

## **MINIMISING THE COST OF HONG KONG MAKING AN APPROPRIATE CONTRIBUTION TO GLOBAL GHG MITIGATION**

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*Abstract: By the 2015 Paris Agreement, the Nations of the World set the target of achieving carbon (GHG emission) neutrality in the second half of this century. Pricing carbon emissions and introducing carbon emissions trading will facilitate this transition at minimum cost. Hong Kong's good governance and entrepreneurial traders enabled it to benefit from a similar market in the past – textile quotas in the 1970s and 1980s. Hong Kong's early participation in China's National carbon market is likely to be the lowest cost way for it to make an appropriate contribution to carbon emissions reductions the Paris Agreement implies for advanced cities. Further, this action will increase opportunities for Hong Kong to earn its living by providing some of the engineering and financial services that China needs for its transition to a low carbon economy.*

### **INTRODUCTION**

This paper addresses four questions:

1. What is an appropriate contribution for Hong Kong to make to GHG mitigation?
2. How can Hong Kong reduce GHG emissions?
3. What is the easiest way for Hong Kong to put a price on carbon emissions?
4. What is the benefit to Hong Kong of a cross-border carbon market?

### **WHAT IS AN APPROPRIATE CONTRIBUTION FOR HONG KONG TO MAKE TO GHG MITIGATION?**

#### **The global context on GHG mitigation**

The 2015 Paris Agreement adopted the objective of holding the increase in global average temperature well below 2°C above preindustrial levels and pursuing efforts to limit the increase to 1.5°C. It was agreed to achieve this goal by peaking global GHG emissions as soon as possible and undertaking rapid reductions thereafter so as to achieve a balance between anthropogenic GHG emissions and their removal through [natural] sinks in the second half of this century (UNFCCC-COP, 2015, pp. 3-4).

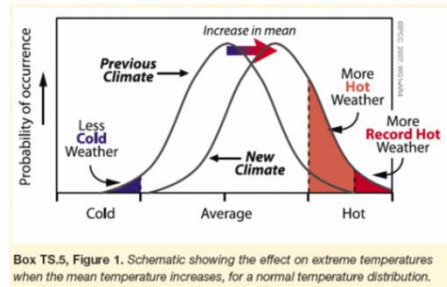
The Paris Agreement sets up a 'pledge and review' mechanism for countries to work together to achieve this target. One way of describing this is to imagine you go to an excellent dinner with your friends. At the end of the dinner each person puts on the table their contribution towards paying the bill – this being the pledge; and someone adds up the money pledged – this being the review. If it is not enough everyone is asked if they can pay more, and the process is repeated until there is enough to pay the dinner bill.

Our civilization is ‘dining well’, and the initial pledges made in Paris, called ‘Intended Nationally Determined Contributions’ (INDC) fall well short of the reduction in GHG emissions required to keep the temperature increase to 2°C let alone 1.5°C.

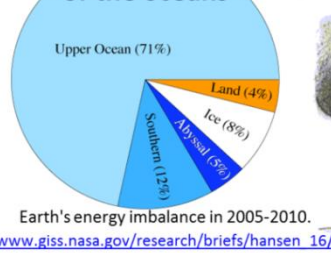
Why are the INDCs inadequate? I believe there are five main reasons:

Figure 1:

Climate change is obscured by weather



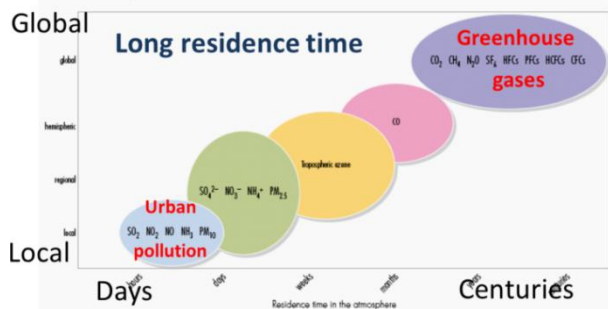
The thermal buffer of the oceans



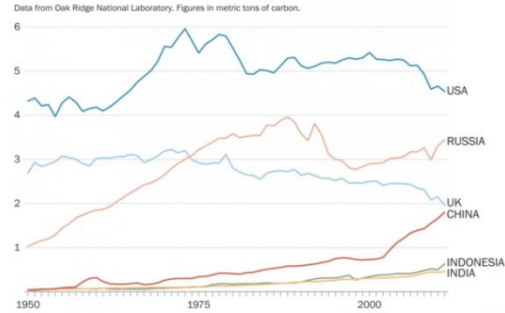
The telephone problem



Figure 2.1 Selected pollutants, their average residence times in the atmosphere and maximum extent of their impact



Carbon dioxide emissions from fossil fuels per capita



Climate change is obscured by weather (IPCC, 2007, p. 53); The thermal buffer of the oceans (GISS, 2012); The telephone problem (The Sydney Morning Herald, 2008); Long residence time (United Nations Environment Programme, 2007, p. 43); Carbon dioxide emissions from fossil fuels per capita (The Washington Post, 2015)

Firstly, climate change is obscured by weather. That is the daily variation of the weather is much greater than the impact of climate change. To determine if we have climate change, we must examine the statistics of the weather over a period of years.

Secondly, we focus on the change in land and air temperatures. Yet, about 96 per cent of the Earth’s energy imbalance warms the oceans and melts ice and only four per cent warms the land and atmosphere. Further the El Niño / La Niña oscillation transfers heat between the oceans and the air causing land temperatures to fluctuate. For example, land temperatures peaked with the 1998 El Niño and then changed little until early 2015 when El Niño started to create another peak. To observe Earth’s energy imbalance, we should look not at land surface temperatures but at the increase in sea levels which reflect the thermal expansion of oceans and the water flowing into them from the melting of ice which is on land.

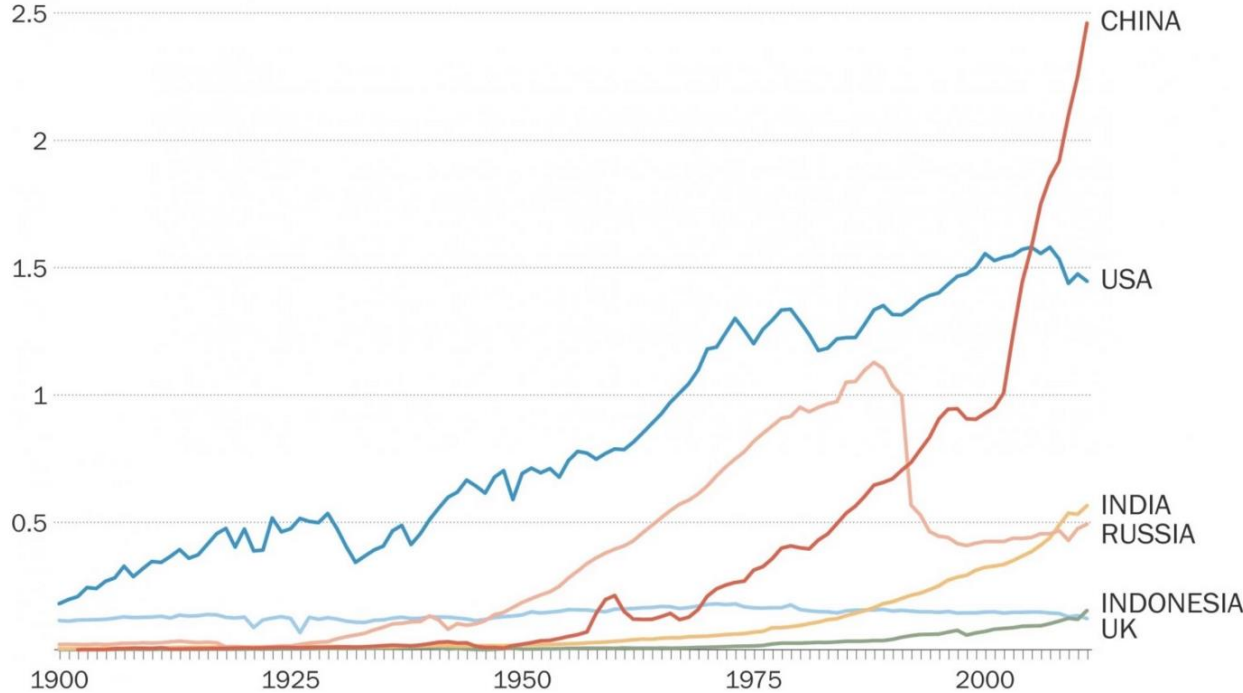
Thirdly, we have ‘the telephone problem’. Just as the immediacy of a phone ringing takes precedence over more important matters so events such as the 2007/8 financial crisis and the current migration into Europe takes precedence over the long-term need to reduce our GHG emissions.

Fourthly, climate change due to GHG emissions needs long-term global action. This is not like Beijing’s visible air pollution which can be corrected within weeks if factories are shut. CO<sub>2</sub>, the main GHG, spreads evenly around the world and remains there for well over a century.

Finally, differences in the stage of development and per capita emissions of countries make it difficult to get agreement on how to share the burden of taking action. For example, India argues that its low per-capita emissions compared to the US and EU justifies it substantially increasing coal-fired electricity generation. The large size of the Major Emerging Economies such as India and China, however, means their growth in per capita emissions has a major impact on global GHG emissions. While the graph in figure 1 shows China’s per capital emissions are below the UK’s, the graph in figure 2 shows the substantial amount by which the total of these emissions now exceed those of the US.

**Figure 2:**  
**Carbon dioxide emissions from fossil fuels**

Data from Oak Ridge National Laboratory. Figures in millions of metric tons of carbon.



(The Washington Post, 2015)

**Given the context outlined above, what is an appropriate contribution by Hong Kong to GHG emissions mitigation?**

The HKSAR Government participated in the UN process which led to the Paris Agreement as part of the Chinese delegation. What has it pledged so far?:

- Firstly, in its Hong Kong Climate Change Report 2015 (HKSAR Government Environment Bureau, 2015) it advised it will use China’s pledge to reduce carbon emissions intensity by 60-65 per cent between 2005 and 2030 as a reference when shaping its mitigation plans.
- Secondly, in the January 2016 policy address (HKSAR Government, 2016), the Chief Executive of Hong Kong confirmed the target set in May 2015 to reduce the Hong

Kong's energy intensity<sup>1</sup>, by 40 per cent compared by 2025 compared to 2005. As page 66 of the May 2015 paper notes, achieving this target depends on community support and passing the necessary legislation.

The HKSAR Government has not yet made, or discussed, 2030 or 2050 commitments. It is reasonable, however, to expect that China complying with the Paris Agreement will include its advanced cities, such as Shanghai and Guangzhou, moving towards carbon neutrality by 2050 with Hong Kong deciding to make a similar commitment.

## **HOW CAN HONG KONG REDUCE ITS GHG EMISSIONS?**

Hong Kong's action to reduce carbon emissions can comprise:

- Reducing demand for energy through improved energy efficiency and life-style changes.
- Planning our city to reduce the need to travel and maximise the extent to which low carbon intensity public transport is used.
- Decarbonising electricity supply coupled with switching from fossil-fuel to electric powered vehicles and appliances.

These actions require both policy changes and improvements in technology. Initial steps to improve efficiency are low cost or can even lead to cost savings. However, with zero carbon electricity generation as the goal, the subsequent changes will lead to higher costs for consumers. Long-term technological advances may eventually reduce these costs; however in the 2030/50 timeframe, we will need to continue to burn fossil fuels and will have to capture the resulting CO<sub>2</sub> emissions and pump them underground. It is the marginal cost of this 'Carbon Capture and Storage' that is likely to determine the price which needs to be put on GHG emissions.

How do we get our community to agree to this? The key arguments are:

1. The polluter pays principle: GHG emissions damage the climate and should be paid for.
2. Motivating decarbonisation: If GHG emissions are priced then business and consumers will work towards reducing them.

## **WHAT IS THE EASIEST WAY FOR HONG KONG TO PUT A PRICE ON CARBON EMISSIONS?**

As noted above, Hong Kong will need to pay for its carbon emissions long-term. The question, therefore, is how to introduce this price with minimum economic disruption. Further, how might Hong Kong put this price on soon in order to accelerate the decarbonisation of its economy?

Two actions which can be taken:

1. Future-proof our decisions on investing in long-term assets by including a 'Shadow Carbon Price' into investment evaluation. For example, the Scheme of Control Agreements for the power companies could require them to use a 'shadow carbon price' for carbon emissions when calculating costs of different ways of meeting

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<sup>1</sup> Emissions intensity is defined as units energy consumed per unit of GDP

electricity demand. The end result of this may be investing in assets which have a higher cost in short-term, but will be lower-cost once a carbon price is introduced.

2. The HKSAR Government could make a revenue neutral tax switch from taxes on property (rates) to a tax on the carbon content of energy used. If, for example, this is introduced for Commercial Buildings, it may significantly improve the payback period of investments to improve energy efficiency. It might even be popular. While no one likes paying taxes, it is preferable to pay a tax on energy consumption which one can manage down rather than a fixed property tax.

## **WHAT IS THE BENEFIT TO HONG KONG OF A CROSS-BORDER CARBON MARKET?**

### **Hong Kong's successful Textile Quota Market**

Hong Kong's successful operation of a textile quota market in the 1970s and 1980s is a 'concrete' example of the benefits a market in permits (Lee, 1988).

Textile quotas were imposed under the Multi Fiber Agreement between 1974 and 2005 to limit the export of clothes to the US and Europe. They were designed to protect textile industries in Developed Countries from being driven out of business by imports from Developing Countries.

Each Developing Country was given a quota of garments that it could export to a given Developed Country. If the Developing Country did not use all its quota in one year then it received less in the next year.

The Hong Kong Government initially allocated the quota based on past sales and then set up an excellent mechanism for companies to sell quota to each other. Thus, a profitable business could buy quota for expanding sales while a weak business could sell quota. The trading system allowed the companies which could get the most value from the quota to use it. It also led to Hong Kong using its quota in full each year and thus gaining quota share over time.

### **The potential for Hong Kong to benefit from China's National Carbon Market**

Hong Kong, given its good governance and entrepreneurial traders, could make a success out of a carbon market in the same way as it benefited from the textile quota system.

Hong Kong combining with the carbon emissions market in China has the following advantages:

1. It is likely to be more cost effective to save carbon emissions in the Mainland than Hong Kong. Buying credits which pay for projects in the Mainland would thus reduce Hong Kong's cost of meeting part of its emissions target.
2. Hong Kong earns substantial income providing services. Part of the arrangement for Hong Kong participating in the China's National carbon trading scheme should be access for its engineering and financial services to work on carbon reduction projects in China. Further, Hong Kong's stock exchange should be able to trade the carbon credits for China's National carbon trading scheme.

## **What lessons can Hong Kong learn from Switzerland's plans to link with the European Union Emissions Trading Scheme?**

Switzerland is an interesting case study for Hong Kong to consider (CDC Climat research, EDF, IETA, 2015) as it is a small territory looking to trade carbon emissions with the much larger European Union. Switzerland has committed to reduce GHG emissions from 1990 levels by 20 per cent by 2020 and 50 per cent by 2030 (Federal Office for the Environment, Switzerland, 2015). Action it has taken to achieve these goal includes:

1. From 2007, it put a price on GHG emissions through a 'carbon levy' paid by about 1,900 firms. The proceeds of this levy funded building energy efficiency upgrades and reduced individual health insurance and business payments for social security.
2. From 2009, permitting firms to voluntarily join its carbon trading scheme to allow them to find lower cost means of abatement than the carbon levy.
3. In parallel, it has been negotiating to link its scheme with the European Emission Trading Scheme (EU-ETS). These negotiations have been going slowly, perhaps due to the EU-ETS's current surplus of credits and hence low carbon price. The negotiations, however, position Switzerland to link with the EU-ETS once conditions are favourable.

This three-step process is low risk as it has, to use the Chinese saying, the merit of '*crossing the river by feeling the stones*'. It is a path Hong Kong can follow while it waits to see the form China's National Emissions Trading scheme will take.

## **CONCLUSIONS**

It is appropriate, given its high standard of living and dependence on trade, for Hong Kong to commit to carbon neutrality by 2050 as its contribution to the Paris Agreement's target of global carbon neutrality in the second half of this century. Putting a price on its carbon emissions and trading emissions credits both reduces the cost of meeting this commitment and should allow Hong Kong to earn income from its engineering and financial service industries contributing to carbon reduction projects in Mainland China. The first steps to achieving this objective are for Hong Kong to:

1. Put a levy on its own carbon emissions through a revenue neutral switch from property taxes to a levy on the carbon content of energy and building 'shadow carbon prices' into infra-structure investment decisions.
2. Follow Switzerland's example of setting up its own carbon market as a voluntary alternative to paying a carbon levy and then explore linking this to China's National Carbon Trading scheme.

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