FIELDWORK REPORT HONG KONG

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Summary

This report describes the fieldwork in Hong Kong, one of the cities selected by the Mapping Urban Energy Landscapes - MUEL - research project. Through field interviews and documentary analyses the projects gathered data on the city's urban energy landscape.

Interviews with those who plan, manage, produce, distribute and coexist with energy infrastructure provided a rich source of data on the city's energy system and its governance, as well as an entry point to the actors' perception of ongoing material and cultural transformation and future challenges. Documentary reviews complemented the source of information of energy grid, conflicts and institutions involved in the city's energy system.

The gathered materials expose different dimensions of Hong Kong's urban energy landscape. Firstly, there is the geopolitical dimension, manifest in the autonomous region's constant negotiation of its political and economic relation to China – emerging in the interviewees' description of possible implications of closer integration of energy systems with the mainland. Moreover, Hong Kong's energy scenario is shaped by the fact that the region has no indigenous fuels, and depends on imports to meet its energy demands.

The key spatial characteristic of the city and the region is the limited amount of space, that led to a construction of one of the world's most densely populated vertical cities. On one hand this urban form contributes to making the city more sustainable: it is a very compact city with no large distances and very efficient public transportation. The lack of space, however, creates barriers to development of renewable energy sites.

Commercial and residential buildings are recognized as the biggest energy consumers. The combination of the city's tropical climate and a cooling culture developed over decades results in widespread use of air conditioning that is often set to temperatures so low, that the residents carry around scarves and jackets to protect themselves from cool indoor temperatures.

Complete reliability of energy supply is recognized as so desirable, that the power companies have overcapacity of energy production reaching up to 50%. While the energy provision is near universal, some urban citizens suffer from energy poverty –

mostly the inhabitants of the city's subdivided flats that are forced to pay premium prices for energy, despite their limited budgets.

The regional government and the two energy companies that enjoy a duopoly status are the key decision-makers in regards to the current and future energy scenarios of the city. The relation between the government and the utilities is governed by a Scheme of Control agreement, a document negotiated and renewed every 10-15 years. Although the government ran consultations on the city's future energy mix, some actors felt their participation had a token status and the activities of the government lacked transparency.

Lack of long-term planning and vision, current market structure, low uptake and prospects for renewables, need for better building design, building standards and retrofitting, financial considerations and the need for behavioural change and shift in attitudes were recognized as key challenges to a transition to a more sustainable energy scenario.

1 Introduction

This report details the fieldwork research activities that took place in the urban settlements of Hong Kong Special Administrative Region between May 2014 and March 2015. Located on a peninsula and a set of islands, Hong Kong is the world's fourth most densely populated sovereign territory, one of the world's most significant financial centres, and a city with the second highest number of skyscrapers in the world. While Hong Kong has one of the highest per capita incomes in the world, it also has the most severe income inequality amongst developed economies.

The fieldwork was conducted by Linda Westman, a PhD student at UCL hired by the principal investigator, and Vanesa Castan Broto, the principal investigator.

30 structured interviews were conducted with private sector, state and civil society stakeholders to gather qualitative data on the state of the energy supply and provision in Hong Kong, the energy governance, and on the perception of current challenges that will shape the future of energy. Although two workshops had been planned to gather the perceptions of local community on the role and impacts of energy in their everyday life and territory, they did not take place in the end. The fully developed workshop plan is included with the data presented. The analysis of documentary sources -such as energy maps, policy papers, official statistics, studies and newspapers- was conducted before the fieldtrip to create understanding of the national, regional and local context in which urban energy landscapes are produced and facilitate the interviews sample. As a result, there is less emphasis on the experiences of the urban energy landscapes than in the other case studies.

Overall, 33 participants were reached in 30 interviews (See Table 1.1).

Table 1.1. Characteristics of population reached through the interviews.

	Interviews	Participants
Group		
Institutional representatives	30	33
Gender		
Female		10
Male		23
TOTAL	**30**	**33**

2 Interviews

Thirty institutions, representing the most relevant actors that shape, monitor, or analyse urban energy policy in Hong Kong were contacted and interviewed. This included representatives of local and regional government; civil society organizations (NGOs, charities, think tanks); universities; private sector organizations; and utility company (one of Hong Kong's two energy companies) (Table 2.1).

The interviews 1-20 were conducted in May-June 2014, while the interviews 21-30 were conducted in March-April 2015.

1	Male	40	Professor	University	Civil Society
2	Male	40	Professor	University	Civil Society
3	Male	30	Project Manager	NGO	Civil Society
4	Male	50	Professor	University	Civil Society
5	Male	40	Professor	University	Civil Society
6	Male	50	Professor	University	Civil Society
7	Male	30	Energy Consultant	Energy consultancy	Private sector
8	Female	30	Engineer	Local government	Government
9	Female	30	Lecturer, Researcher	University	Civil Society
10	Female	30-40	Activist	NGO	Civil Society
11	Male	30-40	Lecturer	University	Civil Society
12	Male	40-50	R&D Manager	NGO	Civil Society
13	Female	30	Energy Consultant	Consultancy firm	Private sector
14	Male	30	Energy Consultant, Researcher	Consultancy and Investment Bank	Private sector
15	Female	30-40	Manager of Energy Projects	NGO	Civil Society
16	Male	50-60	Activist, Policy advisor, chemical engineer	NGO	Civil Society
17	Male	50-60	General Manager	Utility company	Private sector
18	Male	40-50	CEO	NGO	Civil Society
19	Male	40-50	Activist	NGO	Civil Society
20	Male	40	Energy Consultant	NGO	Civil Society
21	Male	40-50	Sustainability Consultant	Consultancy	Private Sector
22	Male	40-50	Director	Museum	Civil Society
23	Female	40-50	Director	Membership Association for Private Companies	Civil Society / Private Sector
24	Male	20-30	Activist	Museum	Civil Society
25	Female and Female	30-40	Project Officers	NGO	Civil Society
26	Male	40-50	Director	Think Tank	Civil Society
27	Male	30-40	Project Officer	NGO	Civil Society
28	Male	60-70	Professor	University	Civil Society
29	Male, Male and Female	20-40	Museum managers	Museum	Civil Society
30	Female	50-60	Department Director	Regional Government	Government

The interviews followed the project's ethical protocol, which recognised rights of information, anonymity and withdrawal for each contacted person. Written or verbal consent to the interviews -and to recording- was always asked and respected. The respondents could choose not to be recorded.

The interviews aimed to capture data about five large themes: the role of the interviewee's organisation in the provision, governance or consumption of energy at a city scale; the interviewee's perspective of the current state of energy supply and consumption in the metropolitan area including infrastructure and landscape; a description of the energy governance schemes; and perceptions of the future plans and challenges faced by the energy system; and a glimpse on how innovation is -or is not- transforming energy landscapes.

2.1 Institutional actors

Two representatives of the government were interviewed: an employee of EMSD, the regional government branch responsible for executing and enforcing energy policy and an employee of one of the public housing branches. The EMSD employee underlined the organization's role in promoting energy efficiency, especially in buildings and its role in improving the efficiency of public buildings. The public housing representative underlined their role in researching, promoting and introducing far-reaching innovations in the managed buildings: to promote energy efficiency, sustainability and improve lives of the residents. The department also undertakes public engagement and educational work.

The utility company representative underlined the company's role in supplying energy to the city and described their attempts at – and barriers to – introducing more renewable energy projects. The company owns the biggest solar project in HK and the region's only commercial wind turbine.

Not all of the interviewed academics described the role of themselves or the institutions they represent in shaping HK's energy landscape, although two of them were working on projects aimed at mitigating a problem very specific to the city: efficiency of building cooling and air conditioning systems.

Among the interviewed representatives of private companies, there were several, who described their role as providing large clients (government, building developers, companies) with energy audits and sustainability and/or climate change strategies.

A wide range of diverse NGOs and civil society representatives were interviewed, including activist organizations that lobby with government and utility companies to influence future energy scenarios; NGOs focused on public engagement and educational campaigns; three museums, including climate change museum and a science park; socio-environmental NGO focused on addressing the problem of energy poverty, experienced particularly in the city's numerous subdivided flats; think-tanks focused on research, dissemination of knowledge and public engagement; and a membership organization for banks and financial institutions that focuses on research, leadership, events on sustainable finance, green investment, big challenges in Asia.

2.2 Energy scenario

The Hong Kong's energy scenario that emerges from the interviews is one that is chiefly determined by the region's geographical and geopolitical situation: it is characterized by limited amount of space that would allow for developments; constant negotiation of its economic and political relation to mainland China; and lack of indigenous energy resources.

Virtually all of HK's energy is imported. 25% comes directly from a nuclear power plant in the mainland China, while the rest is imported from abroad in form of fuels (cca. 50% coal and 25% natural gas) and converted to energy by HK's two energy companies: Hong Kong Electric (HKE) and China Lighting and Power (CLP). Additionally, oil products are imported, chiefly to power the transportation system and private vehicles. Renewable energies (mostly solar and wind projects) provide between 1 and 2% of the city's energy needs. A lot of existing renewable projects are for demonstration or research and are mostly not commercially viable. Lack of space is a key barrier to development of renewable energy projects.

Several interviewees mention the interconnected issue of the reliability of the energy supply and overcapacity of the network. Interviewees mention the importance of near 100% reliability of supply and avoiding of black outs. While some claim this is to ensure uninterrupted provision of energy to the big financial companies located in the city (Interviewee 3), others underline that in a vertical city like HK, a black out could leave many trapped in elevators (Interviewee 5). Interviewee 28 estimates the overcapacity to reach 30-50% and several participants mention that the overcapacity translates into higher energy tariffs. The representative of the utility company (Interviewee 17) underlined that the

overproduction of energy comes from a combination of historical reasons in which government was granting and/or mandating construction of new plants before the previous ones retired (e.g. switching to coal from oil in the 1970s). Interviewees agree that HK has near universal provision of electricity: only up to 5 islands, with few residents each are not connected to the grid and need to arrange for their own fuel purchases and energy production, using diesel generators.

Although specific estimates vary (from 50 to 90%), the interviewees agree in that most energy in HK is consumed by commercial and residential buildings: mostly to power the air-conditioning, lighting and vertical transportation. Low cost of energy tariff, compared to other expenses, does not encourage most companies and residents to save energy, and there are no tangible incentives e.g. for the companies to cut down on a carbon footprint (Interviewee 5). Retrofits that would allow for increased energy efficiency are difficult and costly in existing buildings, but the government is increasingly promoting building standards and regulations that ensure new developments are more energy efficient. The city is sustainable when it comes to transport: it has efficient public transportation and a small use of private vehicles.

Most interviewees claimed that energy poverty is not an issue in HK. However, 6 interviewees (18, 21, 26, 27, 28, 30) describe the problem of energy poverty in HK – among which Interviewees 18 and 27 represent the same organisation that specialises in aiding energy poor households. According to those respondents there are between 144,000 and 210,000 energy poor households in HK. Those are mostly the households that live in subdivided flats – that pay disproportionately high tariff, because of a premium often charged by landlord and the progressive tariff structure: the subdivided flats may host often even 10 families, which are charged on one energy meter, as it is officially a single flat. The tariff increases with increased use, leaving the smallest and poorest household paying the premium tariff. The need to save energy leads the families to limiting use of air conditioning, light and other appliances. The problem of energy poverty is not highly geographically concentrated – subdivided flats are spread all over the city.

2.3 Governance

The key actors for Hong Kong's energy governance are recognized to be the two power companies as well as a number of government agencies: Environmental Protection Bureau (EPB), Electrical and Mechanical Services Department (EMSD), Environmental Planning

Department (EPD) and Economic Services (Interviewees 4, 8, 17). Some interviewees believe it is the two power companies that have the most say (Interviewees 3, 9) while others indicate that the companies are heavily regulated (Interviewee 7) and the energy planning lies chiefly with the government (Interviewees 1, 3, 8, 17, 20). Representative of one of the power companies (Interviewee 17) claimed that the companies propose projects, targets, need to expand, and the government normally approves those projects and targets, but "whatever we do, we need [the government's] blessing". Interviewee 13 (private consultant) noted that although the government agencies have less say in day-to-day energy management and operations, they do have a final say in determining the fuel mix, which will determine the size and shape of future energy infrastructure.

A Scheme Of Control (SOC) agreement is a government-issued document regulating the utility companies (Interviewees 1, 10, 20), although some claim that it is a bilateral agreement: the two power companies have a powerful status whenever the SOC is being negotiated (Interviewee 15). The SOC is normally agreed for the period of 10-15 years (Interviewees 1, 18).

An NGO representative indicated that the utility companies enjoy a situation of a duopoly which poses barrier to renewable energy development (Interviewee 3). However, a utility representative (Interviewee 18) indicated that the companies enjoy a situation of a natural monopoly, determined by HK's geography.

At the time that the interviews were being conducted, the government was running wide consultations (inc. academia, business, civil society, general public) on the future of energy supply and fuel mix. However, some respondents indicated that the public and civil society participation was a token participation (Interviewees 3, 16); that the process lacked transparency (Interviewees 15, 18). The final decision in the process lies with the government (Interviewees 1, 7, 13).

Some information and data regarding energy supply, demand and use is publicly available on the EMSD website; this data is mostly provided by the two utility companies.

2.4 Future of energy

The aforementioned consultation on future energy and fuel mix in HK included two possible future scenarios: Scenario (1) in which more energy would be imported directly from

mainland China and scenario (2) in which HK would import more gas and produce the energy internally. Both options assume reducing the proportion of coal in fuel mix. Some interviewees indicated that what is also being considered is whether HK energy system should be more closely integrated with mainland China, e.g. whether HK should eventually be integrated with the South China grid. While some interviewees wondered whether importing more energy would allow for adding more renewable energies to the mix, as China is constantly expanding the amount of renewable energy projects (Interviewees 1, 26), others suggested the energy imported directly is more likely to be produced from coal, which still forms major part of mainland China's fuel mix, which would lead to HK transferring, rather than reducing its emissions and pollution (Interviewees 4, 5, 18). Importing energy from mainland China could also lead to reduced reliability (Interviewees 1, 5, 18). Importing more natural gas and producing energy in HK would contribute to reliability of energy supply (Interviewee 5) and while one interviewee (5) claimed it would be cheaper, other (18) believed it would be more expensive and would translate into a higher tariff. Interviewee 18, an NGO representative, believed that the entire consultation was too technical and should focus more on issues of price, reliability and pollution.

The interviewees have indicated that there was little prospect for HK to internally produce more renewable energy that to satisfy 2-3% of its energy requirements (Interviewees 1, 5). This is due to lack of space and/or suitable sites (Interviewees 4, 5, 7, 12) and the fact that this would lead to price increases or could not be cost effective (Interviewees 4, 12). The potential of marine energy is being explored, including tidal and wave energy (Interviewee 5) and potential to use sea water to cool buildings (Interviewee 12). One of the barriers to increasing number of renewable energy projects in the city was the fact that small-scale producers could not sell, but only donate surplus energy to the grid (Interviewee 15) although the utility company representative indicated that individual producers were unlikely to be able to produce more energy than they could use (Interviewee 17). A proposal to build a waste-to-energy site was being discussed. Interviewees interviewed in 2014 indicated that it was met with protests: nobody wanted such a site in their locality, because of pollution concern (Interviewees 1, 4). Interviewee 28, interviewed in 2015 indicated that the plant was finally approved and will be commissioned in the next few years.

A representative of the utility company (Interviewee 17) indicated HK's population was not very concerned with climate change: the city does not have high vulnerability and has no own

farming system. An academic (Interviewee 2) indicated that climate change is recognized as key issue in some circles, but there is little that HK can do about it.

The interviewees identified a number of challenges that would need to be overcome for HK to transition to a sustainable energy scenario:

- Low uptake of renewables, barriers to higher uptake and dependency on coal (Interviewees 3, 9, 16, 9, 30).
- Need for better building design, retrofitting, more green buildings, lack of energy efficiency in existing buildings and the need to change investors' and developers' attitudes to innovative technologies (Interviewees 6, 9, 11, 13, 14, 23).
- Lack of public consciousness of and demand for sustainability, need for energy-saving by residents and companies, need for behavioural change (Interviewees 7, 9, 10, 13, 16, 19, 27, 29).
- Lack of long-term planning and vision (Interviewee 20).
- Current market structure with two companies having a monopoly over energy production and distribution, and lack of incentives embedded in existing regulations (Interviewees 15, 23)
- Lack of money to finance such a transition (Interviewees 17, 18, 23).

The interviewees also presented a number of proposals the introduction of which could facilitate transition to a (more) sustainable energy scenario, that included governance-oriented solutions, market mechanisms, education and awareness building, public engagement campaigns and introducing existing technological solutions or researching new ones.