

# Governing Climate Change in Hong Kong: Prospects for market mechanisms in the context of emission trading in China

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**Abstract:**

Hong Kong continues to struggle over which environmental governance approach is in its best interest while fulfilling its environmental obligations. With regards climate change, Hong Kong's approach is characterised by a passive form of governance that is highly dependent on China's national policy directions. This is reflected, for example, in Hong Kong having not set its own mitigation targets. Market mechanisms have received little attention in developing a city-wide climate change strategy. A transformative impulse, China's national emission trading scheme, may provide momentum to a market-based approach. However, the necessary conditions for such a market mechanism to be successfully implemented in China remain immature. This raises question about early participation by Hong Kong. Direct benefits are likely to be limited, due to Hong Kong's economic structure and weak demand for emissions reduction. Besides, there are regulatory barriers to enforcing emissions targets and/or recognize emissions allowances and credits from China. We therefore argue that nationwide emission trading may, at the present time, present more challenges than opportunities for Hong Kong to leverage its efforts on climate change mitigation. An alternative is to promote voluntary emission trading that will require active involvement and leadership by businesses.

Keywords: climate change; environmental governance; emissions trading; Hong Kong; China

## 1. Introduction

Climate change is accelerating in part because greenhouse gases (GHG) continue to be emitted and accumulate in the atmosphere. Hong Kong, with a population of 7.3 million, records high levels of per capita GHG emissions. The Hong Kong government and its citizens will have to bear the high costs of the increasingly extreme global climate change-driven weather events predicted throughout the 21st century (Francesch-Huidobro and Mai, 2012, Fok and Cheung, 2012). It is in Hong Kong's interest to scale up its efforts towards climate change mitigation.

To mitigate GHGs, emissions trading schemes (ETS) have been introduced to several cities and provinces of the People's Republic of China (PRC). These schemes warrant serious consideration by policymakers in Hong Kong, which has become a Special Administrative Region (SAR) of China since 1997. In Hong Kong, market mechanisms have garnered legislative support in certain areas, but have received little attention in the formulation of a city-wide climate change strategy. Little progress in institutional innovation has been made since the release of a public consultation paper on climate change in 2010 (Environment Bureau, 2010).

This paper reviews the policy challenges to Hong Kong and discusses the prospects for using market mechanisms to govern climate change. The Chinese central government is expected to launch a national ETS in or after 2017, a scheme that may eventually become the world's largest. But carbon emissions trading remains a novel concept in Hong Kong. There is little impetus in the local political and institutional environment for the adoption of this internationally well-received policy tool. This precludes Hong Kong's environmental policy institutions from moving towards a new paradigm that respects sustainability principles. Nonetheless, transformative forces could be derived from Mainland China.

This paper presents an informed discussion on whether China's recent progress in domestic carbon trading could provide an opportunity for Hong Kong to overcome some of these challenges. By making use of a market mechanism with worldwide appeal, Hong Kong could benefit from national coordination and the economies of scale resulting from the large volume of carbon trades across Mainland China. However, the capacity of China's regulatory institutions,

infrastructure, and administrative practices for operating ETS falls short of international standards.

## **2. Climate Policy Landscape in China**

In China, national environmental planning and management are state-driven. Towards the end of the 1990s, the Chinese government increasingly recognised that global climate change would pose significant macro-economic challenges to the country and should be integrated with the state's economic portfolios. Thus, in 1998, the top-tier National Coordination Group of Climate Change was reorganised and relocated from the then State Meteorological Bureau to the predecessor of the National Development and Reform Commission (NDRC) (Qi and Wu, 2013). These institutional arrangements effectively re-defined climate change in terms of development and opened up a new policy space, bringing it closer to national priorities, notably economic development.

During 2011 and 2014 China made big plans and significant commitments for the years ahead. At the Asia Pacific Economic Cooperation (APEC) Summit held in Beijing in November 2014, China and the US jointly announced a landmark climate change agreement, which confirmed that China will peak its carbon emissions and increase the share of non-fossil fuel to 20 per cent by 2030. This is the first time that the world's largest GHG emitter (i.e. China) has promised to put an end to the growth of its GHG emissions.

In China, climate change impacts are understood primarily in macro-economic terms. The NDRC assumes formal responsibility for formulating climate change policies. It is a powerful agency within the Chinese central government, and oversees the portfolio of devising economic and social development strategies primarily to maximise economic growth and improve well-being of the nation. While the NDRC tends to focus on those initiatives that are directly linked to development, rather than the climate or the environment, it has the authority and ability to integrate climate change into the nation's economic policy agenda more closely and effectively than the Ministry of Environmental Protection could. The transfer of policy-making

responsibilities from a technical agency to a macro-economic one signaled a paradigm shift in domestic climate change governance.

Throughout the period of the 11th 'Five-year Plan' (FYP) (2006–2010), GHG control in China was achieved largely through direct regulation. China generated 6,275 Mt CO<sub>2</sub> in 2007 (International Energy Agency, 2015) and became the world's largest CO<sub>2</sub> emitter that year. The Chinese government managed to reduce energy intensity by 19.06 per cent by the end of 2010 against the 11th FYP targets, thanks to the extended use of the 'visible hand', i.e. political intervention (Wu, 2011), and formal, coercive requirements on energy consumption (Gilley, 2012). Market-based instruments played a limited role. As the marginal success in meeting the intensity targets came with significant costs, the central government decided to search for alternative strategies. Market-based instruments immediately received attention from senior government officials.

China has declared a plan to introduce ETS across the country. The NDRC has approved seven pilot sites across the country, including Guangdong Province and Shenzhen City, which are adjacent to Hong Kong. A national scheme will be set up in or after 2017 (Department of Climate Change, 2015); it is expected to cover 3-4 billion tonnes of GHG emissions and about 10,000 enterprises across China (Environomist, 2016, p.30). China's enormous annual GHG emissions output has the potential to make the Chinese carbon market the world's largest (Lo and Howes, 2013, 2015; Lo, 2015).

China's emissions trading schemes may help to minimise the costs of GHG emissions reduction, promote business engagement, and establish links with the international and regional carbon markets currently operating in such jurisdictions as the EU. As the cost-reducing capacities of ETS depend, among other factors, on the size and liquidity of the carbon market, it is in China's interest to bring together a number of provinces and cities in the national scheme and link them with those operating in other regions or countries. Considering its advantages in regulation and attracting capital, Hong Kong seems an ideal candidate for strategic engagement as an official trading region under the proposed scheme.

### **3. Climate Policy Landscape in Hong Kong**

#### *3.1 Policy directions*

As a SAR of the PRC, Hong Kong is granted a number of economic and political privileges under the constitutional principle of ‘One Country, Two Systems’. For example, the SAR is not required to adopt national climate change policies and emission reduction targets that cover the rest of China. Hong Kong’s per capita CO<sub>2</sub> emissions rose from 6.03 tonnes in 2004 to 6.41 tonnes in 2013, exceeding the OECD European average (6.34 tonnes) by a small margin (International Energy Agency, 2015). About two-third of these emissions are produced in the process of electricity generation (Figure 1). This steady increase in per capita emissions has met with a lukewarm response from the SAR government. A comprehensive climate change strategy was absent from the policy agenda until 2010, when the Hong Kong government, for the first time, dedicated a public consultation exercise to climate change issues (Environment Bureau, 2010). The Hong Kong government attempted to develop a city-wide climate change strategy by proposing a number of strategies and measures, including a target to reduce carbon intensity by 50-60% below the 2005 level by 2020 and other energy initiatives (Environment Bureau, 2010).

As in China, Hong Kong attempts to move away from the conventional ‘command-and-control’ approach and makes use of market mechanisms for managing its environmental impacts. However, elements of market mechanisms have not been put into consideration for controlling GHG emissions. The latest climate change policy report released in 2015 by the SAR government has merely emphasized its current efforts and plans about monitoring and reducing building energy consumption and promoting transport fuel switch and the use of public transport (Environment Bureau, 2015). It has neither specified an absolute emissions reduction target nor proposed any major institutional innovation.

The policy agenda has faced criticism for lacking substance and being incremental in nature (Ng, 2012; Mah and Hills, 2016), as well as for perpetuating the administrative-rationalistic and technocratic approach to environmental policymaking prevalent in Hong Kong prior to 2000 (Hills, 2004; Francesch-Huidobro, 2012). The city’s dependence on mainland China’s policy directions and its own institutional traditions contribute to the policy impasse.

### 3.2 *Dependence on national commitments*

Studies have found local climate change governance to face two seemingly intractable problems. Firstly, Hong Kong is not intrinsically motivated to adopt ambitious emissions reduction targets. It lacks domestic incentives to do so, because its commitments are influenced by the national climate change policy set by the Chinese central government (Francesch-Huidobro, 2012, 2014; Mah and Hills, 2016, Ng, 2012). Hong Kong's passive form of climate change governance is highly dependent on national policy direction.

Hong Kong's status as a SAR of the PRC rather than a sovereign state has undermined the agency of local institutions to deal with regional and global environmental issues, notably climate change (Hills, 2002). As a non-Annex I Party to the Kyoto Protocol, the PRC is not subject to binding emissions reduction targets. Hong Kong is represented in the international treaty as a member jurisdiction of the PRC, and therefore is not obligated to curb its own GHG emissions. Priority is often given to other environmental issues such as air pollution (Ng, 2012).

The lack of government leadership in Hong Kong is another cause of the impasse (Mah and Hills, 2016). Hong Kong has made slow progress in producing institutional innovations to deal with climate change, partly because it is not subject to strong international pressure to curb GHG emissions, and lacks a national mandate and the power and legitimacy to lead cross-boundary cooperation and mobilise civil society resources. Moreover, despite its high level of per capita emissions, Hong Kong's aggregate emissions level remains relatively low (46 million tonnes CO<sub>2</sub>), compared to that of China (8,977 million tonnes CO<sub>2</sub>) and other major GHG-emitting countries such as Japan (1,235 million tonnes CO<sub>2</sub>) (International Energy Agency, 2015). As a small GHG emitter without sovereign power, Hong Kong is unlikely to make significant contributions to climate change mitigation and policy development at the global/international or even regional level, while the costs required may be prohibitive due to diseconomies of scale. These constraints discourage the Hong Kong SAR government from unilaterally scaling up its efforts to reduce GHG emissions and formulate a comprehensive climate change strategy.

Solutions to this policy problem must recognise Hong Kong's constitutional status as an SAR of the PRC and respect the relatively small scale of its emissions output. The city's Chief Executive (i.e. head of government) and Secretaries (i.e. cabinet ministers) are appointed by the Chinese central government. The strong dependence on national commitments and the growing incentives for and pressure on the PRC to act suggest that the prospects for Hong Kong scaling up its own commitments hinge upon the central government's leadership in climate change governance. Hong Kong policymakers should therefore examine the conditions for strengthening policy integration with China's climate change initiatives. As Mah and Hills (2016) argue, Hong Kong is merely a passive follower of the PRC's climate change regime, a view that seems to challenge the widespread belief that world cities have moved well ahead of nation-states in climate change governance (Bulkeley and Betsill, 2003).

### *3.2 Struggles over institutional transition*

Secondly, the transition in environmental governance in Hong Kong has proved to be an uphill struggle. Administrative measures dominate, with market-based instruments for GHG mitigation playing a surprisingly limited role in one of the world's leading liberal market economies (Lo, 2008, Mah and Hills, 2016). Local scholars argue that Hong Kong's environmental policy institutions lack a transformative impulse (Hills, 2004). Although it is moving slowly away from the traditional command-and-control paradigm, the SAR's policy system has yet to take further steps towards potentially more feasible and effective approaches.

For the past three decades, the environmental policymaking process has been dominated by the discourse of 'administrative rationalism' (Hills, 2004), which emphasises the role of experts and recognises the importance of professional management by the state (Dryzek, 2005) (Table 1). Since 1997, post-colonial Hong Kong has shown signs of moving towards another policy approach (Hills, 2004, Hills and Welford, 2002), known as 'ecological modernisation', which emphasises the role of business and technological innovations (Dryzek, 2005, Hajer, 1995). However, the local political climate has been bleak since 2003, and even took a turn for the worse in 2014 as the quest for further democratisation encountered significant constitutional hurdles.



Citizens and civil society alike have lost trust in the SAR government led by a pro-Beijing Chief Executive in collusion with the private sector, property developers in particular. This has severely undermined the basis for the public-private partnerships and multi-stakeholder governance required for ecological modernisation to work (Gouldson et al., 2008, Hills, 2005, Wong and Wan, 2009, Lo, 2016). Ongoing political and land-use disputes have further eroded the already low levels of trust, and the policy environment for political and business leadership continues to deteriorate.

The third problem-solving environmental policy discourse identified by Dryzek (2005) is 'economic rationalism'. This discourse privileges the use of market-based instruments, such as carbon taxes, which have proved to be political poison in many countries and regions (Harrison, 2010, Lo and Spash, 2012). The concept of emissions trading is politically more acceptable and consistent with the liberal political-economic norms of Hong Kong. However, on its own, Hong Kong can afford only a small domestic carbon market for emissions reduction trading, with a low level of market liquidity and limited marginal savings. Also, local policymakers have yet to recognise that environmental problems, notably climate change, constitute a form of market failure and that governments have a critical role to play in overcoming them (Lo, 2008; Mah and Hills, 2016). The expected transition towards a market-based approach has stagnated. In the absence of better alternatives, Hong Kong's climate change institutions have shown a regrettable tendency towards returning to a 'sectoral and technological approach' (Francesch-Huidobro, 2012, p. 801), which is rather centralised and expert-led, involving a limited range of sectors and actors, i.e. administrative rationalism. Prospects for institutional transformation remain uncertain.

Local climate change governance stands at the forefront of a deadlock, lacking incentives to pursue more aggressive emission reduction targets and explore an alternative policy approach. Transformative forces may potentially come from Mainland China, but considerable uncertainties are associated with these transformative forces.

#### **4. Emission Trading in China: an opportunity or a challenge for Hong Kong?**

#### 4.1 Opportunities

The special constitutional arrangements and institutional demarcation between the ‘two systems’ provide more challenges than opportunities for Hong Kong to leverage its efforts on GHG mitigation. Hong Kong could benefit from the economies of scale offered by the Mainland ETS. Leung et al. (2009, p. 100), for example, suggest that implementing a regional ETS in the Pearl River Delta (PRD) region is “of paramount importance for Hong Kong, as well as other cities within the PRD region”<sup>1</sup>. Emission trading may be politically feasible because it can be coordinated and operated by the private sector and non-governmental organisations (NGOs) and does not necessarily require new legislation or amendments to existing laws.

Crucially, voluntary participation by corporations and the public sector in emission trading has achieved some success in developed economies (Bayon et al., 2009). A voluntary scheme in Hong Kong with formal links to the domestic carbon markets in Mainland China appears to be promising. Larger markets open up more possibilities for securing access to cheaper goods and services. China’s vast carbon market would give Hong Kong-based firms greater access to lower-cost opportunities for GHG reduction. Acquiring cheaper emissions allowances or carbon offsets would offer them alternative (less costly) ways of meeting reduction requirements and/or fulfilling their corporate social responsibility obligations.

An additional potential benefit for Hong Kong of officially participating in nationwide carbon trading will be greater momentum for institutional transformation driven by the powerful state machinery. The Chinese authorities have strong incentives to build capacity for local market institutions and ensure the functioning of those institutions for the delivery of environmental and economic benefits. Also, a functioning carbon market will attract large corporations and financial institutions to advocate tighter GHG control standards and the continuation of market mechanisms to protect their vested interests. The Hong Kong SAR government may be motivated to accelerate its transition towards a new environmental discourse that respects market

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<sup>1</sup> Leung et al.’s (2009) statement mainly refers to regional air pollution (i.e. SO<sub>2</sub>, NO<sub>x</sub>, RSP, and VOCs), instead of climate change, but these authors appear positive toward setting up an ETS for controlling CO<sub>2</sub>.

principles and offers business opportunities. Such a weak form of sustainability policy approach may fit more easily with the prevailing ethos in Hong Kong (Hills, 2004).

#### *4.2 Challenges*

That being said, markets do not offer a perfect solution to environmental degradation. China is exposed to many market imperfections as it retains an authoritarian political regime. The fact that China is a developing market economy set up by an authoritarian regime calls into question the capacity of its market and regulatory institutions. The severely distorted state-market relations make the economic promise of carbon trading doubtful.

Enduring problems include an incomplete regulatory system, poor law enforcement, excessive state intervention, and weak corporate awareness (Tao and Mah, 2009). Specifically with respect to carbon trading, these problems are exacerbated by a lack of reliable data on firms' GHG emissions, government restrictions on trading options, and the lack of financial institution involvement (Lo and Yu, 2015, Shen, 2015, Zhao et al., 2016, Liu et al., 2015). These limitations are also well recognised by local observers, such as Martin Adams, a Hong Kong-based editor at *The Economist* magazine (Adams, 2013) and practitioners, such as the Environomist (2016), a Beijing-based carbon consulting firm. The functioning of these ETS is therefore questionable. As the conditions for establishing a large carbon market in China remain immature, building linkages with the Chinese ETSs in the present time might not be an effective option for Hong Kong to achieve its climate change objectives. Hong Kong should consider participation in emission trading in China after a few years of successful operation.

Also, companies in Hong Kong have low incentives for engaging in emission trading. The Hong Kong economy is predominantly service-based; 92.9 per cent of its GDP is derived from the tertiary sector, whereas the primary and secondary sectors combined account for 7.1 per cent only (Census and Statistics Department, 2015). The service industry is a low GHG emitter. Since ETSs usually involve organisations (mainly enterprises) rather than individuals, demand in Hong Kong for emission allowances or credits from Mainland China is weak. Renewable energy is the main

source of emission credits, which are produced in one place and can be used as an 'offset' for GHG emissions produced elsewhere. With limited supply of renewable energy, Hong Kong cannot play a key role in the carbon offset market in China. Although some Hong Kong-based enterprises have developed strategies for mitigating their impacts on the climate in order to fulfil their corporate social responsibility, the majority of them remain inactive (Chu and Schroeder, 2010). The two local power companies that account for the largest share of GHG emissions in Hong Kong are relatively active in developing renewable energy, and should be required to curb emissions. Apart from them, however, there are few potential trading entities within Hong Kong that have adequate demand and capacity for emission trading. Therefore, Hong Kong is unlikely to be a critical element of the national system and make a significant contribution to national efforts. Direct benefits for Hong Kong are likely to be limited.

Furthermore, the regulatory practice in Hong Kong is very different from Mainland China. Binding emission targets, which are crucial for a 'cap-and-trade' system to operate effectively, will not be automatically extended to Hong Kong, if the 'One Country, Two systems' principle is adhered to. Under an ETS, emission allowances issued by a regulatory body, and the emission credits accepted by it, are seen as a form of property rights that can be transferred between companies. As these allowances require a legal basis to establish (except those issued by industry-led governing bodies and amenable to voluntary commitments) and treated as a financial asset, remarkable differences in legal system and financial regulation might create difficulties in the formal acceptance and transfer of allowances between Hong Kong and Mainland China. New regulations and laws would have to be established in Hong Kong to enforce emissions targets and/or recognise emission allowances and credits from outside the territory. Such an integrating strategy involving legislation and cross-boundary governance would be politically insensitive, because of the deteriorating political climate in Hong Kong and the popular hostility toward the China's intervention into Hong Kong affairs. Only a voluntary scheme that is set up and operated by the private sector, or in the form of a public-private partnership, instead of the government, could dispense with these regulatory hurdles.

## 5. Conclusions

In this paper we have identified the main challenges to climate change governance in Hong Kong and discussed the key issues that warrant further consideration if Hong Kong is to participate in the national ETS in China. Hong Kong is at a crossroad struggling over which environmental governance approach is in its best and the world's interest. The local government has not proposed any major institutional innovation for controlling its GHG emissions. There are signs of returning to a sectoral and technological approach to governing the environment.

Current efforts are characterised by a passive, 'light touch' form of governance that is highly dependent on national policy directions, giving it little incentive to set its own mitigation targets. The transition towards a market-based approach to governing climate change has met with substantial hurdles. Market mechanisms have received little attention in developing a city-wide climate change strategy, whereas regulatory measures continue to dominate. While regulatory tools have not provided, so far, a transformative impulse, China's national emission trading scheme seems promising in providing the necessary momentum to a market-based approach.

However, we argue that the extent to which Hong Kong could benefit from the new ETS policy programme in China is uncertain. The necessary conditions for such a market mechanism to be successfully implemented in China remain immature. The functioning of the Chinese ETSS is questionable in the near future, raising question about early participation by Hong Kong. Also, direct benefits for Hong Kong are likely to be limited due to its economic structure and weak demand for emission reductions. There are regulatory barriers to enforcing emissions targets and/or recognise emission allowances and credits from China. Cross-boundary cooperation and policy integration is an appealing concept, but the regulatory and policy framework for emission trading in China remains incomplete and fragile, and the economic and regulatory conditions in Hong Kong do not favour an active involvement at the present time. The national policy initiative will provide more challenges than opportunities for Hong Kong to leverage its efforts on GHG mitigation.

While a government-led, mandatory 'cap-and-trade' system is currently not an option for Hong Kong, voluntary emission trading may be a feasible alternative. Voluntary systems offer greater flexibility to businesses, while being compatible with the liberal political-economic norms in Hong Kong. The model adopted by the Chicago Climate Exchange is worth considering. A group of large corporations and other organisations (e.g. government agencies, educational institutions, and trade unions) that elect to pursue binding emission reduction targets would need to agree, on a voluntary basis, on a set of rules and standards that regulate their emissions and the trading of emission reductions within the group. They should be allowed to acquire registered emission reductions from Mainland China to benefit from the large reservoir of emission credits that will be brought to the market upon commencement of the national ETS (Lo and Cong, 2017), which can significantly increase market demand for these credits. The Hong Kong SAR government would need to introduce new policy measures and guidelines to regulate the use of emission credits from China for offsetting GHG emissions from Hong Kong. It should also offer technical assistance in setting up a GHG registry and a comprehensive set of protocols for monitoring, measuring and verifying emission reductions. Business leaders and chambers of commerce should promote the concept and build up a system for voluntary emission trading for coordinating the currently fragmented efforts in making use of carbon offsets by individual business and organisations. Corporate engagement, therefore, will be crucial for advancing the governance of climate change in Hong Kong.

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## References:

- Adams M. (2013) No clear benefit for Hong Kong from mainland China's carbon trading scheme. *South China Morning Post*. 27 August. Available at <http://www.scmp.com/comment/insight-opinion/article/1299514/no-clear-benefit-hong-kong-mainland-chinas-carbon-trading>. Accessed 21 July 2015. .
- Bayon R., Hawn A. & Hamilton K. (2009) *Voluntary Carbon Markets : An International Business Guide to What They Are and How They Work*, London: Earthscan
- Bulkeley H. & Betsill M. M. (2003) *Cities and climate change : urban sustainability and global environmental governance* London: Routledge.
- Census and Statistics Department (2015) Hong Kong Annual Digest of Statistics 2015 Edition. Hong Kong: Hong Kong Special Administrative Region
- Chu S. Y. & Schroeder H. (2010) Private Governance of Climate Change in Hong Kong: An Analysis of Drivers and Barriers to Corporate Action. *Asian Studies Review*, 34(3): 287-308.
- Department of Climate Change (2015) On the conditions and measures for the establishment of national carbon emission trading market [in Chinese]. *China Economic & Trade Herald*, January: 15-16.
- Dryzek J. S. (2005) *The Politics of the Earth: Environmental Discourses*, New York: Oxford University Press.
- Environment Bureau (2010) Hong Kong's climate Change strategy and action agenda: Consultation document. Hong Kong: Environmental Bureau.
- Environment Bureau (2015) Hong Kong Climate Change Report 2015. Hong Kong: Environment Bureau.
- Environomist (2016) Environomist China Carbon Market Research Report 2016. Beijing: Environomist Ltd.
- Fok L. & Cheung L. T. O. (2012) Evaluating the impact reduction strategies for the tropical cyclone hazard in Hong Kong. *Asian Geographer*, 29(2): 121-129.
- Francesch-Huidobro M. (2012) Institutional deficit and lack of legitimacy: the challenges of climate change governance in Hong Kong. *Environmental Politics*, 21(5): 791-810.
- Francesch-Huidobro M. (2014) Climate policy learning and change in cities: the case of Hong Kong and its modest achievements. *Asia Pacific Journal of Public Administration*, 36(4): 283-300.
- Francesch-Huidobro M. & Mai Q. (2012) Climate Advocacy Coalitions in Guangdong, China. *Administration & Society*.
- Gilley B. (2012) Authoritarian environmentalism and China's response to climate change. *Environmental Politics*, 21(2): 287-307.
- Gouldson A., Hills P. & Welford R. (2008) Ecological modernisation and policy learning in Hong Kong. *Geoforum*, 39: 319-330.
- Hajer M. A. (1995) *The politics of environmental discourse ecological modernization and the policy process*, New York : : Oxford University Press.
- Harrison K. (2010) The comparative politics of carbon taxation. *Annual Review of Law and Social Science*, 6: 507-529.
- Hills P. R. (2004) Administrative rationalism, sustainable development and the politics of environmental discourse in Hong Kong. In: T. Mottershead (ed.), *Sustainable Development in Hong Kong*. Hong Kong: Hong Kong University Press.

- Hills P. R. (2005) Environmental reform, ecological modernization and the policy process in Hong Kong: an exploratory study of stakeholder perspectives. *Journal of Environmental Planning and Management*, 48(2): 209-240.
- Hills P. R. & Welford R. (2002) Ecological modernisation as a weak form of sustainable development in Hong Kong. *International Journal of Sustainable Development and World Ecology*, 9: 315-331.
- International Energy Agency (2015) CO2 Emissions from Fuel Combustion - 2015 Highlights. Paris: International Energy Agency.
- Leung D. Y. C., Yung D., Ng A., Leung M. K. H. & Chan A. (2009) An overview of emissions trading and its prospects in Hong Kong. *Environmental Science & Policy*, 12(1): 92-101.
- Liu L., Chen C., Zhao Y. & Zhao E. (2015) China's carbon-emissions trading: Overview, challenges and future. *Renewable and Sustainable Energy Reviews*, 49: 254-266.
- Lo A. Y. (2015) National development and carbon trading: the symbolism of Chinese climate capitalism. *Eurasian Geography and Economics*, 56(2): 111-126.
- Lo A. Y. (2016) Public Discourses of Climate Change in Hong Kong. *Journal of Environmental Policy & Planning*, 18(1): 27-46.
- Lo A. Y. & Cong R. (2017) After CDM: domestic carbon offsetting in China. *Journal of Cleaner Production*, 141: 1391-1399.
- Lo A. Y. & Howes M. (2013) Powered by the state or finance? The organization of China's carbon markets. *Eurasian Geography and Economics*, 54(4): 386-408.
- Lo A. Y. & Howes M. (2015) Power and Carbon Sovereignty of a Non-Traditional Capitalist State: The Carbon Trading Discourse of China. *Global Environmental Politics*, 15(1): 60-82.
- Lo A. Y. & Spash C. L. (2012) How Green is your scheme? Greenhouse gas control the Australian way. *Energy Policy*, 50: 150-153.
- Mah D. N.-y. & Hills P. (2016) An international review of local governance for climate change: implications for Hong Kong. *Local Environment*, 21(1): 39-64.
- Ng M. K. (2012) A critical review of Hong Kong's proposed climate change strategy and action agenda. *Cities*, 29(2): 88-98.
- Qi Y. & Wu T. (2013) The politics of climate change in China. *Wiley Interdisciplinary Reviews: Climate Change*, 4: 301-313.
- Shen W. (2015) Chinese business at the dawn of its domestic emissions trading scheme: incentives and barriers to participation in carbon trading. *Climate Policy*, 15(3): 339-354.
- Wong T. K.-Y. & Wan P.-S. (2009) Lingering environmental pessimism and the role of government in Hong Kong. *Public Administration and Development*, 29(5): 441-451.
- Wu Q. (2011) Policy and Politics of a Carbon Market in China. In: J. Peetermans (ed.), *Greenhouse gas market report 2011: Asia and Beyond: the Roadmap to Global Carbon & Energy Markets*. Genève, Switzerland: International Emissions Trading Association.
- Zhao X.-g., Jiang G.-w., Nie D. & Chen H. (2016) How to improve the market efficiency of carbon trading: A perspective of China. *Renewable and Sustainable Energy Reviews*, 59: 1229-1245.