



20th September, 2019

Dear Prof. Li,

The Asian Energy Studies Centre (AESC), Hong Kong Baptist University, greatly supports the engagement process of the “Long-term Decarbonisation Strategy” led by the Council for Sustainable Development (SDC). With the aim of lending our support to SDC’s good work and in the spirit of offering constructive feedback, AESC would like to draw SDC’s attention to the prospects of exploring local renewable energy sources as a viable energy option for decarbonising Hong Kong.

This consultation document states that “*as Hong Kong has very limited renewable energy potential, regional cooperation plays a crucial role in helping us achieve a higher carbon reduction target beyond 2030*” (p.27). This statement is in line with the Hong Kong's Climate Action Plan 2030+ published in January 2017, in which the Government estimated that Hong Kong has only modest realisable renewable energy potential arising from wind, solar and waste-to-energy at about 3-4% from 2017 to 2030; and only 1-1.5% of Hong Kong's electricity consumption could be powered by solar. This government estimate is equivalent to about 440 million - 660 million kWh which requires an installed capacity of about 440 - 660 MW of solar PV systems to generate such amount of electricity (assuming 1 MW of solar PV systems could generate 1 million kWh of solar electricity annually).

We are concerned that the decarbonisation document tends to emphasis the importance of a regional energy solution in ways that Hong Kong could import more low-carbon electricity from Guangdong, while **understating local solar as a viable energy resource** in meeting Hong Kong’s energy-related climate challenges.

We would therefore like to share an observation on the global trends of urban solar, and some preliminary findings of our recent research that suggests local energy solutions may play a more important role in HK’s long-term decarbonisation strategy than it is currently framed in the consultation document.

Asian Energy Studies Centre

Room 1202, 12/F, Academic and Administration Building,
15 Baptist University Road, Kowloon Tong, Hong Kong

亞洲能源研究中心

香港九龍塘浸會大學道 15 號教學及行政大樓 12 樓 1202 室

Telephone: (852) 3411-7187

Fax: (852) 3411-2383

Email: aesc@hkbu.edu.hk

Website: <http://aesc.hkbu.edu.hk/>

Our Mission: To pursue excellence in sustainable energy research, with focus on perspectives of governance in the Asian context; to promote informed energy decision-making and improve energy policies in Asia as well as Hong Kong, by creating new knowledge, providing practical policy recommendations, and promoting knowledge exchange in sustainable energy.



1. Local Action, Local Solutions - Core to SD Goals

Responsibility and role of localities in aspects such as climate change were given more attention in the Sustainable Development Goals (SDGs) 2030 than before (Reddy, 2016). As mentioned in the SDGs 2030 report, local authorities, indigenous peoples, and civil society will be involved for the SDGs 2030 (United Nations, 2015). And for energy, the importance of the plurality of energy sources and solutions was mentioned in Goal 7. Although not mentioned explicitly, the report recognised the importance of local energy solutions.

Major leading cities in the world including London, New York City, and Seoul are proactive in developing urban solar as a core element of climate policies. Table 1 provides an overview of some of these cities and Hong Kong in terms of solar developments. While Hong Kong possesses modest solar resources that is comparable to those in some of these other cities, Hong Kong is lagging behind in setting an explicit solar target. Two major renewable energy policies in Hong Kong, the Feed-in Tariff Scheme and renewable energy certificates were launched first in October 2018, followed by Solar Harvest in early 2019. The overview in Table 1 suggests that Hong Kong could be more proactive in introducing effective policy instruments to promote urban solar development, rather than prioritising the import option in our decarbonisation strategy.

Table 1. An overview of leading cities and Hong Kong in urban solar development.

	London	New York City	Kyoto	Seoul	Hong Kong
Population by city (2016)	8,799,000	8,615,000	1,475,000	9,931,000	7,336,600
Global rank of GDP by country (2017)	5 th	1 st	3 rd	12 th	2 nd (HK: 33 rd)
GDP by country (2017; in billion US\$)	2,622	19,390	4,872	1,531	341
Global rank of GHG emissions by country (2014)	17 th (494 MtCO ₂ e)	2 nd (6,319 MtCO ₂ e)	8 th (1,322 MtCO ₂ e)	13 th (632 MtCO ₂ e)	1 st (11,601 MtCO ₂ e)
Solar targets by city	2 GW by 2050	1 GW by 2030	475 GWh from residential solar PV by 2020	1 GW by 2022	N.A.
Urban solar initiatives (selected examples)	<ul style="list-style-type: none"> • Neighbourhood solar cooperative • Solar empowerment zone • Renewable energy provider exchange platform 	<ul style="list-style-type: none"> • Solar partnership between government and university • Solar empowerment zone • Microgrid energy trading platform 	<ul style="list-style-type: none"> • Government initiated and developer-driven prosumer development integrated with smart homes • Keihanna new city as site for solar prosumers 	<ul style="list-style-type: none"> • Grassroots prosumers' communities promoted by city government • Community coupon scheme for energy trading between prosumers and consumers 	<ul style="list-style-type: none"> • Feed-in tariff policy • Renewable energy certificates • Solar Harvest (for schools)



A particularly interesting example to share is the case of Hamburg in Germany. Hamburg is featured by its effort in pursuing the localisation of energy solutions, instead of depending on regional power utility. A referendum was launched in the city to purchase back the electricity grid from Vattenfall, which is a power company serving the broader region, and to transform it into a local city-based public utility. Vattenfall has paid less effort in endorsing clean energy, as it owns two fossil fuel power stations in Europe (Energiewende Team, 2014). Despite the high price of the grid (EUR 400,000,000), the purchase provides opportunities for renewable energy development of the city (The Local Europe AB, 2014). As the city regains its energy independence, it would be more flexible for it to pursue its goals of adopting renewable energy (World Future Council, 2017).

2. Preliminary findings of our recent research that suggests local renewable solutions could be a viable energy option for HK's long-term decarbonisation strategy

AESC is currently conducting an on-going, 15-month Public Policy Research Funding Scheme (PPR) project funded by the Hong Kong Government's Policy Innovation and Co-ordination Office (PICO) titled "Engaging the community to develop a model for sustainable energy futures: A case study of two prospective solar communities in Hong Kong" from September 2018 to November 2019 to research on urban solar development in Hong Kong. The aims of the PPR project is to investigate whether solar communities is a viable energy option for the energy future in Hong Kong, and to identify and develop solutions to the technical, economic socio-political and institutional barriers vis-à-vis the Feed-in Tariff Scheme.

Two prospective solar communities, Fairview Park in Yuen Long and Hong Lok Yuen in Tai Po, are chosen for comparative study. These two communities are characterised by their low-density, low-rise residential housing as well as rich and evenly distributed solar potentials among individual households. This project adopts an interdisciplinary approach by conducting solar potential assessment with 51 households; in-depth, semi-structured interviews with 90 households and stakeholders, and ex-post stakeholder workshops with 57 householders to examine household responses on community solar development before and after the launch of Feed-in Tariff Scheme.

One of the major preliminary¹ findings of this research is that solar resources in these two communities are plentiful. Accordingly to our GIS-based solar assessment (Table 2), the projected annual solar energy potential of the *entire* Fairview Park community (including all 5,024 households) amounted to 42,138 -

¹ Full report of this study is expected to be available by end this year.



44,424 MWh with an installed capacity of 42.5 MW.² This amount of electricity is equivalent to the annual electricity consumption of about 12,800 – 13,500 three-person households.

The projected annual solar energy potential of the *entire* Hong Lok Yuen community (including 1,190 households) amounted to 16,926 – 18,093 MWh.³ This amount of electricity is equivalent to the annual electricity consumption of about 5,100 – 5,500 three-person households.

To put these estimates into context, 42.5 MW + 17.2 MW = 59.7 MW, which is already equivalent to nearly 10% of the Hong Kong Government’s “solar target” of 660 MW.

To complement the community-wide solar assessment, we also conducted onsite solar assessment in households in these two residential estates. The estimated annual solar energy potential of the 32 onsite assessment Fairview Park households amounted to 222 MWh, with an estimated rooftop area of 1,078 m². The estimated annual solar energy potential of the 19 onsite assessment HLY households amounted to 210 MWh, with an estimated rooftop area of 984 m².

Table 2: An overview of solar resources in Fairview Park and Hong Lok Yuen

	Fairview Park	Hong Lok Yuen
Solar installed capacity from projection	42.5 MW (assuming an estimated total rooftop area of about 240,811 m ² are fully equipped with solar PV systems)	17.2 MW (assuming an estimated total rooftop area of about 97,544 m ² are fully equipped with solar PV systems)
Solar resources from projection	42,138 – 44,424 MWh/year (240,811 m ² estimated rooftop area; equivalent to annual consumption of about 12,800 – 13,500 3-person households)	16,926 – 18,093 MWh/year (97,544 m ² estimated rooftop area; equivalent to annual consumption of about 5,100 – 5,500 3-person households)
Solar resources from onsite assessment	222 MWh/year (32 households; 1,078 m ² estimated rooftop area; equivalent to annual consumption of about 67 3-person households)	210 MWh/year (19 households; 984 m ² estimated rooftop area; equivalent to annual consumption of about 63 3-person households)

² We assume an estimated total rooftop area of about 240,811 m² are fully equipped with solar PV systems.

³ We assume an estimated total rooftop area of about 97,544 m² are fully equipped with solar PV systems.



香港浸會大學
HONG KONG BAPTIST UNIVERSITY



By sharing the preliminary findings of our research, we would like to urge the SDC to pay sufficient attention to local renewable energy sources as a viable energy option for decarbonizing Hong Kong.

Thank you very much for your kind attention.

Yours sincerely,

Daphne Ngar-yin Mah
Director
Asian Energy Studies Centre
Hong Kong Baptist University

Asian Energy Studies Centre

Room 1202, 12/F, Academic and Administration Building,
15 Baptist University Road, Kowloon Tong, Hong Kong

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