

Climate policy integration on energy transition: An analysis on Chinese cases at the local scale

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ARTICLE INFO

Keywords:

Energy transition
Policy integration
Urban planning
Governance
Urban China

ABSTRACT

International concerns about climate change and environmental and socio-economic impacts linked to fossil fuels have pushed energy transition up the agenda of the Chinese central government. The Chinese central government recognises that energy transition requires actions beyond what the energy sector can deliver, and has thus called for policy integration. Climate policy integration has emerged as one of the key strategies to respond to energy concerns by incorporating the diverse perspectives of various sectors. The main goal is for energy issues be considered and governed by multiple sectors taking collective responsibility and allocating resources for similar policy ambitions. However, developing integrated policy within traditional hierarchical sectoral settings can be rather challenging. In this article, we analyse how the integration of energy ambitions within non-energy sectors manifests at local level in urban China. This research draws upon semi-structured interviews in two case study cities: Chengdu and Yangzhou. We find generally weak climate policy integration in local governments due to insufficient communication and interaction between policy sectors, limited professional capacity, and inefficient governance structures. These findings suggest incorporating hierarchical, top-down governance with an increase in cross-sectoral and horizontal forms of communication and interaction, as both actions can significantly facilitate policy integration.

1. Introduction

Tackling climate change and transitioning towards low-carbon city development are among the main policy ambitions in China (NDRC, 2021). The central government of China pursues this ambition by promoting the integration of national low-carbon policies into all relevant policy domains, including economy, transport, environment, and industry. Such policy integration was enshrined in the recent 12th (2011) and 13th (2016) Five-Year-Plans, with clear legal obligations, and was further punctuated by the New Urbanisation Plan (2014–2020) (State Council, 2014). Importantly, international concerns about climate change and persistent high levels of air pollution in China, notably from fossil fuel combustion, have raised energy transition high on the agenda of the Chinese central government; in response, it is pursuing its 2020 low-carbon targets by highlighting energy transition policies. Notably, China aims to upscale its share of renewable energy to 15%, and reduce CO₂ emissions per unit of GDP by 18% relative to 2015 levels (NDRC, 2016). To achieve these objectives, the Chinese government recognises that actions must exceed what the energy policy sector can deliver and

hence, require a degree of policy integration.

Energy transition is a complex cross-cutting process in which a socio-technical system transforms from one state, fossil-fuel based, into another renewables-based state with efficient energy use (Droege, 2011; Loorbach, 2007). The system shift of energy is a combined process of physical, technical, socioeconomic, and institutional changes which are embedded across a number of sectors, such as housing, transport and industry (Basu et al., 2019; De Boer & Zuidema, 2015; Wu et al., 2018). Given the complex cross-sectoral nature of energy transition, it is necessary to harmonise energy ambitions into other sectoral policies to promote a coherent and integrated approach. This is explicitly acknowledged in the Chinese Urban Adaptation to Climate Change Action Plan (2016): “Climate change adaptation and mitigation, especially energy objectives, should be integrated into all related sectors and policy areas (e.g., transport, spatial, economic, and building) to achieve a sustainable and low-carbon future” (State Council, 2016).

Policy integration means dealing with cross-cutting policy issues by supporting an integrated and holistic policy strategy, and taking account of diverse sectoral values and perspectives (Briassoulis, 2005; Park &

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<https://doi.org/10.1016/j.cities.2021.103469>

Received 26 September 2019; Received in revised form 29 August 2021; Accepted 18 September 2021

Available online 25 September 2021

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Youn, 2017). In doing so, policy integration can help to avoid conflicts, contradictions and redundancy between policy sectors to facilitate reaching overall governmental policy goals (Stead & Meijers, 2009). Briassoulis (2005) describes it as “a process of incorporating certain concerns (e.g., environmental, social and economic) into an extant policy to produce an integrated policy” (p. 50). Integrating climate (including energy) objectives into other sectoral policies is referred to as ‘Climate Policy Integration’ (Rietig, 2013). Specifically, climate policy integration is defined as “the incorporation of the aims of climate change mitigation and adaptation into all stages of policy making in other policy sectors” and “a commitment to minimise contradictions between climate policies and other policies” (Mickwitz et al., 2009, p. 19). Climate policy integration is based on the concept of Environmental Policy Integration, and is seen as one of the key policy strategies to respond to heightened concerns about climate change and the promotion of energy transition (Adelle & Russel, 2013). With integrated approaches, cross-cutting problems are considered and governed by multiple sectors that collectively take responsibility and allocate resources and instruments to pursue a similar policy ambition (e.g., energy transition).

It is well established that the local level can play an important role in the pursuit of policy integration, which also applies to climate policy integration (Codemo et al., 2021; Grafakos et al., 2020, 2019; Landauer et al., 2019). Policy integration targets the development of coherent and holistic policy approaches for addressing interrelated policy issues (e.g., energy or environmental issues). Often such interrelated issues have time and place specific manifestations; i.e. where causes, effects, interests, and exact manifestations depend on unique local circumstances (e.g., Jordan, 1999; Liefferink et al., 2002; Zuidema, 2017). The large spatial implications of pursuing renewables and energy efficiency further strengthen the need to adapt (national) energy policies to specific local circumstances (e.g., De Boer & Zuidema, 2015). Central governments have difficulties in responding to specific local circumstances, since place-specific relations between causes, effects, policy issues, and related stakeholders can easily be outside their span of control. In contrast, as for example, De Vries (2000) and Rydin (1998) emphasise, the proximity of local governments to local circumstances and stakeholders puts them in a good position to respond to the unique manifestations of interrelated issues, which is among the key arguments supporting degrees of decentralisation. The Chinese government also recognises the need for local action and responsibility in pursuing energy transition, and goes beyond merely expecting municipalities to implement energy targets in various sectoral policies. Also, specific programmes were set-up to accommodate proactive local energy policies, such as the ‘New Energy Demonstration City (NEDC)’ programme and ‘Low-Carbon City (LCC)’ programme. An integrated policy approach is highlighted in the implementation of these programmes. Both programmes feature in this study as the context for our case studies and thus, are discussed in detail in section three.

Integrated working relies on municipal departments to work together by sharing responsibilities, exchanging interests and perceptions, and harmonising separate policies. While climate policy integration is identified as a promising and necessary process to help pursue energy transition, making it work smoothly can be a challenge that could well be aggravated in a more hierarchical and sectoral context (e.g., Acheampong, 2019; Candel & Pereira, 2017). Planning and policy making in China remain strongly focused on top-down decision making within distinct policy sectors and implementation based on command-and-control (Hu et al., 2013; Wu et al., 2017). In other words, the Chinese central government develops sectoral policy targets to which the lower administrative levels must conform. Within such a hierarchical and sectoral-based institutional setting, key challenges emerge for integrated working, including coping with policy fragmentation, competing and incoherent objectives, and inconsistent instrument mixes (Candel & Biesbroek, 2016; Mol, 2016). To illustrate, minimising greenhouse gas emissions might create important local tensions with either GDP growth or environmental protection (e.g., nuclear energy

and hydropower) (e.g., Saint Akadiri & Alola, 2020; Wu et al., 2017). Furthermore, departments in urban China are also not accustomed to working together (Yin et al., 2016), but instead tend to concentrate narrowly on their own departmental interests and on achieving targets required by central government sectors (e.g., GDP growth, environmental and ecological protection).

Integrated working cannot be taken for granted, certainly not in a Chinese context, therefore an institutional analysis on climate policy integration is highly relevant. At present, China is arguably one of the most important countries in terms of global energy transition. Nevertheless, research into local energy transition policies and approaches in a Chinese context is still in its infancy (e.g., Cai & Aoyama, 2018; Han et al., 2018; Yuan et al., 2012). Attention to policy integration in connection to the pursuit of energy transition, in particular from the perspective of urban planning has in the past years been quite modest (e.g. Schmidt & Fleig, 2018). Additionally, these analyses of policy integration with regard to energy issues have mostly focused on western societies (Bocquillon & Maltby, 2020; Howlett et al., 2017; Persson et al., 2016). The studies addressing policy integration on energy policies in urban China, have remained fairly general by merely indicating the difficulties of policy integration and limited interactions between stakeholders (e.g., Westman et al., 2019; Westman & Castán Broto, 2018; Zhang & Li, 2012). Thus, little is known of the exact institutional problems and opportunities related to climate policy integration (also Ruan et al., 2020). The novelty of our study therefore lies in our responses to the lack of detailed institutional analyses of the processes and practices of climate policy integration in urban China. In doing so, we also expand on the climate policy integration literature by explicating and applying a framework for its evaluation.

Thus, the aim of our study is to identify how the desired integration of energy ambitions within non-energy sectors manifests at local level in urban China, while also targeting the institutional challenges, opportunities and barriers to climate policy integration. Specifically, we analyse climate policy integration in Chengdu and Yangzhou, two Chinese cities committed to national programmes promoting an integrated approach to energy transition: the Low-Carbon City (LCC) project in Chengdu and the New Energy Demonstration City (NEDC) project in Yangzhou. Specifically, we concentrate on integration at the public administration level; i.e., for now we ignore the private sector (markets) and civil society (citizen groups). Notably, we first aim to identify how cross-sectoral and integrated working might be possible or constrained within governmental organisations before we expand to assessing how the inclusion of other key actors might be pursued or impeded.

In section two we present our analytical framework where we have a conceptual discussion on how to understand policy integration and climate policy integration associated with integration mechanisms. We also discuss how to evaluate climate policy integration as applied in our case study analysis. Section three introduces the case studies and methodology. The fourth section elaborates our empirical findings. Overall conclusions are provided in section five, in which we assert that both integration across levels of authority and more cross-sectoral forms of communication and interaction (within networks) have a significant role in facilitating climate policy integration in China. As such, we call for a more balanced governance structure in China that combines hierarchical coordination and coordination through networks with the aim to deliver better climate policy integration outcomes.

2. Theoretical framework

We begin to build our framework by first explaining why policy integration is used to handle cross-cutting issues. In doing so, we will also clarify the implications of policy integration at a local level, including climate policy integration, and how to evaluate climate policy integration in practice. These questions are elaborated below from two perspectives. One is conceptual, where we present a more clearly expressed characterisation and understanding of policy integration

(including climate policy integration). The other perspective is instrumental, in which we discuss the criteria we apply for evaluating climate policy integration in our analysis of two Chinese cities. Hence in this section, the conceptual understanding of policy integration will be interpreted into concrete criteria, which allows us to identify the possibilities and barriers in pursuing climate policy integration in Chinese local context.

2.1. Understanding policy integration

Demands for integrated policy making have become pervasive in the western world since the early 1990s (Rode, 2019). Before then many western countries had encountered the undesirable consequences of strong reliance on sectoral legislation and policies. Because the effects of sectoral policy were largely restricted to a sole 'compartment,' where planning issues were aimed, the result has too often been inefficient duplication, blind spots, redundancy, poor social learning, and even institutional inertia (Eckberg, 2009; Kidd, 2007; Leat & Setzler, 2002). Moreover, greater awareness during the 1980s of the global environmental crisis has increased the need for better coordination, and it was thought that the constraints imposed by the sectoral and compartmental structures should be removed. A desire for integrated governance was therefore called for to respond to environmental issues that cut across disciplinary and sectoral boundaries (Hajer, 1995). Specifically, cross-cutting issues would be rendered more effective by "going beyond the sectoral approaches" (Commission of the European Communities, 1990, p. 1) and engaging in "joined-up thinking in the development of a vision for an area" (Rydin, 2011, p. 19). Policy integration is thus seen as a desirable approach, among others, that can improve policy cohesion; it is regarded as "the management of cross-cutting issues in policy making that transcend the boundaries of established policy fields" (Stead & Geerlings, 2005, p. 446). As Westerman (1998) suggests, policy integration implies "a concern with the whole, agreement on common outcomes, and a commitment to actions and targets to achieve these outcomes" (p. 3).

The intended substantive outcome of policy integration is a better linked or more integrated policy agenda when coping with cross-cutting issues. Policy integration itself is then the process of pursuing and creating such substantive outcomes. Organisational structures have a profound impact on actors' behaviour since they are associated with how responsibilities are allocated, who takes the lead in organising, and how power is distributed and impacts on policy integration processes (Nee & Strang, 1998; Newman & Thornley, 1997; Pierre, 1999). In this regard, two main and contrasting governance structures stand out in political science: hierarchies and networks (Rode, 2019). In hierarchies policy integration relies on the coordinative capacity of the top of an organisation to create coherent and integrated policies. Pursuing integration relies on the issuing of institutional mandates, the allocation of power and responsibilities across administrative levels and sectors, and is supported by a plethora of relevant administrative orders, rules, procedures, and (in)formal channels of policy coordination (Acheampong & Ibrahim, 2016; Bogdanor, 2005). Fragmentation of policies is a known risk of relying on such hierarchical organisations (e.g., Pierre & Peters, 2019). Furthermore, numerous studies show that not every organisational structure or approach is equally suited to deliver integrated policies; i.e. different ways of organising relate to different functional ambitions (e.g., Gresov & Drazin, 1997; Zuidema, 2017).

A strength of hierarchical organisational structures, and their related functionally specialised bureaucracies, is their suitability for delivering standardised and clearly defined outcomes for situations seen as isolated from a contextual environment (Miller, 1986; Mintzberg, 1993). Benefits of hierarchical structures include strong lines of control and accountability, a standardised working process, and routine implementation of policies. De Roo (2003) differentiates between pursuing so-called 'single fixed objectives' and 'multiple composite or integrated goals'. For a hierarchical structure to achieve single fixed objectives

while balancing multiple, and possibly competing objectives into one integrated solution strategy, however, requires a different way of working.

De Roo (2003) argues for a decentralised way of working in unique situations, as these are strongly interwoven with a dynamic environment. Such a decentralised way of working is based on collaboration, negotiation and making sense together. This collaboration relates to a specific local context that requires integrated policy approaches (see also Christensen, 1985). Other authors also highlight the need for horizontal cooperation in more flexible, collaborative or even informal structures while pursuing integrated ambitions, or what Miller (1986) describes as an organic structure, and what Mintzberg (1993) calls an 'adhocracy'. Rather than routinised working processes focusing on a single fixed objective, the process involves making trade-offs and finding synergies and creative solutions from specific contextual conditions (e.g., Zuidema, 2017). The organisation structure now emerging as preferable depends on networks in which interactions and communications occur between individuals and organisations on the same policy level, such as between departments or municipalities (Goold & Campbell, 2002; Peters, 2006). Within such networks, the realisation of policy integration relies on mutual interests, shared responsibilities, receptivity to change, and interdependence between members and organisations with a shared understanding of what such integration could mean (Newman, 2004; Peters, 1998).

Pursuing integrated policies demands changes in how the process of policymaking and delivery is organised. First, it is necessary to reconsider the role of sectoral regulations or legislation. Strong sectoral targets can frustrate possibilities for balancing different ambitions within an integrated solution strategy. For example, standards regarding safety risks on roads are potential limitations for using electric vehicles or hydrogen as fuel in cars. Integrated policy solutions would seek to balance the importance of safety risks with the benefits of sustainable mobility. As long as the law requires these same safety standards, however, balancing cannot take place. Hence, maximising the outcomes on one ambition (reaching safety standards) can hinder the opportunity to optimise the overall outcome across all relevant ambitions.

Secondly, it is important to develop organisational structures that allow for open discussions towards balancing various (sectoral) interests and related actors in a collaborative effort (Belaieff et al., 2007). In addition to creating cross-sectoral coordination tools (regular meetings, invitations to reflect on each other's work, requests for input), a receptive attitude is also valuable. Notably, open information, discussion, a collective learning process, and a culture of mutual support between relevant stakeholders and government sectors would be optimal (Rode, 2019). The development of cross-sectoral task forces and other horizontal networks for collaboration are good examples of supportive organisational structures. Furthermore, it would be beneficial to introduce administrative incentives for cross-sectoral organisations to enable integration, for example, in the form of budgets and leadership (Calvert, 1992; Jordan & Lenschow, 2010; Ross & Dovers, 2008). Without such incentives, communication and interaction within horizontal networks would certainly compete with established routines and ambitions of individual policy sectors or associated governmental departments, likely leading to stalemate.

2.2. Understanding policy integration in the context of energy transition

The cross-sectoral nature of energy transition urges for a harmonisation of energy ambitions with other sectoral policies and stakeholder interests (e.g., Auktor, 2017; Spijkerboer et al., 2019). As such, policy integration is among the crucial processes supporting energy transition (e.g., Adelle & Russel, 2013; Hamdouch & Depret, 2010). While policy integration typically requires action on various administrative levels (Stead & Meijers, 2004; Van Stigt et al., 2013), the local/urban level is certainly among the *prima arenas* for pursuing an integrated approach. Notably, it is at the local level where various sectoral and stakeholder

interests can be balanced while being sensitive to distinct local circumstances (e.g., Rydin, 1998; Zuidema, 2017). Such sensitivity has become increasingly important to include when it comes to energy policies, due to the vast spatial implications of energy transition. Fossil fuels have traditionally only had minor spatial impacts, while being often limited to distinct locations (De Boer & Zuidema, 2016). In addition, they are easy to transport over the globe, allowing for easy access to energy even if this comes from remote and far-away regions. The reliance on fossil fuels has even resulted in an almost complete lack of attention from the perspective of urban planning and policies for energy until recently (Zuidema & De Boer, 2017).

Shifting to an energy system based on renewables is currently urging urban planning to explicitly address energy as a topic (e.g., Cajot et al., 2017; De Pascali & Bagaini, 2019). Energy production through especially solar energy, wind farms, hydropower and the utilization of biomass require large areas to harvest sufficient amounts of energy, while being highly visible (Stremke, 2012). Furthermore, shifting to an increased use of renewables will also beg for serious investments in refurbishing the built environment, including industries, housing, our transportation system or electricity grid (e.g., Paiho et al., 2019). As a result, energy transition also explicitly relies on the interplay of technical, social and institutional innovations in a geographical setting (Bridge et al., 2013) and “these particular assemblages vary over space and time” (Faller, 2016, p. 86). That means, shifting to a renewables-based energy system will explicitly urge us to recognise and respond to the interrelatedness between energy systems and distinct local (urban) environments. Such interrelatedness, clearly, is more than just respecting and adapting to the physical environment; e.g. building stock, climate, land uses, infrastructure. It is explicit also in the engagement of various governmental departments and local stakeholders in local energy production or resistance to renewable infrastructures (e.g. solar fields, wind farms).

Policy integration, thus, is a crucial process for supporting energy transition in an urban environment. Nevertheless, the energy system and related, the energy sector, has in the past been approached as relatively isolated from other policy sectors (e.g., De Pascali & Bagaini, 2019; Verbong & Geels, 2007). This situation can also be witnessed in China, where energy transition has traditionally been treated as a technological issue (Andrews-Speed et al., 2014) and attempts at cross-sectoral coordination are recent and largely dictated by top-down steering by the sectoral NDRC (Ruan et al., 2020). The isolated position of energy vis-à-vis other policy sectors is also well-illustrated by the lack of attention it long received in the international literature on policy integration; i.e. policy integration has become an important principle guiding public policy development mostly when considering other policy fields, such as the environment (Tosun & Peters, 2018), land use (Geerlings & Stead, 2003; Taki et al., 2017), tourism (Aall, Dodds, Sælensminde and Brendehaug, 2015; Brendehaug et al., 2017) and urban sustainability (He et al., 2018; Khan et al., 2020). Attention to policy integration regarding energy sector, however, has been growing over the past decade, both in practice and theory (e.g., Camargo & Stoeglehner, 2018; Giannouli et al., 2018; Halim, 2018; Hogg et al., 2016). However, in line with the observation by Spijkerboer et al. (2019), there is still limited attention for policy integration and harmonisation to be applied in the context of (urban) energy transition and area-based thinking. Within this limited literature, the focus lies mainly on western societies. Hence, this article will address this research gap identified, by using the framework developed on climate policy integration and add value by focusing on energy and urban planning in Chinese context.

2.3. Criteria for evaluating climate policy integration

With regard to assessing policy integration, researchers have developed a variety of methods that often largely focus on environmental policy integration (e.g., Lafferty & Hovden, 2003; Lenschow, 2002). They might well be useful, as various authors suggest climate policy

integration can be regarded as a component or subset of environmental policy integration, or resembling environmental policy integration (e.g., Ahmad, 2009; Jordan & Lenschow, 2010); i.e. there would be scope to simply replacing the word ‘environmental’ with ‘climate’ in the definition if we are to define climate policy integration (Rietig, 2013). Alternatively, potential differences and conflicts between climate change and environmental governance would result in differences in defining both forms of integration (Dupont & Primova, 2011). We follow this suggestion, implying we also see important implications for a framework for evaluation.

Evaluating environmental policy integration tends to focus specifically on the process of policy integration rather than on outcomes in terms of material delivery (Adelle & Russel, 2013). Among the reasons, as Jordan and Lenschow (2010) explain, is that evaluating the state of the environment is highly complex since it is affected by myriad factors, such as health, water resources, solid waste, biodiversity, and air pollution (also Moussiopoulos et al., 2010). Nevertheless, policy integration not only involves changing bureaucracies and processes, but also leads to impacts in the ‘real world’ (Mickwitz & Kivimaa, 2007). When it comes to climate change and specifically energy outputs (e.g., carbon emissions or energy efficiency), the claim is made that outputs are also more directly measurable than the wider state of the environment (Dupont & Primova, 2011). Like many other authors of climate policy integration literature, we here also consider climate policy integration as both a process and a contributor to material outcomes.

Subsequently, we follow the framework for analysing climate policy integration proposed by Brendehaug et al. (2017), which explicitly includes policy outcomes as being among the criteria for analysing climate policy integration. Nevertheless, we also notice that the framework proposed by Brendehaug et al. (2017) sees climate policy integration largely as a process that follows from the creation of (static) institutional regulations and rules enforced by formal governmental channels (e.g., instruments, organisational structures, procedures). We argue that, next to these ‘rules of the game’ (Spijkerboer et al., 2019) there is also the so-called ‘play of the game’ (Spijkerboer et al., 2019), where policy integration is shaped by dynamic interactions and communication between actors and departments. Both two aspects are interwoven and considered necessary for jointly producing the outcome of policy integration. Indeed, Simeonova and van der Valk (2009) also suggest policy integration involves aspects such as commitment, sharing responsibilities, collaborative practices, etc. While considering this ‘static-dynamic interaction’ we have interpreted the five indicators based on the framework of Brendehaug et al. (2017) and translate these into distinct questions to analyse climate policy integration as shown in Table 1.

The first indicator of successful climate policy integration, *inclusion*, means that energy issues and area-based policy strategy are included in the policy making process of other policy domains, taking note of the importance of energy-related concerns, ambitions, and aims which are rightly reflected in written statements and added to the sectoral agenda. *Consistency* refers to a shared understanding of the energy issue among relevant sectors and policies. Thus, different sectoral goals and instruments should be consistent with each other regarding area-based, integrated energy governance and there should be a commitment to minimise contradictions (Lafferty & Hovden, 2003). *Weighting* means the relative priority given to energy issues, as compared to other policy objectives involved, in the face of different sectors having their own interests and targets. Furthermore, achieving successful climate policy integration also requires knowledge and *resources* (e.g., time, personnel, funding, organisational structures, etc.), the ‘know-how’ to deal with issues of the energy transition, in particular area-based and integrated energy planning. Finally, successful climate policy integration should bring real and positive consequences and impacts to the practice, for example, energy efficiency. Brendehaug et al. (2017) discuss the criterion *reporting*, which reflects the actual delivery of policies in a material sense. We are less interested in reporting per se, than on actual performance: Did the policy deliver an integrated solution? Therefore, we use

Table 1
Summary of the analytical criteria to assess climate policy integration.

Criteria	Key questions
Inclusion	- How does your department define or think of energy transition? - To what extent and in what ways have energy objectives been considered? - Are there any instruments (e.g. protocols, rules, requirements) that support cross-departmental coordination in the decision-making process? - What kind of organisational structures or approaches exist to support integration? - Are there plans and strategies that can support climate policy integration? - Are you motivated to pursue climate policy integration? - Do you see the added value of pursuing climate policy integration? - How are responsibilities distributed and who takes the lead in organising and pursuing integrated policies?
Consistency	- Is there a shared understanding of energy issues among actors and policies? - Have contradictions between policy goals been identified, and have there been efforts to minimise known contradictions?
Weighting	- What is the relative priority given to energy issues as compared to other issues on the agenda? - Are there procedures for determining the relative priorities?
Resources	- Are competence, time and other resources available for the promotion of energy issues? - Is there internal and external know-how about dealing with energy issues? - Are there funds available for cross-departmental working or integrated policy delivery?
Performance	- Are policies implemented and evaluated? - Are their practical consequences or impacts visible and measurable?

Source: based on Mickwitz et al. (2009), Mickwitz and Kivimaa (2007) and Brendehaug et al. (2017).

performance instead of reporting as our fifth criterion. Performance also includes ex post evaluation of policy implementation that could give further insights into real impacts in practice.

3. Methodology

In response to our research objective, this article examines how climate policy integration is emerging in two Chinese local authorities via two qualitative case studies. These case studies are not representative of China as a whole, but rather our aim is to identify institutional challenges and opportunities for climate policy integration, and to explore in particular the integration of energy ambitions within non-energy sectors in urban China. We chose to study two cities from two prominent national programmes that try to boost local action towards energy transition, guaranteeing that our case cities indeed are pursuing integrated approaches to energy transition. The programmes are the “Low-Carbon City” (LCC) and the “New Energy Demonstration City” (NEDC) programmes. Both programmes were launched by different Chinese ministries; they are the most influential programmes for promoting urban sustainability by integrating environmental objectives into local policy making and implementation.

Both projects have been set up with their own goals, institutional structures and frameworks. The NEDC project specifically focuses on the shift to a sustainable urban energy system through developing renewables-based projects and technologies (NEB, 2012). The added value of using a case in the LCC project is that this programme not only includes energy ambitions, but also aims for a wider set of ambitions to promote a low carbon and ecologically-sound cities. Hence, where the NEDC programme targets urban energy transition through starting within only one sector (energy), the LCC targets urban energy transition as a part of a wider sustainability effort encompassing various policy sectors and thus departments (e.g., transportation, industry, housing, economy) at the same time (NDRC, 2010). As a consequence, the different focus and related institutional structures of the two projects

might trigger different actions regarding policy integration on a local level. It is because of this possible difference that we considered it attractive to choose a case from both two projects.

Ultimately, we selected the LCC project in Chengdu and the NEDC project in Yangzhou (Fig. 1). Although it is not our intention to generalise based on only two cases, we do aim to create a realistic picture of the types of processes, barriers and mechanisms used in Chinese cities in pursuing energy transition. The intention of our explorative study, thus, is to shed light on what might be key integration challenges in urban China. Chengdu and Yangzhou are selected for this research based on several arguments. For one we limited the scope of cities to study by excluding smaller cities in less-developed Chinese regions (e.g., Gansu or Guizhou province), with the argument that we did seek cities who could safely be assumed to have some degree of financial resources and institutional capacities to engage with the projects. Second, we selected cities with proven experience working on the project and that have available information online or in reports. Thirdly, we identified both Yangzhou and Chengdu as fairly progressive on issues related to energy and sustainability, making them highly suitable to study how climate policy integration might unfold within the chosen LCC and NEDC projects. Yangzhou stood out as it has been identified as a ‘leading municipality’ for undertaking energy transition measures (Menglin & Shanheyi, 2015). The city has also been named as the demonstration city of national smart grid, national renewable energy buildings in China (Yangzhou government, 2011), and therefore it was highlighted as a good example of the work done in the pursuit of energy transition. Furthermore, existing contacts in the city helped us in gaining access to information. Chengdu was chosen due to its prestigious image as the ‘most livable city in China’ (Zhang et al., 2020) and there is existing evidence of this city taking action to make it more sustainable (Fu & Zhang, 2017).

3.1. Introduction to the case studies

Chengdu (population: 14.4 million) is the capital city of Sichuan province in mid-west China. Economic growth in Chengdu has been rapid, and in 2017 its GDP reached (\$USD) 138,05 per capita, ranking it 32nd among the top 50 richest cities in China (China's Statistical Bulletin, 2018). *Low-Carbon City (LCC)*, launched by the National Development and Reform Commission (NDRC), encompassed five provinces and eight cities in 2010. In December 2012, LCC was expanded to cover another 29 cities and the provinces, including Beijing, Shanghai, Qingdao, and Hainan province. Chengdu has recently been working diligently to become a sustainable city and was selected as one of the third batch of pilot cities to join the LCC project in January 2017 (NDRC, 2017). The Chengdu municipality subsequently installed a leading group of administrators led by executive vice-mayors and composed of various representatives from local government departments (see Fig. 2). This group is supported by an executive office for implementation of its plans and policies, with the municipal DRC (Development and Reform Commission) leading the project implementation. The DRC is primarily responsible for formulating and implementing strategic and overarching policies on the city's economic and social development. The DRC has several sub-departments, including those on resources conservation, strategic development and planning, regional coordination development, social development, infrastructure constructions and national economy. The LCC project in Chengdu is the responsibility of the entire DRC, supported by research institutes and think-tanks (e.g., Chengdu Economic Development Research Institute). In addition, the Chengdu DRC is responsible for building organisational capacity in terms of formulating working procedures and communicating with all relevant governmental departments. Other responsibilities include monitoring, evaluating and implementing policies, together with the Municipal Supervision Office, and directly reporting to the national NDRC. Other relevant governmental departments (e.g., bureaus of environment, housing and



Fig. 1. Location of the two case studies.
(Source: Authors.)

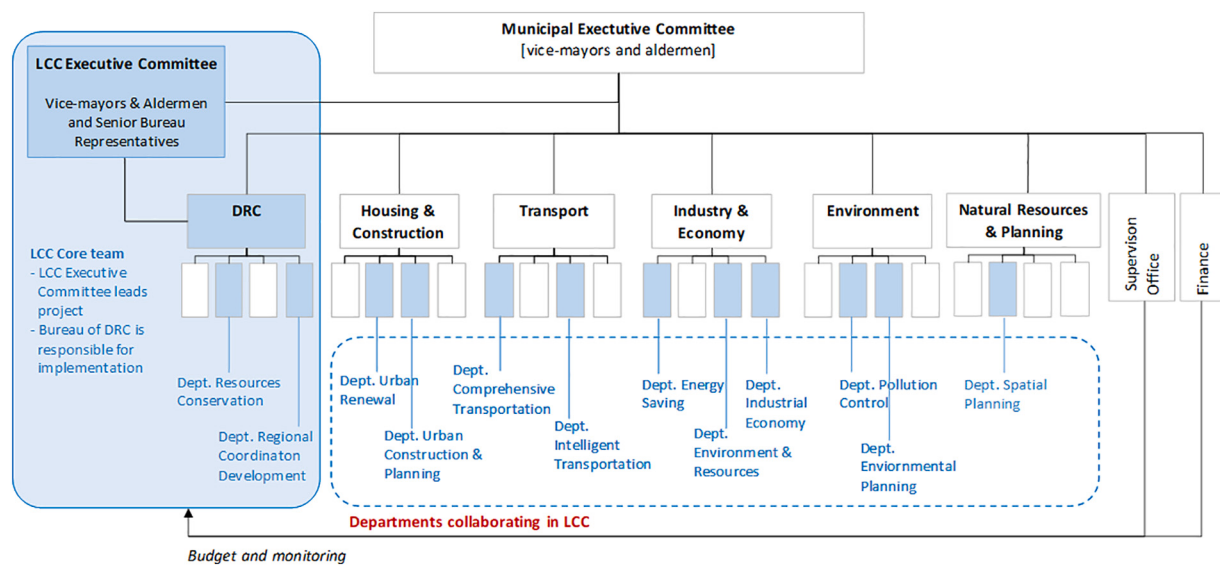


Fig. 2. The governance structure of LCC Project in Chengdu.
(Source: Authors.)

transportation) are obliged to translate energy policies into their own departmental policies during the policy making process and contribute by implementing these policies. Moreover, the Municipal Finance Department provides financial support to those policies conducive to the creation of a low emissions environment.

Situated in the economically strong eastern part of China, Yangzhou is smaller than Chengdu, with 'only' 4.4 million inhabitants. Yangzhou traditionally commits to a livable city ideal, and in 2014 was identified as one of 81 pilot cities to implement the *New Energy Demonstration City (NEDC)* project by the National Energy Bureau (NEB) (NEB, 2014), a department of NDRC. To implement this NEDC project, the Yangzhou municipality applies a fairly similar institutional structure as Chengdu by setting up a leading group of administrators, but with one key

difference: the energy department, a sub-department of the municipal DRC, leads the project implementation. Hence, the NEDC project cannot assume other DRC sub-departments such as resources conservation, strategic development and planning feel responsible to use their coordinative capacity in engaging other municipal departments. Rather, the energy sub-department has to either do such engagement themselves or convince other DRC sub-departments to join forces with them. Only the municipal bureaus of technology, and economy and DRC, are also responsible for applying financial support from provincial and national governments. Fig. 3 shows how different governmental departments relate to one another to implement the NEDC project in Yangzhou.

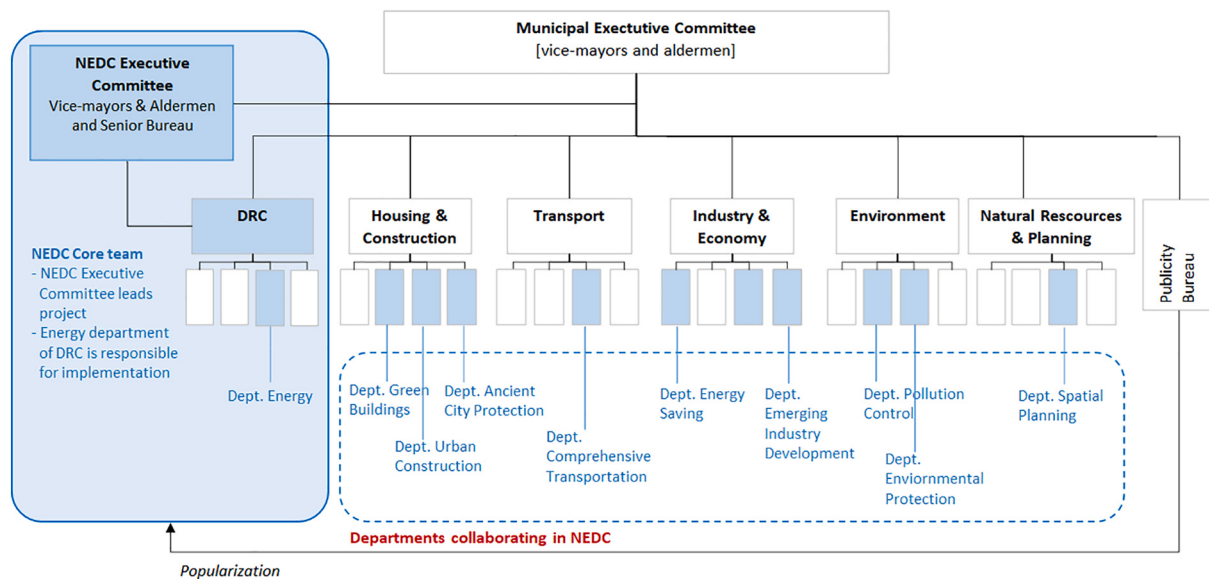


Fig. 3. The governance structure for implementing NEDC Project in Yangzhou. (Source: Authors.)

3.2. Data gathering and analysis

Our analysis consists of two parts: policy document analysis and in-depth interviews with key actors. First, we examined all detailed management plans and documentation regarding our two case study projects, and reviewed national and local policy documents and measures related to policy integration on energy from main government departments. Our groundwork comprised investigating whether and how energy ambitions are integrated into departmental policies and plans, thus improving our understanding of the general governance process of climate policy integration. Part two involved in-depth, semi-structured interviews with 20 respondents (11 respondents in Chengdu and 9 in Yangzhou) between June and July 2018 (Table A.1). Respondents comprised scholars, private/third sector representatives, and senior government officials from different departments of the local authority, including planning, economy, housing, transportation, and environmental protection. The amount of interviews chosen was influenced by both our desire to have a broad selection of various stakeholders and departments and saturation occurring after adding more respondents upon identifying new findings. The policy document analysis and analytical framework discussed in Section 2 forms the basis for the interview guidelines, and Table 1 frames our pertinent interview questions. The 45–60 minute interviews were audio-recorded and fully transcribed. The transcripts together with policy documents were systematically coded following a three-step-method:

- (1) Coding of national/local policy documents: focus on how does policy content itself define, value and support ‘policy integration’;

- (2) Coding of the perceptions of key stakeholders (20 interviews) for each criterion: inclusion, consistency, weighting, resources and performance (Table 1);
- (3) Looking for interrelationships and differences between step (1) and step (2), and identify the reasons.

The use of the computer program Atlas.ti supported the coding process and the code tree is presented in Table 2. For example, codes in step (2) for inclusion were “policy strategy” (e.g., what kind of organisational structures or approaches exist to support integration?), “policy priority” for weighting (e.g., what is the relative priority given to energy issues as compared to other issues on the agenda?), and “expertise” for resources (e.g., is there internal and external know-how about dealing with energy issues?). These codes are related to the analytical framework/criteria discussed in Section 2.

4. Findings

Our preliminary analysis of policy and research reports on the implementation of the LCC and NEDC projects provides insights into the institutional challenges for policy integration; notably, most local authorities lack comprehensive thinking across policy sectors and departments. To illustrate, the 2016 NEDC Project Report concluded that “...A much stronger effort is needed based on a multilateral inter-organisational governance structure where a common vision is developed out of an agreement based on a mutual understanding of the role of energy transition for the cities’ future and a shared feeling of responsibility” (p. 39). The 2014 LCC Construction Report also states that policy integration in urban China remains limited. However, these evaluations say little about the exact institutional challenges,

Table 2
Code tree for the policy documents and interviews.

Inclusion	Consistency	Weighting	Resources	Performance
Policy targets Policy strategy	Contradiction Mismatch Shared Understanding	Policy priority Procedures	Competence Expertise	Policy implementation Practical impact
- Instrument - Organisational structure - Motivation - Leadership			- Internal - External - Funding - Other resources	

opportunities and barriers for policy integration, which we want to further identify through close analysis of our two case studies.

4.1. Inclusion

In both cities we found that the inclusion of energy ambitions and targets in non-energy related policies is strongly dependent on national incentives; i.e., there are limited local attempts at creating cross-departmental and integrated policies. This finding, first of all, relates to the strong dependence on national policy incentives in Chinese local governance. Following the choice to make energy transition national priority, national ministries and agencies have been pushed to integrate energy goals into their own policies. That is, the state uses existing departmental policies to issue energy targets that local governments have to work with, e.g., targets for electric vehicles (transportation), energy efficiency in houses (housing), or energy efficiency in industries (industry). Policy integration within this approach, however, depends on implementation through sectoral policies to be implemented locally by distinct departments. While this might also be considered an impetus for a more integrated approach locally, our results show a different picture.

Most respondents from the different municipal departments do confirm that higher level governmental mandates and political pressure are fostering the inclusion of low-carbon and energy-related targets into their departmental policies and strategies. For example, in Chengdu we found that the local transport department has issued policies supporting the use of new energy vehicles, and has regulations promoting the operation and management of the timeshare rental industry on new energy vehicles (Chengdu General Office, 2017). Nevertheless, implementation remains based on work done within distinct departments, a situation also encountered in Yangzhou; i.e., in the two cities there is little cooperation across departments. When energy concerns are integrated in other policy sectors or the work of associated governmental departments, it is typically not due to collaboration across departments locally, but rather as a result of national targets. An example is given in the Yangzhou housing bureau (department), which aims for all new buildings to realise 50% less energy consumption than the average in existing buildings. In addition, solar thermal must be installed in +50% of new buildings (HCDJS, 2018). “These aims are also the mandatory targets directly allocated by our higher level governments. Nevertheless, our work is to try the best to complete these tasks, but how to link them with other departmental policies is not our main business” (YZ05, 2018). Therefore, in neither of the two cities were the national programmes regarded as the joint responsibility of all relevant departments; they were instead framed as isolated or stand-alone projects solely the responsibility of the municipal DRC (Development and Reform Commission) (including the energy department) for spatial planning and implementation. Energy was for other municipal departments limited to the aforementioned national mandates for energy-issue inclusion. As respondents in Chengdu’s DRC stated, “Local climate policy integration is far from adequate, and when it comes to energy issues, other departments always narrowly think it is merely our department’s issue while not strongly relating to them. Dealing with energy issues actually needs a joint force from all relevant governmental departments” (CD01, 2018). At first glance, the situation was even worse in Yangzhou, where even other relevant sub-departments within the DRC also took an ‘indifferent’ attitude to the NEDC project implementation. Hence, the NEDC project was considered the responsibility and task of only the DRC’s energy sub-department by both other DRC sub-departments and other sectoral municipal departments. Nevertheless, this *de facto* resulted in the same result as in Chengdu: no feelings of collective ownership or responsibility for the project across the municipal organisation.

Along with the routine of merely following national sectoral incentives, we identified three more factors that help explain the modest local efforts at cross-departmental and integrated working. To begin

with, the governance structures (see Figs. 2 and 3) that Chengdu and Yangzhou adopted to implement their LCC and NEDC projects do not promote mutual ownership across the municipal departments needed to make the projects a success. After all, responsibility in Chengdu is allocated in only one department (DRC), and in Yangzhou even in a sub-department (the energy department within the DRC). Given that the municipal DRC has the same administrative rank as other departments (e.g., bureaus of transport, industry and housing), the DRC depends on the *willingness* of other departments to follow its suggestions and commit to the projects. They cannot compel them to pursue its visions and targets. To illustrate:

Implementing a new project requires creative ideas, efforts and exchanges from all related departments. The Municipal DRC is in charge of organising meetings across departments to discuss these ideas, dealing with their different interests and views, and even assigning the implementation tasks to them. Nevertheless, if the DRC takes these actions not in the name of the Municipal Government, but just by its own power alone, many other departments are actually less motivated to join any discussions or implement the project (CD08 2018).

Due to sharing an equal administrative rank, some departments in Yangzhou municipality have even considered contributions to the NEDC project as additional work to help the municipal DRC, and without having seen any clear benefits. Consequently, as a government official remarked: “It is then difficult for some departments to take the project implementation seriously” (YZ06, 2018).

Secondly, in both cities there was no general climate policy integration strategy. A structural communication strategy for climate policy integration to ensure a contribution from other relevant departments and stakeholders did not exist. Instead of following an inclusive and holistic process professed by local government and its experts as essential to the energy projects’ success, many local government departments and actors remained detached from policy making. Only in Chengdu was there even an attempt at developing something of a holistic approach. The initial measures and plans were drafted by the municipal DRC and an external consultancy firm. Meanwhile, the DRC asked for advice and feedback from other government departments on what kinds of measures and strategies could be taken and whether these measures aligned with their own departmental interests. The plan was then adjusted based on this departmental feedback. Nevertheless, communication was largely limited to bilateral communication between the DRC and the other individual departments only by phone or by email, with few group discussions or meetings across departments. We also found that local authorities have mostly overlooked or been oblivious to the benefits of pursuing integrated energy policies. A DRC officer explained: “Frequent group meetings can make things more complicated and might need a longer time to have a clear idea on what to do and how to do it. More importantly, we do need the leaders to see our efforts on the LCC project implementation in a short time, doing so [group meetings] would be more time-saving” (CD 02, 2018). Although a plan was deemed essential, a systematic, holistic and cross-departmental plan, based on mutual understanding of each other’s responsibilities and interests, was missing. No clear agreement could therefore be reached among the relevant departments on how energy concerns would be addressed. An officer from the industrial department complained, “We always suffer from not having enough time to seriously consider how we deal with governmental affairs in a coherent fashion, one after another, since we are forced to complete each task in a given timeframe. Nowadays, we rely too much on a high speed of completion, while the quality of what we complete should actually be the fundamental thing” (CD02, 2018).

Thirdly, in both cities complying with central government targets related to energy were already seen by most departments as their contribution to the project implementation, indicating that the project

itself did not produce much added value regarding these departments' contributions. The only exceptions were a few additional and tailor-made measures and strategies, especially for the LCC project in Chengdu. While pursuing the NEDC, a respondent in Yangzhou stated, "In following the central government's requirements, we already include energy targets into our departmental plans, for instance, the low-carbon economy development plan. This is also a part of the contributions for NEDC project implementation. Therefore, we really do not have to make a particular plan for the project. Besides, we have less willingness to always make plans for numerous energy-related projects which are just issued by different ministries actually with the similar goals" (YZ02, 2018). We also found that, in both cities, no real stimuli were in place to support their pursuit of climate policy integration.

On a positive note, we identified that climate policy integration at a local level can gain urgency when alongside the DRC-based governance structure; also top-down leadership exists. When senior officials are determined to work on energy issues, their political willingness can push for enhanced and multilateral communication and support collaboration among departments and result in better integrated and collectively supported plans. In the case of Chengdu's LCC project, support of the city mayor has raised awareness within various non-energy departments regarding low-carbon city development. Because of this increased attention for energy issues by political leaders, the municipal government organised two intensive conferences in 2017 with main senior governmental officers from all relevant departments and other stakeholders such as experts, local community members, and energy company leaders. The conferences explored both how different stakeholders can collaborate and also reflected on the problems and lessons of previous implementation efforts. Although limited added value was created in the LCC project, there was nevertheless modest development towards more integrated plans due to the active promotion of mutual commitment and multilateral communication in 2017. "These conferences have helped various departments better understand their respective tasks and responsibilities", as stated by a scholar in Chengdu (CD11, 2018). This also reflects the tendency in China to be sensitive to hierarchy and signals given by key political leaders: "As long as the senior leaders pay attention to certain issues, those issues can be better implemented with more motivation since as a lower-level government we have to conform to the mandates" (CD07, 2018).

4.2. Consistency, weighting and resources

4.2.1. Consistency

Without a sense of common ownership of the NEDC and LCC projects in both cities, there is also little common understanding of what is needed to pursue a local energy transition. Instead, focus is merely on national sectoral policies that might include energy targets, but not on energy transition as an issue in and of itself. In fact, we found little evidence in both cities that energy transition is even regarded as urgent outside of the local DRC (Chengdu) or even the DRCs energy sub-department (Yangzhou).

Inconsistencies stem from some contradictions between policy agendas. One crucial example is the ambiguity of land use regulations, where there can be totally different land use purposes stipulated by different policy documents for the same land block, as happened in Chengdu:

On the same land plot, the National Land Plan regards it as a farmland, and it would be defined as a woodland in the Forest Land Plan while we might consider it as urban construction land in Urban Planning. If there is a plan to develop renewable energy projects, the first but also very complicated thing is to change the land use, which would involve interest harmonisation among departments (CD09 2018).

A comparable issue occurred in Yangzhou, as explained by a

municipal officer:

When it comes to offshore wind power in our Jiangsu province, conflicts between plans can always happen, such as between the Energy Plan and the Ocean Plan, sometimes also with the National Defense Plan. That means the same land is allocated for port use in the Ocean Plan, whereas it is also planned for developing offshore wind farms in the Energy Plan. Some project constructions are already approved by the energy department, but if the oceanic department says no, the project fails to continue (YZ04, 2018).

Another example is the mismatch of policy ambitions on transportation and urban planning in Chengdu. The bureau of transportation aims to promote electric car sharing: "Until the end of 2020, the entire city is aimed to be covered by a wide range of new energy vehicles timeshare rental service network. Notably, the number of service networks is planned to reach 5,000 and public charging stations piles up to nearly 20,000" (Chengdu Transport Commission, 2017). This ambition, however, creates tensions with urban planning efforts to lower already crowded urban areas, add public space, expand parking areas and reconfiguring streets. Notably, a timesharing rental service network of electric vehicles conflicts with the policy *Administrative Regulations on the Appearance of the City and Environmental Sanitation of Chengdu Municipality* issued by the bureau of urban management and law enforcement, stating Chengdu aims at "prohibiting the occupation of urban streets and public space for carrying out business activities" (UMLE, 2012). Meanwhile, it also conflicts with the rule of 'making sure the priority of public space use' that is defined by planning department in Chengdu Urban and Rural Planning Ordinance (2017).

Without a shared sense of urgency, ownership and even understanding of the issue of energy transition, it is not surprising that energy remains a priority only in the local DRC (Chengdu)s or energy sub-department (Yangzhou). Significantly, we also found that existing plans and strategic documents do not help to promote such a shared understanding or ownership. Quite to the contrary, they remain largely based on departmental priorities that are sometimes confusing and lack an integrated vision. Not surprisingly, the only mechanisms in place to promote an integrated approach come from the municipal DRCs in both cities. Mostly they use interactive meetings among departments so as to create more understanding, awareness and remove contradictions. Nevertheless, it is a fairly weak tool that does not change how most other departments continue to see the NEDC or LCC as a standalone project, and energy transition as not their responsibility. Most of all, despite the best intentions, meetings and interactive sessions are hardly enough to push departments to alter their plans, priorities or even habits. As a district government official in Chengdu stated, "At present, policy suggestions for LCC projects in made by people in communicative meetings are still very much focused on their own departmental interests and visions. For the project as a whole, an integrated understanding and discussion across departments is not yet there" (CD06, 2018).

4.2.2. Weighting

Energy ambitions still have difficulty competing with other key policy priorities in both Chengdu and Yangzhou. This largely applies to the sometimes conflictive balance between promoting GDP growth as well as energy transition. To illustrate, Chengdu's 13th Five-Year-Plan on economic and social development still emphasises local GDP growth as the overriding policy goal (Chengdu FYP, 2016). Not only does this goal give the green light for expanding fossil intensive industries and mobility, but it also implies that energy efficiency measures, such as refurbishing factories, are not popular as they are seen as barriers to rapid GDP growth. The promotion of renewable energy projects might contribute to reaching GDP goals, but they are not yet considered fully compatible with them:

Implementing renewable energy projects sometimes has been a conflicting interest with GDP growth. For example, the profit of

running a thermal power plant is much higher than a solar panel project, since the tax of solar panel companies can be exempted as specified in the policy. Once such conflict happens, there will be a reluctance among departments to promote the energy projects (CD03, 2018).

In Yangzhou a more subtle tension between GDP growth and energy transition was identified. As an officer stated, “Renewable energy projects (e.g., photovoltaic projects) normally need a large area of land, which other departments would also like to use for more GDP growth-driven industries, for example, real estate development from the planning department” (YZ02, 2018).

With regard to balancing energy ambitions with other key societal interests, it is more onerous to identify priorities. This is true not only for us as researchers, but also within local governments. We observed increases in conflicts between energy and other interests that are currently difficult to manage. To illustrate, in Yangzhou expanding the photovoltaic industry can result in housing demolition, which “leads to problems such as reluctance of resettlement or compensation allocation” (YZ05, 2018). Also, wind turbines can produce noise pollution and, although there is no pollution at all for solar power generation itself, the process of producing silicon panels has a heavy pollution load. Currently, as was illustrated by one of our interviewees, there are limited conflict resolution strategies: “If there is no effective communication mechanism to get consensus on energy issues, such conflicts between governmental departments can always stall the process of project implementation” (YZ03, 2018). In the meantime, neither Chengdu nor Yangzhou has formal procedures or mechanisms in place for resolving conflicts between departmental interests or for determining relative priorities. Rather, both rely on either informal discussions (e.g., private meetings) or power relations (i.e. resort to a higher authority). As an officer in Chengdu planning department stated, “If there are conflicting departmental interests that cannot be solved by departments themselves, then we often report the issue to the executive committee of LCC project. The final decision will be made by vice mayors or the mayor” (CD06, 2018).

On a positive note, our respondents in both cities nevertheless acknowledge an increase in the importance of energy ambitions and low carbon development in recent years. Although Chengdu and Yangzhou continue to prioritise other economic or political objectives, nowadays energy issues are clearly seen as valuable. In Chengdu, “even district and county-level governments often come to us, trying to get professional advice on how to deal with the energy transition, and nothing like this ever happened two or three years ago” (CD02, 2018). Respondents in Yangzhou referred to national policies urging for energy transition and indicated them as important signals that impact local political awareness and also activate other departments to think about energy as an issue. In both cities environmental concerns in China, notably serious air pollution caused by dependence on coal, were also identified as triggers for increased awareness. Finally, as noted in Yangzhou, renewable energy is becoming economically viable with future prospects also beginning to propel energy up the policy agenda for Chinese local governments (YZ08, 2018). Nevertheless, in both cities energy transition remains a relatively marginal activity in local policy making.

4.2.3. Resources

A lack of competent staff and expertise was identified in both cities as a key challenge. Notably, as a respondent in Yangzhou articulated, “The energy transition is something new, especially for us working in lower-level district or county government, thus we often have difficulties during the process of policy making and implementation” (YZ03, 2018). As result, few people have sufficient knowledge and expertise, and when they do, it is in the realm of practical and technical issues. What was especially lacking in both cities were skills and expertise for cross-departmental and interdisciplinary communication. “Most experts we can find right now for energy transition are more skilled in dealing with

technical problems, such as solar cells or solar heaters. However, expertise on the institutional and governance level is far from adequate” (CD01, 2018).

In the meantime, despite the energy issues climbing up the political agenda, all respondents in both case study cities mentioned the ongoing limited support in terms of resources or expertise from national and local government. In fact, all respondents described limitations or even the complete absence of financial support for advocating energy transition policies as a crucial barrier. For Chengdu this meant that LCC project implementation was under pressure, even within the DRC that saw it as its responsibility; while in Yangzhou's case the lack of funds undermined cross-departmental working and integrated policy delivery even within the DRC. Faced with financial constraints, most municipal departments are not willing to move beyond their own energy-related targets. Furthermore, both cities noted difficulties acquiring new knowledge and expertise on pursuing an energy transition, i.e., there was little scope for training or hiring external expertise:

Even if experience exchange meetings for LCC project implementation are sometimes held by the national government, the focus of such a meeting is more on what policy measures and actions have been taken, but not really on how to pursue a holistic and integrated approach in dealing with energy transition (CD04, 2018).

Especially problematic were how to translate energy ambitions into existing departmental plans, instruments and practical policy measures (both cities), create new cross-departmental networks or institutions (both cities), acquire new technological skills (both cities), and develop new governance structures (both cities). The result is that integrated working becomes nearly impossible, as was well-illustrated by a scholar in Yangzhou: “It is hard to come up with a holistic and integrated view to implement the project as long as they (governmental officials) don't have adequate opportunities for learning and getting mutual support between departments” (YZ09, 2018).

4.3. Performance

In both cities respondents from all government departments expressed their own achievements with a tremendous sense of satisfaction in implementing energy policies or measures. These achievements have clearly also contributed to the pursuit of low carbon practices and energy transition (e.g., in housing, transportation, economy, and industry, see Table 3). Nevertheless, all respondents admitted that the achievements were primarily the result of conforming to central government requirements, where energy targets had been incorporated into departmental policies rather than direct contributions to the LCC or NEDC projects. Although these policy achievements are also listed as contributions to these projects, there is little local department motivation to pursue additional energy ambitions. Local authorities also reported caring more about the implementation of tasks required by higher-level government than promoting local energy projects per se. Since there are no evaluation and monitoring mechanisms developed by the central government for LCC and NEDC, the cities can simply report implementation outcomes to the central government by collecting each departmental achievement related to energy. It therefore seems that the energy projects LCC and NEDC largely exist in name only.

Evaluations by local governments do exist, but they are typically conducted within departments, not by the city as a whole. To illustrate:

At the municipality, we do not hear about an evaluation system, especially for the NEDC project. But we do annually self-evaluate our work, for example implementing policies for saving energy in buildings. However, sometimes we do not exactly know what the problem is with the implementation or how to better improve our work. After all, there is no objective third party getting involved (YZ01, 2018).

Table 3
Main achievements of implementing energy targets in two case study cities.

Bureaus (departments)	Chengdu	Yangzhou
Housing	- Prefabricated construction techniques have been improved and Chengdu got approval from central government to be among the first batch of demonstration cities for refabricated buildings in November 2017; - Until 2017 the construction area of green buildings was designated up to 12.57 million m²	- In 2017 newly-built energy-saving building areas comprised up to 8000 m², saving CO₂ emissions up to 90,000 tons; - Yangzhou has been approved by the State Council as the 'demonstration city of renewable energy application in building'; - Introduced renewables technologies into Yangzhou's ancient city's renovation work, e.g., solar panels, ground source heat pump(s)
Transportation	- Developed new-energy timeshare rental system and put 3600 new-energy cars into use in 2017; - Introduced a total of 849 new-energy buses for use starting in 2017	- In 2017 more than 900 charging stations were installed for electricity vehicle use; - Over 1000 pure electric and hybrid electric public buses were in use as of 2017
Industry	- Closed down 100 plants with obsolete production capacity in 2017; - Three waste burning power plants were built and made operational	- Grid-connected electricity generation from distributed photovoltaic projects has reached 167 MWh, making the city a front-runner in Jiangsu province; - A wind power project with 50 MW installed capacity is up and running

Source: Interviews 2018.

As such, there is no facilitation of learning-by-doing and capacity building between governmental departments and no open and objective evaluation and feedback mechanism. Energy transition in both cities is little more than implementing national targets by sectors (or departments) and a well meant but ineffective effort by the DRC to promote a local integrated effort. A shared view on a citywide energy transition is missing. To summarize succinctly in the words of a respondent:

Low carbon city development or energy transition has an integrated nature, which involves multiple aspects. We are now impatient for the success of developing low-carbon city and only simply consider and implement it from our own departmental perspectives. Instead, a deeper and overall consideration of what kind of city can be known as low-carbon, and how to systematically make the city use less energy is not there yet (CD02, 2018).

5. Discussion and conclusion

Energy transition is certainly gaining importance throughout China. However, our two city cases both clearly demonstrate that policy integration at the local level is not self-evident. Interestingly, although the LCC and NEDC projects have different organisational set-ups and goals, there was little indication that such differences impact our findings. Our findings do indicate that in Chengdu problems to convince and engage other organisational were mostly an issue between the DRC and other departments, while in Yangzhou this was also already an issue within the DRC. This did not, however, result in much differences in the process of policy integration, the issues encountered or the outcomes. Hence, even though the LCC project has a broader policy goal (i.e. low carbon and sustainability) that is supposed to be supported by various policy

sectors and departments; it turns out that all other relevant departments in both cities (e.g., transportation, industry, housing) still simply consider both cases as stand-alone projects solely the responsibility of the municipal DRC. The result is that, although Yangzhou even lacks a degree of ownership even within the DRC, pursuing shared visions, cooperation and integrated policy development is similarly absolute in Chengdu as in Yangzhou.

A central explanatory factor for both cases is the lack of a shared vision and approach to energy transition across various municipal departments. For one, non-energy departments foremost comply with central government targets related to energy through implementing sectoral policies. Even the LCC and NEDC projects are not considered as overarching responsibilities. This also follows from the organisation in both cities, where the local DRC, and in Yangzhou, even the energy department within the DRC are responsible. Other departments can hardly be incentivised, as there are no existing supportive policies or (financial) stimuli to convince them to join forces with the DRC. Instead, both Yangzhou and Chengdu depend on voluntarism and the convincing power of the DRC or mayor-level officials when pursuing integrated working. An institutional culture of cooperation, however, is lacking, while experience in cross-departmental cooperation or working in interdisciplinary project groups are also non-existent. Investing time and resources and creating more local leadership to encourage a shared sense of ownership will be crucial to ensure true interaction, discussion and eventually policy integration on energy transition. As local priority is given to energy policies and awareness of a need for more integrated working is rising, there seems to be increased acceptance that such additional investments are needed. Momentum to push energy transition forward in both Chengdu and Yangzhou is apparent, but clearly, this momentum has not yet resulted in real integrated policy efforts.

Another important finding is that national policies play a key role in both promoting and frustrating climate policy integration in our two city cases. Starting with its contribution, it is evident that national efforts to integrate energy ambitions in the various departments can help, as administrative orders and rules via a top-down organisational structure can directly facilitate the integration of policies and activities at local level too (Acheampong & Ibrahim, 2016; Bogdanor, 2005). Alternatively, these national incentives do reinforce existing departmental tendencies to focus on their own departmental policy agendas and can even create barriers in advocating for cross-departmental working. Hence, our findings suggest it is worthwhile to further investigate the potential role of national policies on climate policy integration in a local context. In particular, how national policies can help the shift from a mono-sectoral policy implementation to more integrated/area-based working on energy transition. On the one hand, the central government can support local authorities by removing potential barriers such as fragmented and conflicting departmental requirements (e.g., Wu et al., 2018; Zuidema, 2017). Regarding energy transition, Dawley (2014) points out that central governments can also provide leadership and political power to 'make things happen', where various sector and departments require this 'core' to coordinate actions and form integrated energy policies at the regional and local level. On the other hand, combining national support for more integrated urban policies with (financial) resources and facilities might be worthwhile to consider. This is because equipping local authorities with adequate resources and expertise on integrated/area-based energy policies seems to be a necessary condition for improving climate policy integration at local level. This aligns with Markantoni (2016) who argues the important role of top-down funding initiatives and advice from experts in facilitating energy governance and creating the paths to a low carbon future.

While national policies are worthwhile to consider in promoting climate policy integration, we also need to be prudent in our expectations. The main problems identified in both cities relate to the local organisation of responsibilities, degrees of shared ownership, existing departmental routines and cultures, and lack of structures and processes to promote cross-departmental communication and working. That is, it

is mostly a local problem. We identified a few hints that might be fruitful for further research. Local political leadership can be instrumental in creating local integrative efforts. We saw how Chengdu's local leadership has already set the stage for a more holistic and coherent approach in their discussions of energy transition policy; i.e. while not yet visible in actual actions, these discussion might well become vehicles for pushing for more coherent policies. Hence, rather than only working through issuing energy targets through policy sectors, local political leadership can create pressure to advance climate policy integration based on integrated urban visions. Notably, there seems to be a need for creating collective ownership and a true network of collaboration to develop policies and projects that range across departmental boundaries. Essentially, there is a need for various departments to not only acknowledge a responsibility for advancing an energy transition in their cities, but also to provide leadership that goes beyond individual departments. Hence, our cases suggest that if climate policy integration at the local level is to advance, we should explicitly study the kind of top-down incentives and support that can be provided by the state in interaction with both local leadership and the limitations of capacities cities face. Ideally then, local political leadership would be combined with support and incentives from the national government to both enable and motivate local integrated and area-based working.

Our results can contribute to research and debates on how and why integrated, area-based and holistic policy strategies are explicitly needed for energy transition. A few years ago, [Coenen et al. \(2012\)](#) identified that transition analyses have neglected the spatial dimension (i.e., where transition takes place) as well as the socio-spatial relations and dynamics within which transitions evolve. While the spatial dimension has gradually gained increased attention ([Kempenaar et al., 2020](#)), our study suggests that the institutional ramifications in the form or area-based and integrated approaches similarly need increased attention. Such attention has remained modest overall, but specifically when it comes to China, despite the importance of understanding how energy transition in urban China might be advanced. This study explicitly adds to such understanding, by identifying policy integration challenges with regards to energy and urban planning in a Chinese context.

Appendix A

Table A.1

List of interviewees.

City	Type of interviewees	Organisational affiliation	Date
Chengdu (n = 11)	Governmental officers (n = 8)	Development and Reform Committee	18-06-2018
		Resources Conservation (within Development and Reform Committee)	18-06-2018
		Environmental Protection Bureau	19-06-2018
		Commission of Economy and Informatisation (n = 2)	20-06-2018
		Planning Department (with Bureau of Natural Resources and Planning)	25-06-2018
		Commission of Housing and Urban-Rural Development	27-06-2018
		Traffic and Transport Committee	27-06-2018
	Scholars (n = 3)	Sichuan Academy of Social Sciences	28-06-2018
		Faculty of Architecture and Environment, Sichuan University	29-06-2018
		Energy Strategy and Low-carbon Development Institute	02-07-2018
		Energy Strategy and Low-carbon Development Institute	02-07-2018
Yangzhou (n = 9)	Governmental officers (n = 7)	Energy Department (within Development and Reform Committee), n = 2	09-07-2018
		Energy Saving Office (within Commission of Economy and Informatisation), n = 2	10-07-2018
		Traffic and Transport Committee	13-07-2018
		Commission of Housing and Urban-Rural Development	16-07-2018
		Planning Department (with Bureau of Natural Resources and Planning)	20-07-2018
	Scholars (n = 2)	Yangzhou University	16-07-2018
		Yangzhou University	16-07-2018

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Secondly, we have taken the academic debate on climate policy integration (including policy integration) into a Chinese context. We confirmed that pursuing integrated policy is constrained by the current Chinese top-down oriented political system. What is more relevant is our call for considering more localized, area-based practices in pursuing integrated approaches to energy transition within an institutional environment not attuned or accustomed to such practices. Hence, our call is to further study how – in our case Chinese – cities might further experiment, develop and practice such approaches. The framework for analysing climate policy integration as discussed in our study is a good start, but does urge for further development. Notably, next to mere analytical approaches there is also a need for more prescriptive guidance, where theoretical developments fueled by empirical work can also help cities in accelerating the development or integrated energy planning approaches. In this, as we signal, the role of top-down policies as both barriers and incentives for such area-based working clearly need explicit attention, which would also suggest additional research into this relationship is sensible when trying to push forward local energy planning.

Our findings displayed the institutional barriers and also opportunities when Chinese planning traditions and efforts to introduce climate policy integration in energy transition practice. These insights can be helpful to many other institutional contexts which are also more centralised-based in addressing energy issues (also other cross-cutting issues), in terms of fostering planners and policymakers to widen their knowledge and vision on promoting approaches towards achieving climate policy integration.

CRedit authorship contribution statement

Jing Wu: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft. **Christian Zuidema:** Conceptualization, Writing – review & editing. **Gert de Roo:** Conceptualization.

Declaration of competing interest

None.

improve policy-making and implementation? *Journal of Sustainable Tourism*, 23(7), 977–989.

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