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Research note

Intentional Ambiguity in Chinese Policymaking: The Case of the Smart Grid Industry

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Summary:
'Intentional ambiguity' is a concept that most commonly appears either in the realm of diplomacy (Benson and Niou 2001) or in military jargon to describe a situation where two factions circumvent confrontation by using imprecisions to discuss a sensitive topic upon which each side possesses contrasting ideas (Johnson 2017). While much criticism is directed at China using the strategy in its dealings with foreign nations, little attention has been paid to analysing how that country's government uses purposefully ill-defined policies to stimulate economic and technological development at home (Ahrens 2013). This article seeks to remedy this analytical deficiency by outlining in detail the theory of 'strategic ambiguity', and extending deliberations thereon to the case of the Chinese 'smart grid'. The study will reveal how vague understanding of smart grids in the literature and in industry, coupled with intentionally hazy policy prescriptions from central government institutions, while stimulating technological innovation and local policy experimentation are also misleading investors in the electricity market and creating favourable conditions for large state-owned enterprises at the expense of their privately-owned small and medium-sized counterparts.*

Keywords: smart grid, policymaking, intentional ambiguity, China, political steering

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Introduction

'Intentional ambiguity' is a concept that most commonly appears either in the realm of diplomacy (Benson and Niou 2001) or in military jargon to describe a situation where two factions circumvent confrontation by using imprecisions to discuss a sensitive topic upon which each side possesses contrasting ideas (Johnson 2017). While much critical debate has been directed at China's use of the strategy in its dealings with foreign nations, little attention has so far been paid to analysing how that country's government uses purposefully indefinite policies to stimulate economic and technological development at home (Ahrens 2013). This article seeks to remedy this analytical deficiency by outlining the theory of 'strategic ambiguity', and then extending deliberations to policymaking in China – as exemplified by the case of 'smart grid' legislation.

The study will show how vague understanding of smart grids in the literature and in industry, coupled with intentionally hazy policy prescriptions from central government institutions, contribute to the development of smart grids. However, while the strategic use of intentional ambiguity stimulates technological innovation and local policy experimentation, it also misleads investors in the electricity market and creates favourable conditions for large state-owned enterprises (SOEs) at the expense of privately-owned small and medium-sized enterprises (SMEs). The paper is part of a larger research initiative on policy design and implementation in China's energy transition.

The insights presented here are based on a series of qualitative interviews with industry experts, politicians, academics and grid operators conducted during the summer of 2018 in Beijing, Tianjin, Suzhou and Nanjing. The paper discusses what benefits and drawbacks vagueness in objectives, authority and means have had for stakeholders in the Chinese smart grid. While further research is necessary, we argue that intentional ambiguity has been and still is a strategic feature of Chinese policymaking. By acknowledging the calculated use of intentional ambiguity, it is possible to analytically bridge the gap often perceived between the visible authoritarian state and the overwhelming amount of policy documents on the one hand and the pragmatism of policymaking frequently observed at the local level on the other. While we argue that intentional ambiguity is a long-term feature of Chinese policymaking, we contend that under the Xi Jinping administration changes in the strategy's use seem to work to the disadvantage of the private sector – at least with regards to smart grid development.

Intentional ambiguity as a concept in policymaking

Intentional ambiguity is rooted in communication and organisation theories, first propagated during the 1980s – when horizontally coordinated businesses equipped with modern digital communication technologies (Eisenberg 1984) sparked a wave of research into new forms of message transmission somewhere in-between the two

extremes of top-down monologic control methods and context-sensitive dialogic empowerment communication models (Goodall et al. 2006). In the classical one-way model of communication (Shannon and Weaver 1964), messages containing meaning are actively passed from sender to receiver through a channel of communication. According to this model, the receiver passively interprets the message's meaning. This was an initial assumption later rebuked by scholars, who argued instead that interpretation is active and heavily influenced by the receiver's personal surroundings, as well as by the relationship with and level of trust in the sender (Corman et al. 2006).

For this reason, one-way message transmission has proven ineffective as a mode of communication (Berlo 1960). Dialogic empowerment communication models on the other hand assume that sender and recipient engage in an honest, equal, open, symmetric and temporarily non-judgemental exchange (Dutta-Bergman 2006). This is an assumption that equally does not hold up on closer scrutiny (Eisenberg et al. 2009), for even the most tolerant interlocutors will be influenced by context and barriers to communication ('noise') (Goffman 1974).

Intentional ambiguity is an alternative method of communication that simultaneously gives receivers more leeway to interpret a message (Goodall et al. 2006) and senders greater flexibility to steer implementation, coordinate and galvanise actors (Madon et al. 2004), circumvent institutional voids (Ravishankar 2013) and deflect from taking responsibility for failure post hoc (Edwan 2009). In its extended form, the term goes beyond negative connotations criticising the sender for deploying deliberate obscurity in its dealings with actor groups. With intentional ambiguity, meaning is not controlled as in the one-way model; neither are context-specific influences ignored to the extent they are in dialogues however (Eisenberg et al. 2009).

Proponents see 'ambiguity' as a given factor in any institutional setting that requires flexible, decentralised and bottom-up approaches to communication in order to overcome local needs and restraints (Ravishankar 2013). Besides a barrier to communication, detractors ('top-downers') also see ambiguity as an uncontrollable danger (Paul and Strbiak 1997) and point to clearer, more precise strategic planning as a viable alternative to ensure implementation according to plan (Matland 1995). 'Bottom-uppers' on the other hand believe that if adopted, special attention should be paid to the degree of ambiguity and the subsequent implementation process – which may differ markedly from the sender's original intentions (Pearce and Pearce 2000).

When deviations occur, rather than repeating the original message the sender should seek new channels, tweak the content or engage more closely with their intended audiences in order to better understand the noise-hindering transmission. In this context it is especially important for the sender to grasp the local conditions that may be shaping the receiver's interpretation, and thus to create messages that resonate with audiences (Pearce 1989). Because of the message's ambiguity, as well as the

trust and engagement shown by the sender, receivers feel more willing and able to carry out prescriptions – even in systems characterised by hierarchical structures. The strategy can also be applied to managing target audiences' expectations, for instance when companies use 'plausible deniability' to eschew functionalities that consumers may have expected from a product's broadly stated service promises (Eisenberg 1984).

Applied to policymaking, intentional ambiguity refers to the idea that effectiveness may increase if policies leave room for manoeuvre. Instead of setting clear performance standards, formal evaluation methods and calibrated governance mechanisms (Ravishankar 2013), a vague and incomplete objective ('goal ambiguity') is set by one or more passive – and sometimes concealed – sender ('authority ambiguity'). The latter follows the subsequent unravelling of the communication's effects from a distance, allowing for local interpretation, experimentation and empowerment in implementation ('means ambiguity') (Jarzabkowski et al. 2010). Intentional ambiguity is especially useful in environments of high uncertainty, where the relationship between sender and receiver is either distant or affected by noise (Weick and Sutcliffe 2001).

Turning to China, previous research has documented how its political system and its relationship with other societal subsystems in many ways correspond with the above description of communication between an active sender and a more passive, but not entirely incapacitated, receiver. For example, in policy design the Chinese government invites a large number of academics, industry experts and local cadres to participate in forming ideas (Berger et al. 2013; Kennedy 2016). Once proposals are aggregated, a policy is passed down the hierarchical system to local actors for revision and implementation (Shambaugh 2009). Those at the local level charged with implementation are confronted with a host of challenges, including central supervision and conflicting expectations from multiple stakeholders (Ravishankar 2013).

To help ease this pressure, Chinese policies tend to express a general direction and vague objectives, but usually do not include specific prescriptions on how exactly goals are to be attained (Ahrens 2013). Heilmann (2016, 2018) argues that over the course of Chinese history, the leeway given to local actors has shifted depending on the urgency vis-à-vis policy implementation, who is in power and the domain(s) being targeted. Whereas in times of crisis very little room for ambiguity is permitted, in periods of economic prosperity and social stability more decentralised forms of governance are applied – creating opportunities for policy experimentation. Ravishankar (2013) earlier suggested that besides policy experimentation, intentional ambiguity can also encourage innovation in urgently required technologies by creating practical abstractions and encouraging public–private collaborations – serving to maintain a broader scope to innovation-related undertakings.

While intentional ambiguity has implicitly and explicitly emerged as a concept used to explain Chinese policymaking, there is little empirical evidence of how this practice evolves in the context of central–local actor relations. The authors therefore took advantage of access to actors in the Chinese energy sector as part of a related research project to analyse how goal, authority and means ambiguity play out in practice in relation to smart grid policies.

Methodology

Policy design is a process shaped by humans. Different groups of stakeholders with potentially conflicting interests are involved in the design, revision and drafting of policies on the one hand, but also in the adoption, interpretation and implementation thereof on the other. Besides scrutinising the policy process, this study also focuses on how humans devise strategies to interact and communicate with one another; specifically, what methods senders deploy to transmit messages in a way that grants recipients freedom to receive and interpret meaning according to their own individual contextual surroundings. For this reason, we have adopted the theoretical/interpretative research methodology, as described by Creswell (2012), that focuses on human action and experiences (Bevir and Kedar 2008) – with the ultimate aim of understanding 'phenomena through accessing the meanings participants assign to them' (Orlikowski and Baroudi 1991: 5).

The basis of our analysis is 18 qualitative interviews conducted during 2018 in Beijing, Nanjing, Suzhou and Tianjin. Thankfully this research benefitted greatly from open and honest interview partners willing to permit more expansive insight into not only their own personal interpretation of meaning, but also their working environments – which strongly influence their understandings of policies in Chinese smart grid industries. During the two periods of field research, the authors were granted on-site access to one of the largest solar-panel manufacturers and smart grid innovators in China, as well as a tour of a pond-based solar park that was being connected to the grid on the very day of our visit. In addition, interviews with municipal planners and State Grid Corporation of China (SGCC) employees during a lengthy stay in the Sino-Singapore Tianjin Eco-City (SSTEC), as well as with leading academics from some of the most prestigious universities in the country, offered further insight into the political environment shaping Chinese smart grid development.

The interviews themselves were, where possible, conducted according to McCracken's (1988) prescriptions for the 'Long Interview', which allows researchers to 'step into the mind of another person, to see and experience the world as they do themselves' (McCracken 1988: 9). Semi-structured interviews deploying a guideline questionnaire were prepared in advance to make the most of the time granted by interviewees with tight schedules (Creswell 2012). The guideline not only offered the interviewers a certain amount of stability while conducting inquiries in a foreign tongue, but also ensured the conversation did not turn stale. In our

interviews, it was the respondents who dictated the flow of conversation. The researchers only interrupted when the discussion drifted too far off-topic, or when the danger of misinterpretation arose due to language barriers or noise. In these cases, probing and follow-up questions were used to ensure 'meaning' was captured as intended.

Ideally, video and audio recordings are the most effective means of grasping information that can later be transcribed and reviewed for maximum data accuracy (Creswell 2012). However, placing a recording device between the interviewer and interviewee would have created an artificial barrier to communication. For this reason, and because also the interview partners for this study would not have consented to recordings, the researchers took turns asking questions and writing down the answers delivered in shorthand. The interviewers took the time to exchange views and interpretations immediately after our conversations ended so as to further minimise misunderstandings and in order to maximise data accuracy. The notes were then transcribed to form a narrative that aided in the detailed analysis of the data. The transcriptions also allowed us to 'determine the categories, relationships, and assumptions that informs the respondent's view of the world in general and the topic in particular' (McCracken 1988: 42).

To structure the information, Mayring's (2000) qualitative content analysis was adopted in combination with McCracken's (1988) five stages of analysis. Such a combining of methodologies was beneficial because it allowed cross-referencing of the research's unique findings with external sources – a technique absent from McCracken's five stages. In the first stage, responses were analysed and commonalities grouped as to their meaning and substance. Statements that related to these categories were highlighted in the transcripts and summarised in an individual spreadsheet. As a second stage, these observations were further cross-referenced with external information gathered during desk research. The third stage then sought patterns and overarching themes, which helped connect observations across interviews. In the fourth stage, the most relevant topics were extracted for further analysis. Finally, the fifth stage integrated a reduced number of issues to create generic themes that applied to all interviews. These overarching topics are addressed in due course, in discussing the benefits and flaws of deploying intentional ambiguity for the purpose of fuelling innovation, policy experimentation and investment in the Chinese smart grid industry.

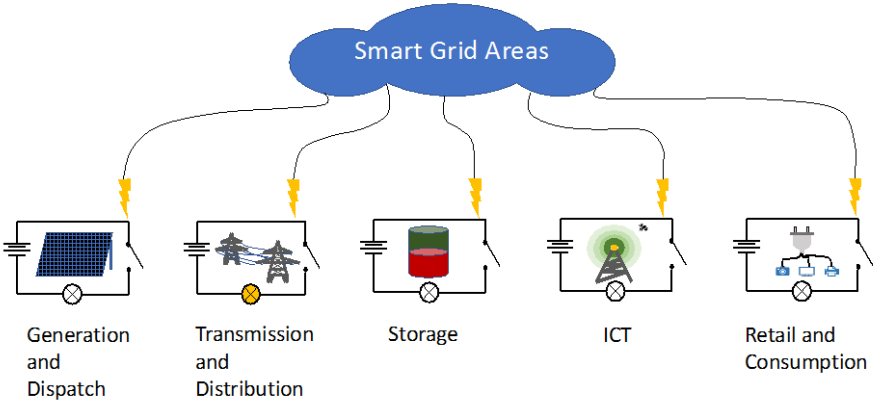
China's smart grid and challenges in policy design

Before turning to interviewee insights, a brief background description of challenges to Chinese policymaking in smart grid industries is in order to clarify what technologies and sectors are under discussion here. Faced with limited fossil fuel reserves, severe environmental deterioration and slow yet steady increases in demand for electricity from a progressively more prosperous population (Liu 2018), China's electricity systems stand at a crossroads in the search for safer, more reliable

and cleaner means of powering society (Liu 2015). The Chinese government thus encourages increased use of naturally abundant, low-carbon renewable energy sources such as wind, solar and hydropower for electricity generation – ones that are, however, located at great distances from load centres along the country's coastal areas (Zhang 2018). In addition to geographic challenges, any electricity generated needs to be consumed immediately due to renewables' intermittent nature. As storage technologies are currently unable to bank all the energy produced by such sources, generators rely on demand forecasts and optimal weather conditions to determine the amount and time when electricity is produced – as well as on electricity systems that sense and respond to load fluctuations without endangering the network's overall stability (Brunekreeft et al. 2015).

In China and elsewhere, smart grids have been identified as the next stage in the electricity system's evolution towards tackling intermittency in generation, raising efficiency, flexibility, reliability and sustainability in both transmission and distribution (Brinker, 2015), reducing costs in grid expansion and consumption (Zymla, 2015), as well as towards managing demand for electricity without affecting energy security or harming the environment (Brunekreeft et al. 2015). Based on this definition, the smart grid does not refer to a single technology but rather to a series of ones employed in the areas of electricity generation, transmission and distribution, storage, information and communications technology (ICT), and consumption (see Figure 1 below). In generation and storage, the system of smart grids includes all forms of renewable energy generation, technological aids to dispatch decision-making and modern storage technologies, as well as their seamless integration with existing grid infrastructure (IEC 2013). To transmit and distribute electricity, smart grids provide operators with holistic software and grid-management systems that detect faults and automatically re-route electricity to minimise black- and brownouts (Liu 2015). Smart grids collect information on the actions of individual actors in the electricity system and automatically distribute data in real-time to where it is required with the help of sophisticated ICT systems (IEC 2013). On the demand side, these grids integrate a multitude of smart home appliances that allow citizens to better manage their consumption patterns – thereby decreasing overall electricity demand in society.

Figure 1. Smart Grid Areas



Source: Authors' own design, based on Liu (2015).

The smart grid revolution is therefore a gigantic undertaking that involves mobilising a large number of actors to modernise, automatise and digitise every stage of the electricity supply chain (IEC 2013). Because of the breadth in technologies, a fair degree of administrative overlap will necessarily occur – as ministries, grid operators and private actors all vie for authority to shape the future electricity grid and its connecting markets. Arguably, any government seeking to push groundbreaking innovation and steer development in smart grid technologies will face major challenges in providing a policy framework that facilitates stable grid operation while at the same time reigning in actor expectations and coordinating related measures (Liu 2018).

But in China, much confusion exists as to what developing smart grids actually means and who is in charge of spearheading the necessary innovations required to bring about a 'smart grid' revolution (Brunekreeft et al. 2015). So far, the Chinese government has laid down its expectations and objectives in a rather vague manner as part of its 12th (2011–2015) and 13th (2016–2020) Five-Year Plans (Liu 2015); beyond 2015, the government has relied strongly on policy recommendations from the respective smart grid road maps of the country's two monopoly grid operators: SGCC and China Southern Grid. However rather than interpreting this surprising laxity in central policy prescription as a sign of trust in market actors' expertise or a realisation of the government's own dilettante position in relation to grid operators, such ambiguity should be seen as an intentional ploy to stimulate innovation, investment and policy experimentation in smart grid technologies.

Intentional ambiguity and China's smart grid policies: Findings and discussion

China's smart grid development has so far certainly been marked by intentional ambiguity, both in terms of concept and strategy. First, what set of technologies even form part of the smart grid is kept exceptionally vague to include any in the realms of renewable energy generation, transmission and distribution, storage and smart home appliances (Liu 2015). Determining stimulating policies for such a hazy concept necessarily demands strategic ambiguity, because governments can hardly legislate on a notion even industry experts struggle to define (Matland 1995). On the other hand, by leaving the definition as open as possible, more types of innovation fall under the category 'smart grid' – thereby elevating China's standing as a pioneer in the field.

Second, China's strategy towards developing smart grids is significantly influenced by all three types of strategic ambiguity outlined. In terms of objectives, the Chinese government – rather than contributing its own framework – relies on the SGCC's 'Planning Outline of Robust Smart Grid Development' that in itself sets very vague goals for smart grid development (Brunekreeft et al. 2015). With regards to authority meanwhile, the Chinese energy market – though extremely centralised in terms of market operation – remains fragmented in terms of policy influence, with multiple government agencies vying to set future trajectories (Liu 2018). Finally, as power over the Chinese grid is concentrated in the hands of two large state-owned operators, between them they also control the speed, direction and means of smart grid innovation at the local level (Liu 2015).

Having transcribed and dissected the interviews and grouped together the commonalities across them, 'innovation', 'political experimentation' and 'investment' were identified as the three areas forming the main points of contention. The following section expounds on how intentional ambiguity affects different actors in all three of these areas critical to China's smart grid development.

Intentional ambiguity and innovation in smart grid technologies

The experts interviewed agreed that by leaving the scope of technologies that constitute a smart grid undefined in policy prescriptions, central planners offer local players greater incentives to engage in research and development (R&D) along the entire electricity supply chain – all under the remit of enhancing China's smart grid capabilities (Interviews 1, 6 and 7). Interviewees from China's largest grid operator, SGCC, for instance emphasised that their company's smart grid initiative primarily focuses on improving the flexibility and responsiveness of transmission and distribution lines, as well as enabling greater connection possibilities for renewables and electric-vehicle charging stations (Interview 1).

Another SGCC employee said smart grids were especially useful for maintenance purposes, as they accelerate the detection and repair of faults along power lines

(Interview 4). For a private energy management chief executive officer meanwhile, the smart grid extends beyond the realms of hardware to include also software that collects information on multiple customers' energy usage and monitors conditions along power lines (Interview 14). Interestingly, and in contrast to the widespread understanding of smart grids in the literature (Momoh 2012; Brunekreeft et al. 2015; Liu 2015), solar generators did not feel their panels constitute part of the smart grid; rather, that the smart grid only starts at the point of connection with the grid (Interview 17). An academic at the National Development and Reform Commission's (NDRC) Energy Research Institute on the other hand felt smart grids are synonymous with smart meters, which have reached almost universal penetration across China (Interview 6).

The insecurity over what technologies exactly constitute the smart grid stimulates debate among industry participants, but also compounds confusion over the ultimate objective or direction of innovation as encouraged by related policies (Interview 18). Purposeful goal ambiguity is especially important for China's smart grid ambitions, since it keeps all possible pathways for future development open – which in turn creates a window of opportunity for innovators involved in the country's burgeoning electricity market (Interview 14). Goal ambiguity on the part of local governments seeking to expand their smart grid initiatives is especially beneficial for private actors, since they can seek partnership agreements without being bound to concrete objectives (Interview 14). In addition, because the smart grid is a futuristic idea – one which even industry experts have a hard time defining in concrete terms – then goal ambiguity also serves as a protective shield that allows new market entrants sufficient time to develop the capabilities and understanding required to be successful (Interview 17). For although a large number of interviewees lamented SGCC having a monopoly position that allows the company to steer smart grid development according to its own aspirations, they also highlighted areas where private companies do enjoy lucrative opportunities (Interviews 13, 14, 15 and 17). To be successful, however, innovation is key, both in terms of technologies and business models (Interview 14).

Regarding regulatory constraints, institutional voids still exist in smart grid areas that allow entrepreneurs to gain an initial foothold in a newly developing market – such as in generation (distributed generation for example), distribution (microgrids), retail or in consumption through smart appliances (Interview 11). In these areas – being ones in which authorities have sometimes purposefully refrained from setting regulatory guidelines, that with the aim of stimulating local experimentation – smaller private players still have the means to develop successful business strategies that best suit local contingencies (Interview 11). Without centralised command-and-control mechanisms, more decentralised decision-making can occur – which several interviewees saw as the most conducive way to further innovation in China's smart grid apparatus (Interviews 13 and 17). Examples where such innovation has thrived due to currently lax regulative guidelines range from hotels running their own virtual

power plants to battery manufacturers engaged in R&D to improve energy-storage capacities (Interview 18).

However the crux of the problem in deploying goal, authority or means ambiguity to stimulate innovation lies in how to evaluate successful outcomes. At present, no government-set Key Performance Indicators or timelines exist that can serve as demarcation points to measure progress (Interview 17). As such, success or failure in Chinese smart grid development is impossible to accurately assess. Phrased slightly differently by one of the interviewees, this also means that without clear and definitive evaluation criteria, smart grid development in China will always be successful – as ambiguous objectives can be interpreted in such a way as to suit the requirements of the interpreter every time (Interview 17). The laxity in interpretation concerning the exact functions a smart grid should fulfil can also be extended to service provision, to form a protective shield that Eisenberg (1984) termed, as noted earlier, plausible deniability.

During a memorable conversation over dinner with an SGCC employee and a personal acquaintance living in the SSTEC, the two started a heated debate over a recent blackout in the eco-city. The SGCC employee – despite minutes earlier having suggested the opposite – strategically (though probably unwittingly) deployed intentional ambiguity to deny that the smart grid promised a complete elimination of such inconveniences, claiming now it would only minimise periods without electricity (Interview 4). The ability to deny and circumvent certain expectations through the use of hazy interpretations concerning functionality certainly seems to be an important (though potentially annoying) feature of intentional ambiguity in smart grid innovation. The analogy however also shows that the evaluation of success and failure of smart grid operation is extremely difficult, not only for government officials but also for consumers – whose expectations may exceed functional realities.

Intentional ambiguity and policy experimentation in the smart grid industry

The Chinese political system, though extremely hierarchical, does grant local agencies a certain degree of freedom to experiment with their own policies as well as adapt centrally mandated ones to local conditions. For the smart grid industry, intentional ambiguity being deliberately deployed in policy design to stimulate policy experimentation was highlighted on several occasions during the interviews. SGCC employees involved in the smart grid pilot project in the SSTEC, for instance, provided a detailed account of how intentional ambiguity allows the company to steer policy design first at the local and ultimately at the national level (Interviews 1, 2, 3 and 4). Policies for the smart grid industry at the local level are numerous but also imprecise according to these interview partners. They explicitly dictate what cannot be done, while leaving ample room for interpretation and experimentation over how to achieve certain objectives (means ambiguity) (Interview 1).

By providing only a rough framework, the central government encourages local governments as well as SOEs involved in smart grid technologies to formulate their own solutions to local problems (Interviews 1 and 2). For example, as an SOE the SSTEC's local SGCC branch can influence the design of policies by collaborating closely with the municipal government in finding solutions to local problems and by passing suggestions up through the company's chain of command (Interviews 2 and 4). SGCC's headquarters in Beijing then collaborate with government ministries on the designing of polices that affect their business operations (Interview 4). Once more precise policies have been crafted at the centre, SGCC and their local branches then become executing agencies – ones who no longer question policy prescriptions from above, but who nevertheless operate flexibly within the framework provided (Interviews 1, 2, 3 and 4). Two interviewees found memorable anecdotes to explain their implementing function, stating that in terms of policy 'Beijing is the brain, we are the arms and legs' (Interview 1) and 'you give me water, I'll drink it' (Interview 2) respectively. Private actors are largely excluded even from participating in the local policy-design process, and can for the most part only respond to implemented policies ex post (Interview 13).

Although policy documents grant local actors a certain degree of flexibility in interpretation and adaptation, when substantial changes are required they must always be reported to the next-highest-up government level (Interviews 2, 4 and 14). As such, intentional ambiguity in the Chinese system always functions under the shadow of hierarchy (Schuppert 1990). But because of policy documents' often vague specifications and the resulting political room for manoeuvre, local actors are often unsure whether a policy change can be directly implemented or whether a certain issue requires confirmation from above before action can be taken (Interview 2).

This issue has been exacerbated since Xi's strict anti-corruption campaign, as local officials rather err on the side of caution than risk jeopardising their careers by making high-risk but potentially correct decisions (Interview 14). As a result, the lengthy and bureaucratic process of reporting suggestions up through the hierarchy has intensified – an issue lamented on several occasions in conversation (Interviews 1, 8, 13). In addition, while internal communication and exchange with the municipal government work effortlessly (Interview 1), once a report arrives at the national level SGCC is often unsure which government department(s) to turn to for political support (Interviews 1 and 3) – indicative of the authority ambiguity prevalent among political institutions in charge of Chinese smart grid development. Interviewees also indicated a desire for greater policy support, which they cited as one of the biggest challenges to such development (Interviews 1, 3 and 4). One individual even expressed a wish for more guidance from the centre in terms of strategy and direction (Interview 1).

Interviewees also cited the sheer number of policy documents as a challenge to further smart grid development, a tool effectively deployed by the Chinese

government as part of creating ambiguity (Interviews 1, 3 and 4). One conversation partner revealed that the SGCC branch in the SSTEC possesses a separate department to deal with the flood of policy prescriptions from central, provincial and municipal governments dictating only vague smart grid objectives (Interview 3). He even went so far as to say that it is impossible to so as much as work-to-rule under the number of opaque prescriptions from above. Another interviewee at the NDRC's Energy Research Institute however refuted this argument, saying that policies on smart grids are exceptionally rare, since the term is far too broad to legislate on (Interview 6). Instead, policies are designed to target specific areas of the smart grid, such as distribution, which he admitted were certainly numerous and opaque. Another informant agreed, but added that the paucity of policies specifically mentioning smart grids is due to the novelty of the concept and not its breadth (Interview 8).

In sum, all three modes of intentional ambiguity – that is, goal, authority and means ambiguity – manifest themselves in Chinese policy design and implementation within the country's smart grid industry. First, goal ambiguity is expressed in the vague definitions of what even constitutes a smart grid (Interviews 1, 4 and 6). In SGCC's phased 'Planning Outline' (Brunekreeft et al. 2015), which functions as an unofficial guideline in the absence of government prescriptions, objectives are, indeed, stated in such broad terms as 'experimentation' until 2015, 'completion' in 2020 and 'improvements' by 2025 (Liu 2015). This intentional goal ambiguity means China will achieve its objectives on smart grid construction – irrespective of actual progress – as the government will be able to interpret outcomes opaquely in ways that signal accomplishments having been made at each phase of development (Interview 17).

Second, interviewees raised authority ambiguity as a major obstacle to SGCC making suggestions regarding altered policy designs (Interviews 1, 3 and 4). On the other hand, authority ambiguity allows the government to send companies seeking political support – whether state-owned or private – on an endless bureaucratic merry-go-round, which in many cases proves too costly or exasperating for them to pursue (Interview 18). This ensures that only the most well-connected or perseverant will persist in bringing grievances forward (Interview 17). Finally, means ambiguity is expressed in vague central policy prescriptions that grant local governments freedom in the shadow of hierarchy to experiment with – and in some cases even design and implement – their own policies, ones that better suit conditions on the ground (Interviews 1, 4 and 6).

Intentional ambiguity and investment in smart grid technologies

The smart grid's lack of precise definition also provides the most powerful actors in the Chinese electricity market with greater flexibility to direct investments into areas that promise the greatest opportunities for their own individual operations. As any investment in that market necessarily involves cooperating with either one of the

country's two monopoly grid operators, intentional ambiguity allows these two behemoths to control the speed and area of investment as related to almost any part of the electricity grid, from generation to consumption (Interview 6). Ambiguity as to the direction of development is therefore significantly lower for SGCC and Southern Grid than it is for private companies seeking to invest in the Chinese electricity market (Interview 3).

The power wielded by these two companies also allows them to obscure actual costs of grid operation, which affects investment in both up- and downstream markets (Interviews 14, 15 and 17). A dramatic example was provided by a manager at one of China's largest equipment manufacturers for renewable energies, whose company is seeking to expand to Xinjiang – where generating electricity from solar and wind, as well as land prices, are far cheaper than in the eastern provinces (Interview 14). Because transmission lines are operated by SGCC however, the expansion's economic viability will always be dependent on the latter's cost structure – creating higher risks and uncertainty for the manufacturer in question. As long as the costs of transmission remain unknown, equipment manufacturers will thus always face an uphill battle to make accurate investment calculations.

Besides the dominance of SGCC and Southern Grid, the central government's authority ambiguity as to who is ultimately in charge of setting smart grid objectives – whether it be the national or local levels of government – also confuses investors (Interview 17). Resolving such ambiguity is essential – especially for SMEs engaged in the electricity market, since most rely on subsidies to survive (Interview 15, 17 and 18). This problem is exacerbated by the fact that the electricity sector involves a large number of government ministries each vying for responsibility over the direction of development (Interviews 7 and 15), and who can potentially each serve as a 'backdoor' for obtaining subsidies too (Interview 7).

Attaining funds for smart grid technologies in China is generally easier for larger SOEs than it is for privately owned SMEs, so knowing the exact procedures and having connections are essential for survival (Interview 1). While application processes for funding remain opaque, interviewees stated that once funds have been received government entities become far more rigorous in demanding regular reports on where they are ultimately being allocated (Interviews 7 and 14). By raising administrative requirements, this stricter stance certainly reduces instances of corruption; it also severely curtails subsidy receivers' freedom to allocate funds in response to often rapid changes in the market, though (Interview 14). Several informants also lamented that government authorities were less than precise when handing out subsidies, with several stating that they had been waiting for up to three years for promised funds (Interviews 14 and 17). So while ambiguity prevails on the side of the government in how to obtain funds, the same ambiguity is not extended once they are actually allocated or received.

Conclusions

The paper has shown that intentional ambiguity is an appropriate theoretical framework within which to analyse the Chinese government's communication with critical actors in the country's smart grid industries. The smart grid's only vague definition grants a unique opportunity to Chinese policymakers and developers to use intentional ambiguity as a tool to shape development and achieve objectives. This research has investigated three areas in which the strategy has been deployed: namely, innovation, policy experimentation and investment in the country's smart grid network.

First, definitional ambiguity allows more innovation to be classified as 'smart grid'-related, which in turn enhances China's standing as a pioneering nation hereof. A wider understanding of smart grids also creates a window of opportunity for private entrepreneurs seeking to engage in the industry. This is especially important in a domain dominated by two state-owned monopolists capable of making expedient, costly and risky decisions – an advantage withheld from private actors, who need time to explore new areas and business models that promise profits in the future. Authority ambiguity also creates institutional voids, ones filled by entrepreneurs before regulators can constrain innovation with regulatory oversight. But intentional ambiguity can also be deployed by equipment manufacturers, who can use 'plausible deniability' to manage consumer expectations. Finally, by deliberately leaving the term 'smart grid' and its ultimate objectives undefined, actors involved in such innovation can declare their efforts a success irrespective of the actual progress ultimately made.

Second, goal ambiguity in policy experimentation grants local governments greater freedom to interpret intentionally vague policy prescriptions, which in some cases leads to new policy ideas that can be tested and applied nationally. Recently however, in light of stricter government oversight, local officials have become wary of crossing administrative boundaries and tentatively applying their own ideas for fear of damaging their long-term political careers. Instead, they tend to play it safe and follow centrally mandated policies to a tee. Nonetheless, local governments and SOEs do have means to influence policy design – but only following approval from above. As such ambiguity in all its forms only functions under the shadow of hierarchy, where any changes to prescribed policies have to be reported and approved by those at higher levels of government. Authority ambiguity is also useful to government ministries who use opaque networks of actors to avoid taking responsibility. Depending on perspective, intentional ambiguity in the realm of policy design and implementation can either be a boon (for governments, and to a lesser degree SOEs) or a curse – one which especially privately-owned SMEs have to circumvent.

Finally, in terms of investment, several interviewees expressed a desire for stricter guidelines, clearer strategic direction and more government oversight in the smart grid industry. Here a line has to be drawn between SOEs and private enterprises,

with each possessing contrasting viewpoints on the issue. For SOEs, intentional ambiguity on the part of the government has its advantages, since the monopoly players can more freely dictate investment decisions in smart grid technologies. As each and every private player has to cooperate with SGCC or Southern Grid in any venture involving electricity, the grid operators wield significant power to steer investment into areas beneficial to their own revenue streams and political standing. Authority ambiguity and opaque subsidy-application processes complicate decision-making for SMEs with fewer contacts among government ministries and less access routes to lines of credit from banks.

Continuous reflections on and due diligence paid to the methodological pathways of inquiry have revealed both limitations to the present study and potential avenues for future research. In terms of limitations, due to the research design's qualitative nature our findings cannot be extended to the overall population as easily as those from quantitative approaches can (Alpermann 2009; Atieno 2009) However, in comparison to other qualitative inquiries, this study's sample size of 18 interviews can be considered rather large (Creswell 2012). In addition, because the interviewees were spread over diffuse areas of activity, viewpoints may only apply to the individual market conditions and regulations pertinent to their respective jurisdictions. A further limitation is the only short amount of time spent in each locality (two times three weeks). With extended periods of research, follow-up interviews and deeper investigations would have helped substantiate findings further.

With respect to prospective future research, this paper has merely highlighted the potential of applying intentional ambiguity to the Chinese political system and raised several sites of interest in that regard within the country's smart grid industry. Further research is necessary to investigate the exact mechanisms behind how governments set limits to ambiguity, what command-and-control instruments are applied to reign in overly ambitious actors, who is ultimately in charge of making decisions on delimiting ambiguity at different levels of government and finally how separate actors influence, circumvent or even counter ambiguous policy design and not only in the smart grid industry. From research in other sectors of the electricity supply chain (Fischer et al., forthcoming), we expect that intentional ambiguity can also be fruitfully applied to other industries and social contexts to show how using purposefully vague terminology, wilfully obfuscating positions of authority and consciously providing room for actors to interpret and implement policy prescriptions can be beneficial to achieving objectives – especially in domains where ultimate goals are unclear even to the instituting agents themselves.

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