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Energy governance, energy security and environmental sustainability: A case study from Hong Kong



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ABSTRACT

This article explores the challenges associated with governing the competing objectives of energy security and environmental sustainability. It examines this challenge in the context of Hong Kong and the city's recent fuel mix consultation. Based on the results of ten interviews with public and private stakeholders in the Hong Kong power sector, the findings analyze the perceptions of stakeholders with respect to the tension between sustainability and core pillars of energy security — accessibility, affordability and reliability. It concludes with four policy recommendations for managing and potentially moving beyond the energy dilemma, including suggestions for locally feasible sustainable energy, long-term pathways to decarbonization, policy changes on tariffs, incentives and pricing, and collaboratively co-governing clean energy.

1. Introduction

Addressing the threat of climate change will require nothing short of an energy revolution (Gates, 2016; George, 2015; Ki-Moon, 2011; UNDP, 2015). Yet, global progress towards clean energy continues to be slow.¹ One core restraint on achieving swift transitions to low carbon economies has been the fundamental challenge of managing the energy trilemma—the competing goals of energy security, environmental sustainability and energy equity (Gunningham, 2011; World Energy Council, 2008; Bradshaw, 2014).

Unfortunately, no blueprint yet exists for charting pathways from fossil fuels to clean energy in a way that can balance these competing energy goals. How the shift to more sustainable regimes occurs—which technologies will be selected, what their impacts will be, and how contests will be managed—depends largely on the understudied challenge of energy governance (Gunningham, 2011). Though its meaning can be broad and varied, energy governance, at its core, is the coordinated management of energy issues that occur within and beyond the traditional channels of centralized authority (Hoffmann, 2011:17; Welch, 2013:257). As energy resources, social systems and government arrangements manifest differently in different contexts and countries, plausible energy governance strategies cannot be determined *a priori*, but require careful exploration through empirical, and context specific research (Gunningham, 2011; Holley et al., 2012; Johnston and Shearing, 2003; Ostrom et al., 1994).

Given this, our article draws original empirical insights from the understudied case of Hong Kong and its governance of two prominent tensions in the energy trilemma, namely energy security and environmental sustainability. In adopting this focus the paper builds on and extends a small but growing body of broader energy policy work examining interactions (or lack thereof) between energy security and environmental sustainability and the difficulty these often competing dimensions can pose for a transition to a low carbon economy (Bradshaw, 2014; Brown and Sovacool, 2012; IEA, 2016; Graaf, 2012; Chester, 2010; Sovacool and Brown, 2010:84; Winzer, 2012:42). At this stage of the literature, there is significant value in examining ways to resolve and govern tensions between these two prominent arms of the trilemma. As Gunningham, 185) (2013) notes: "it has been rare for the existing literature to consider the tensions between even two components of the trilemma, let alone all three".

Indeed, energy security has traditionally been governed separately from environmental sustainability. It is only recently, and to a limited extent, that the relationship between the two has been seriously recognized and discussed (Gunningham, 2013:185; Brown and Sovacool, 2012; Bradshaw, 2010). One of the central drivers for greater integration between energy security and environmental sustainability

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¹ For instance, while renewable electricity generation grew at its fastest ever rate in 2013, the International Energy Agency projects that this pace of growth still falls short of being consistent with the 2°C warming scenario recommended by the Intergovernmental Panel on Climate Change (OECD/IEA, 2014:12).

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has been the growing awareness of global greenhouse gas pollutants, and to a lesser extent, local air pollutants at regional and national scales (Brown and Sovacool, 2012; IEA, 2016; Graaf, 2012). Spurred by the Paris agreement (United Nations, 2015), low-carbon energy sources in the power generation sector are now considered to be at the heart of tackling sustainability and climate change (Graaf, 2012; IEA, 2016:14). Emblematic of this fact is the growing, yet still nascent, inclusion of sustainability in energy security concepts and policies (Chester, 2010; Sovacool and Brown, 2010:84; Winzer, 2012:42; IEA, 2014:13).

Given its emerging nature in the energy context, the precise meaning of environmental sustainability remains complex and multilayered (Sovacool and Brown, 2010:84; Winzer, 2012:42; Ang et al., 2015:1082). Even so, sustainability goals often encourage the use of renewable energy (rather than carbon intensive fossil fuels) to mitigate greenhouse gases, as well as preventing waste emissions (or other environmental risks) from exceeding the relevant assimilative capacities of ecosystems (eg, avoiding local air pollution or greenhouse pollutants) (Sovacool and Brown, 2010: 84; Graaf, 2012; Ang et al., 2015:1083).

Despite increased interest in sustainability (Winzer, 2012:42; Ang et al., 2015), few governments have managed to design and successfully implement energy security policy in line with the urgent need to purse low carbon economies (Gunningham, 2013; Heubaum and Biermann, 2015:230). In part, this is because energy security and sustainability policy – at both domestic and international levels – have evolved largely separately and often in opposition to each other (Gunningham, 2013; Heubaum and Biermann, 2013; Heubaum and Biermann, 2013; Heubaum and Biermann, 2015:230, 236–237).

Like the notion of sustainability, there is little consensus on precisely what the term energy security means (Chester, 2010; Ang et al., 2015). Often context dependent, the term has been described as an 'umbrella concept' (Winzer, 2012:36) that embraces various short and long term dimensions. These dimensions can include environmental stewardship, infrastructure, efficiency, and most importantly from the perspective of this article, accessibility, reliability and affordability (Sovacool and Brown, 2010; Winzer, 2012; IEA, 2014:13; Ang et al., 2015;). The latter three dimensions are often taken as the core pillars of energy security, albeit that their precise meaning varies within policy and the literature (Sovacool and Brown, 2010; IEA, 2014). In this article, accessibility is associated with geopolitical elements related to energy generation, ² safety, energy independence and diversification of energy fuels and services (Sovacool and Brown, 2010:82). This includes a focus on source diversity (eg, importing energy from a mix of countries and/or minimizing foreign dependency on fuels), spatial diversity (eg, distributing energy facilities across different sites/locations) and energy mix diversity (eg, a balanced supply of different energy types) (Sovacool and Brown, 2010:81-82; Ang et al., 2015:1081). Affordability relates to the basic cost and price of energy, but can also include equitable access of energy services (including quality of services and fuels) (Sovacool and Brown, 2010:82-82; Winzer, 2012; Chester, 2010; Ang et al., 2015). Finally, reliability is the ability to supply the quantity and quality of energy desired by the customer when it is needed under normal operating conditions, but also in response to unexpected interruptions (eg, enduring disruptive events) (McCarthy et al., 2007:2153; Winzer, 2012).

To date, these three energy security pillars have been realized using

fossil fuels. Fossil fuels have driven economic activity and growth, and have been reliable, cheaper and easier to access within nation state territories than other less carbon intensive sources (Martenson, 2011). The modern challenge for the global community, as well as for individual countries, is to develop energy security strategies within the limitations of environmental sustainability (Hallding et al., 2009; Bradshaw, 2014). The vexing question is whether and how we can we have accessible, reliable and affordable supplies of energy and, at the same time, manage a sustainable low-carbon energy system (Bradshaw, 2010). Given this, the article draws insights on governing these tensions by focusing on the unique case of Hong Kong.

Hong Kong is a provocative case for examining the challenges of governing the contests between energy security and environmental sustainability. An Asian mega-city with two power companies, Hong Kong is also endowed with the capacity of a state under China's "one country two systems" arrangement. These features make it a unique case for shedding light on not only energy supply transformations within the relatively small geographic confines of urban contexts, but also state-driven energy transitions and their interaction with other regional actors, like China. Hong Kong is also a particularly timely case study. Despite pursuing sustainability and greenhouse gas mitigation goals, recent public consultations and decisions on the city's power sector fuel mix have favored expanding liquid natural gas-fired generation. This has limited Hong Kong's ability to make significant improvement to supply sustainability, including through cooperation with China that is claimed to be the easiest way to lower carbon emissions (Kao, 2015).

In response, this paper seeks to examine three fundamental questions: Why were low-carbon options largely absent from discussions regarding the city's future fuel mix? Why did the public and government select the liquid natural gas option over the power importation option? How might Hong Kong achieve both energy security and clean power? And what can we learn from Hong Kong's experience about broader energy governance strategies capable of managing the contest between energy security and environmental sustainability in other cities and contexts?

To answer these questions, the article proceeds in four parts. After outlining the methodological approach, part three briefly sets out the law and policy arrangements in Hong Kong and their management of energy security and environmental sustainability. Part four then presents original research on the contemporary Hong Kong power sector. The article examines core state and non-state actors, and their awareness, motivations, and preferred pathways towards governing the competing demands of sustainability and energy security (defined as accessibility, affordability, and reliability). It draws from ten interviews with public and private stakeholders in the Hong Kong power sector (including regulators, power companies, NGOs and other community actors) conducted between December 2014 and January 2015. Although this may seem a small number of interviews on which to base analysis and policy recommendations, given the small size of the Hong Kong power sector community (eg, two power companies and a small bureaucracy) our sample was sufficient to capture key actors from across the sector. Moreover, data arising from each interview was triangulated, both by progressively testing ideas and arguments raised in one interview with subsequent interviewees, as well as comparing and linking interview data with available documents and reports to enhance the validity of the analysis and recommendations. Finally, part five discusses the implications of the case study, and makes several policy recommendations for future consideration.

The findings from this case study demonstrate key challenges which come with managing competing goals of energy systems, highlighting the tension between environmental sustainability and energy security. Accessibility and reliability versus sustainability, in particular, remain the fundamental challenges for Hong Kong, in part because of the city's import dependency, difficulty diversifying sources in its small territory and its geo-political relationships with the mainland. It is argued that

² This paper focuses on a specific aspect of energy security related to energy generation, principally choices between domestic generation and imports from China. This focus on technical capability of power generation was a central issue raised within our empirical research, however it is important to acknowledge that there are also broader elements of geopolitical energy security relating to fuel dependency. For example, in Hong Kong, power generation has a high dependency on coal imported from Indonesia (see footnote 4 below). In this broader context, which is nonetheless beyond the present scope of this article, energy security may be determined by concentration of import and geopolitical stability of Indonesia.

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