anping County cut off water and electricity supplies in residential neighbourhoods, forcing hospitals to shut down health-care one day per week, and traffic lights to be switched off, to ensure that policy goals were met in the final year of the 11th FYP (China Greentech Report, 2013). Such extreme measures arise from local authorities feeling compelled to meet national FYP targets at any cost. The result is a real risk that the current use of strict central targets and top-down implementation will overlook the interrelatedness of energy systems with other local societal systems by forcing local authorities to comply with an a-priori prioritisation of energy targets above possible other essential local needs. In the meantime, academic research has convincingly shown that shifting to a sustainable energy system is a complex process involving multiple societal changes, ranging from economic and behavioural change, to the development of new technologies and the consideration of spatial changes (Kemp and Loorbach, 2006; Scrase and Mackerron, 2009). Energy production from renewables, for instance, requires much more space than production from fossil sources (Sijmons and Van Dorst, 2012). Another issue is that households, companies, trade associations, and other social organisations will have to alter their prevailing attitudes and responses towards new energy systems (Andrews-Speed, 2012). In effect, both a large variety of activities and actors have to be involved in the shift to a more sustainable energy system. These actors and stakeholders vary in their aspirations, visions, wishes, perceptions, and knowledge and may thus generate tensions and conflicts between policy priorities, notably at the local scale where diverse aspects need to be balanced (e.g., de Boer and Zuidema, 2015; Wüstenhagen et al., 2007).

Clearly then, energy issues do not occur in isolation, but are interrelated with other local issues, policy ambitions and stakeholder interests that collectively influence policy development and implementation. As such, shifting to a sustainable energy system within a local realm is ideally based on an understanding of the interrelatedness of energy systems with the local socio-economic and physical circumstances (e.g., de Boer and Zuidema, 2015). Such an understanding can be difficult to translate into centralised policy formats and initiatives, as these tend to be less capable of responding to various unique and detailed local circumstances and stakeholder interests (e.g., Burström and Korhonen, 2001; De Vries, 2000; Zuidema, 2017). Instead, it seems sensible to at least allow local authorities some flexibility in implementing central policies so as to respond to specific local circumstances and stakeholder interests (e.g., Matland, 1995). Such flexibility seems especially relevant when policies mean to impact highly different localities, such as in China. China is a large country and local circumstances vary greatly across different regions, including differences in resources used, geography, demography, and the socio-economic status and related structure of the economy. Although the Chinese energy efficiency policy framework does take some varying local circumstances into account by assigning localities different targets, it remains unclear if the framework allows for flexibility in the face of the highly different Chinese localities. Our ambition is to investigate how the Chinese energy efficiency policy framework functions when applied under very different local circumstances.

Our research departs from previous studies concerning the implementation of Chinese energy efficiency policy. Some of these studies examined what actions and measures were employed by local authorities to conform with state planning mandates (e.g. Kostka and Hobbs, 2012; Zhang et al., 2011; Zhao et al., 2014). Others paid attention to interpreting the phenomenon of policy implementation gaps (e.g., Lo, 2014a, 2014b; Wang, 2012). Nevertheless, these previous studies have predominantly zeroed in on one particular area, especially in energy-intensive and industrialised regions such as Shanxi province and Changchun city. Hence, they are only offering limited information about how the Chinese energy efficiency policy framework functions

under different local circumstances. Furthermore, these studies focus on identifying reasons for poor implementation of energy efficiency by specifically addressing the rigid, top-down target allocation system in China (Kostka, 2015; Zhao and Wu, 2016). They pay less attention to the way in which implementation is evaluated and localities are held accountable. International studies on policy implementation have shown that evaluating policy success need not just be about controlling conforming to targets, but might also assess how the targets influenced the actual work or performance of implementing authorities within different contexts (e.g., Oliveira and Pinho, 2010). Moreover, performance oriented evaluation has rarely been discussed in Chinese academic debates (e.g. Tian and Shen, 2011). Therefore, we will investigate the Chinese energy efficiency policy framework to understand how policy design on both target setting and evaluation is impacting and driving the implementation at the local scale.

Next, in Section 2 we introduce and discuss the notions of conformance and performance in relation to policy implementation. This discussion serves as background for the analysis of the Chinese policy framework on energy efficiency in Section 3. In Section 4 we introduce our methodology, which investigates how four different Chinese city municipalities have responded to national energy efficiency policies. In Section 5 we discuss the coping mechanisms of these municipalities with the energy efficiency policies and bottlenecks that local governments are suffering from. There is a reflection on the Chinese approach in our concluding Section 6, where we argue for increased flexibility in both of the targets set by the central state as well as the system of measuring policy success so as to promote an improved performance towards reaching energy efficiency targets.

2. Conceptual discussion related to policy implementation

Up until the 1970s, policy implementation was rarely on the agenda of policy scientists (e.g., O’Toole, 2000; Schofield, 2001). Instead it was largely assumed, with a high degree of certainty, that well-designed plans and policies would deliver their objectives. Starting with authors such as Pressman and Wildavsky (1973) and Derthick (1972), it became increasingly clear that policy implementation proved to be much less evident in practice than had been previously expected. A rich academic debate grew apace (e.g., Goggin, 1990), prominently featuring studies on balancing the desire for effective top-down policy delivery in the local realm with the desire to allow for locally sensible policy responses (e.g., Elmore, 1979; Matland, 1995; Sabatier et al., 1986). These studies demonstrate that degrees of local discretion in dealing with centrally stated policy ambitions indeed depend on a combination of policy design and policy evaluation.

Local discretion is firstly influenced by how central policy ambitions are expressed and assumed to be translated across multiple tiers of government. As was explained by scholars, such as Elmore (1979) and Sabatier (1986), central policies can allow for different degrees of differentiation based on variations in local circumstances. At one extreme, central policy ambitions are generic with each lower level of authority being expected to meet the same uniform targets. Alternatively, central policy ambitions can also be differentiated with different localities being expected to deliver different targets based on different local circumstances. In both cases policy implementation remains top-down, but in the latter case it is sensitive to knowledge of the detailed local circumstances. Acquiring such knowledge can, however, be problematic for central governments (Burström and Korhonen, 2001; De Vries, 2000; Fleurke and Hulst, 2006), thus implying that differentiation in targets might fail to sufficiently take local circumstances into account. Consequently, it is also possible to allow for some flexibility in central ambitions itself, as discussed by Matland (1995) and Sabatier (1986). Central policy ambitions can then be stated in more strategic or ambiguous terms in order to allow for modifications to these policies as they get translated to lower levels of authority (e.g., DeLeon and DeLeon, 2002; Yanow, 1998). In this way,

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