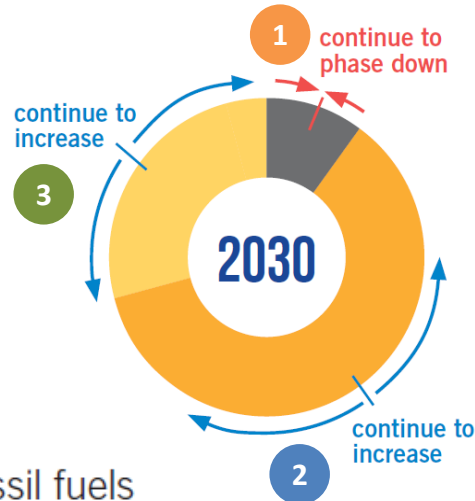
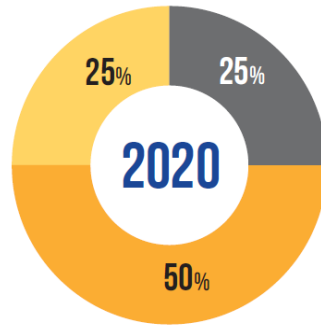
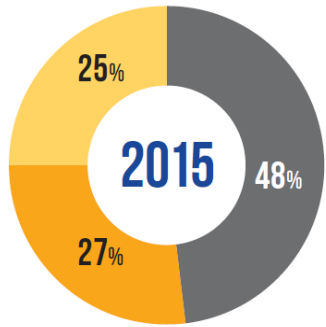


A Clear Blue Sky – the CLP Journey

by T K Chiang
Managing Director, CLP Power

Presentation to Green Council Seminar:
Energy For Our Future Generations
9 May 2019

Hong Kong's Carbon Journey



Coal
 Natural Gas
 Non-fossil fuels


Source : Hong Kong's Climate Action Plan 2030+ 2017

1 Phasing down coal




3 Increasing non-fossil fuels


Feed-in Tariff




Landfill Gas




Renewable Energy




Waste-to-Energy






Clean Energy Transmission Enhancement

2 Increasing gas



New Gas Fired Units



Offshore LNG Terminal

Hong Kong now needs to draw up a long-term decarbonisation strategy up to 2050

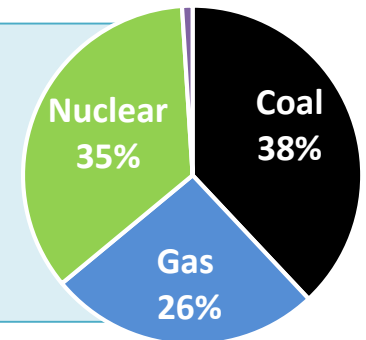
How to Lower Carbon Emissions in Electricity Supply?

Different forms of generation have different carbon emissions



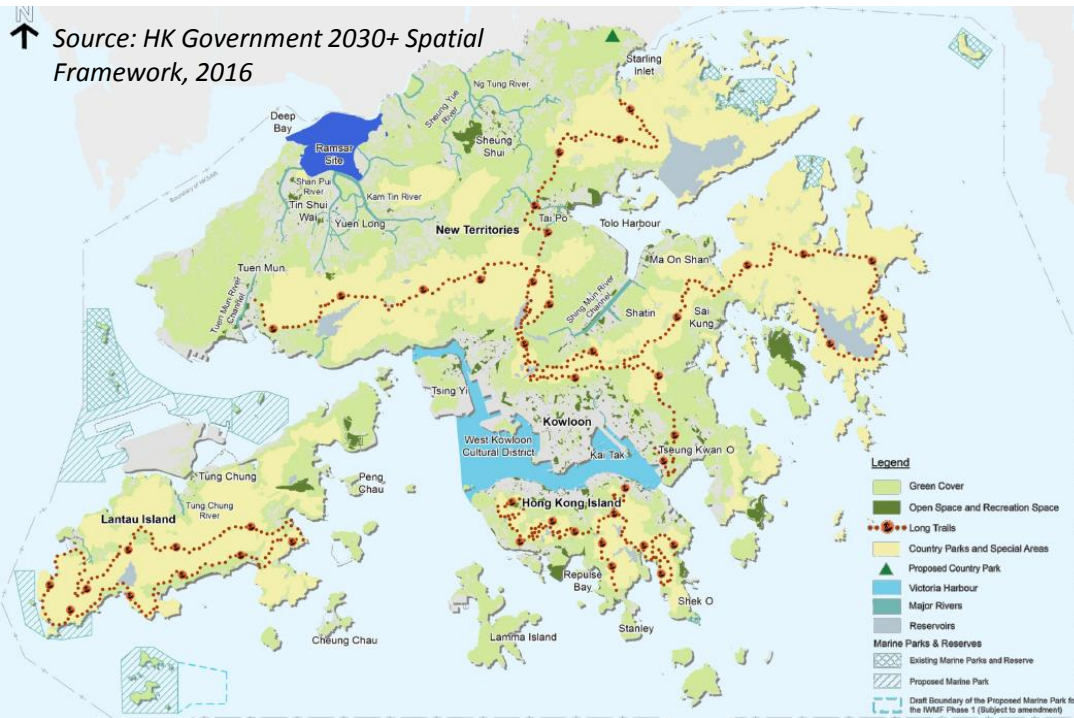
0.95	0.45	0
Typical CO ₂ Emissions (kg/kWh)		

- CLP's current generation is a mix of all of these
- The coal and gas plants are located in Hong Kong
- Nuclear is imported from Daya Bay over CLP direct connection



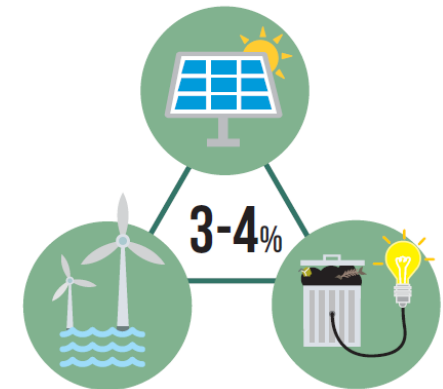
To reduce further we need more zero carbon energy. In bulk, that has to be imported

What Zero Carbon Energy is Available in Hong Kong?

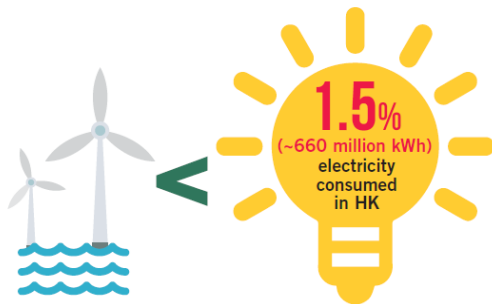


Green & Blue Assets in HK limit land available for Renewable Energy (RE)

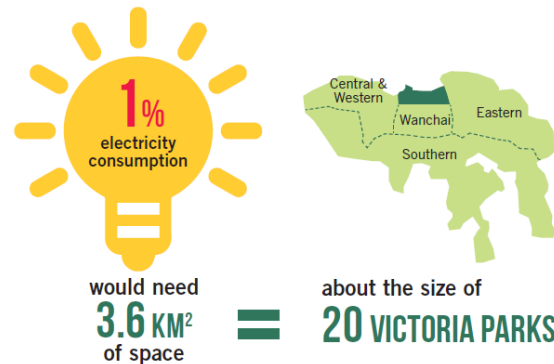
HONG KONG'S REALISABLE RE POTENTIAL UP TO 2030



HONG KONG'S WIND CAPACITY



SPACE NEEDED FOR PV TO GENERATE 1% OF HONG KONG'S ELECTRICITY CONSUMPTION



If we want to do more, regional co-operation needs to be explored

Introduction of the Feed-in Tariff (FiT) Scheme



Solar Power



Wind Power

Capacity of the Renewable Energy system	FiT rate/unit (Effective 1 Oct 2018)
$\leq 10\text{kW}$	HK\$5
$>10\text{kW}$ to $\leq 200\text{kW}$	HK\$4
$>200\text{kW}$ to $\leq 1\text{MW}$	HK\$3

Success and Challenges for FiT



Up to now...

>2,500 applications
With ~83% approved

Challenges

- Incomplete information from customers
- Technical and safety issues at site
- Insufficient network capacity
- No existing network



Congested space for utility work without proper clearance



No network access

For outstanding cases, CLP is working closely with customers to address these challenges in order to accommodate connections as far as practicable

If Hong Kong Wants to Do More, What Could be Done?

Zero carbon power today : RE and nuclear

0 Carbon



If we consider Regional Co-operation:

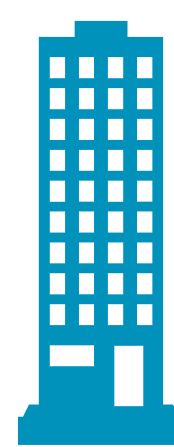
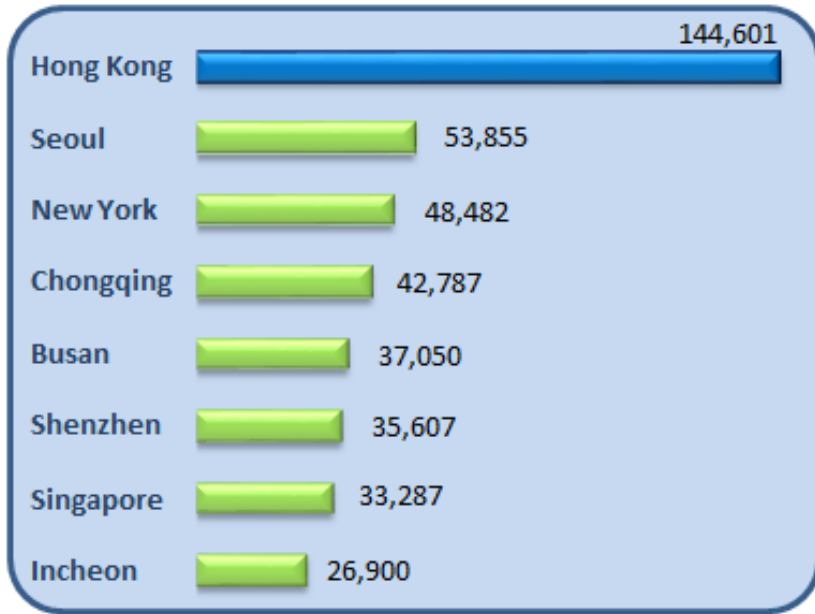
A number of pre-requisites for importing zero carbon power

- Dedicated sources with best terms
- Additional interconnection
- Support from stakeholders
- Time for building infrastructure

No compromise on reliability

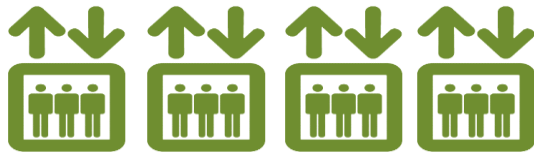
Hong Kong Requires Extra High Level of Electricity Reliability

Emporis High Rise Rankings 2016



50%

or more of the population live or work above the 15th floor



66,300

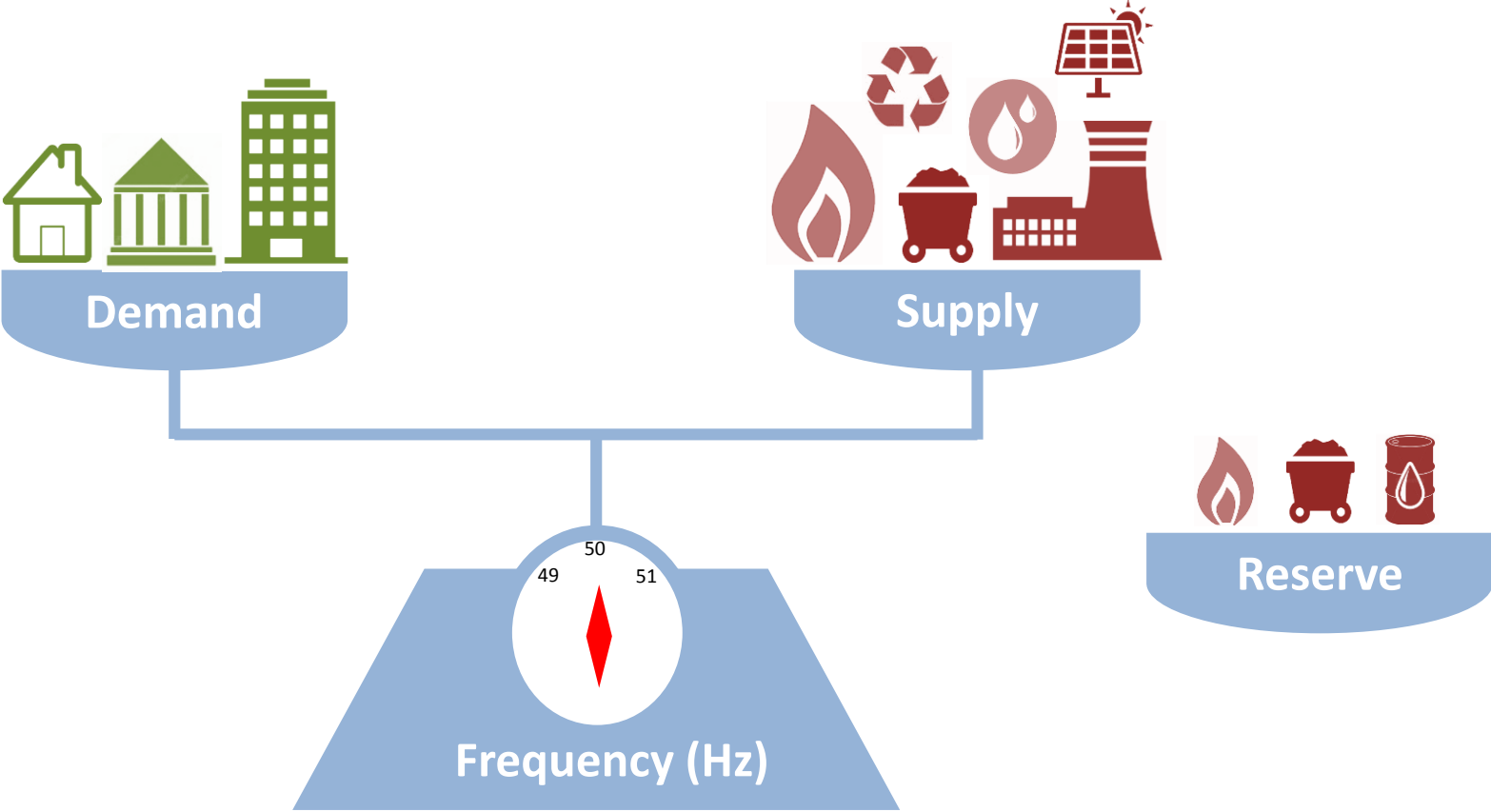
lifts in use every day

5.8million



passenger trips every day on electrically powered transport

A Reliable Electricity Supply Needs a Balanced System



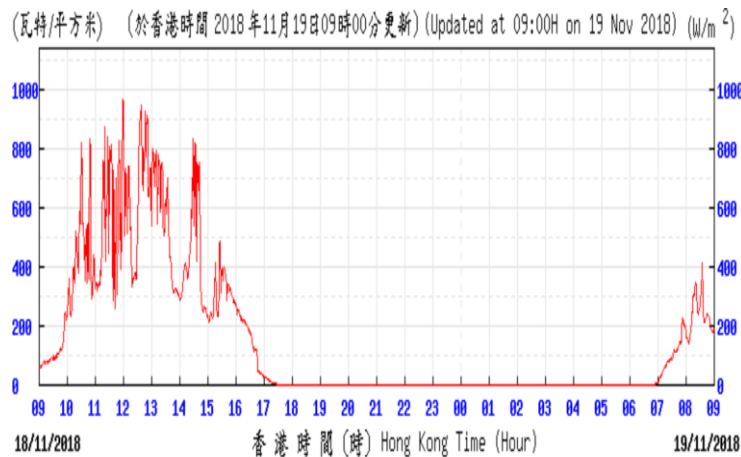
Is RE Available When We Need It?

➤ RE is intermittent –

It varies within the day, from day to day and over the longer term

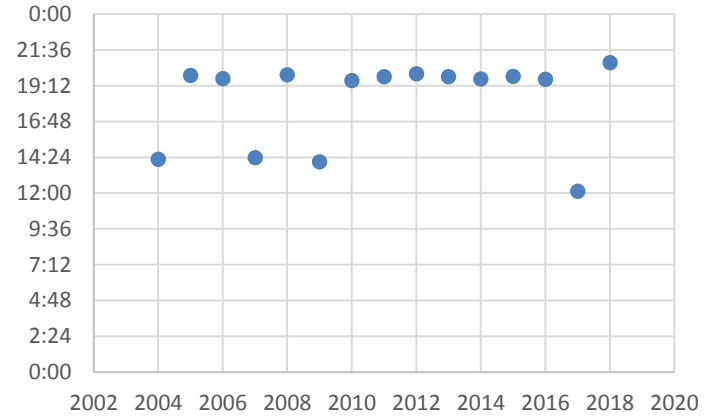
Solar Energy in Hong Kong

King's Park - Global Solar Radiation



Increasing trend
for CLP system
peaks to be at
night, when there
is no Solar Energy
production

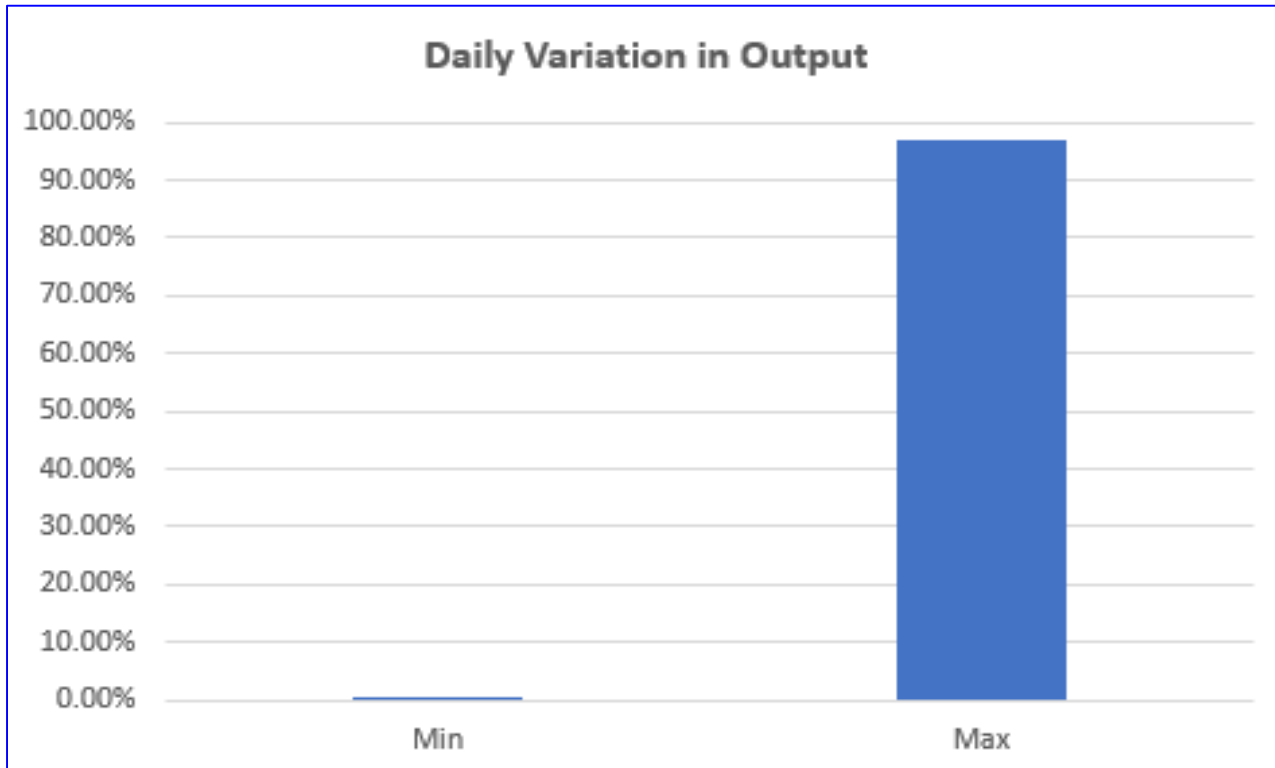
System Peak Time Last 15 Years



Is RE Available When We Need It?

Wind Energy

Wind turbine outputs vary enormously

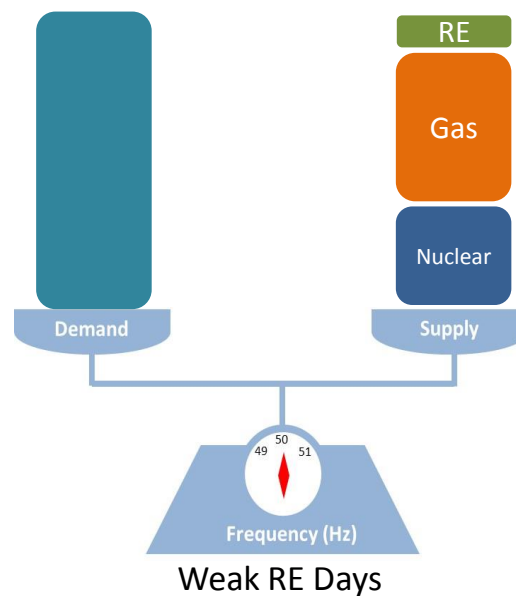
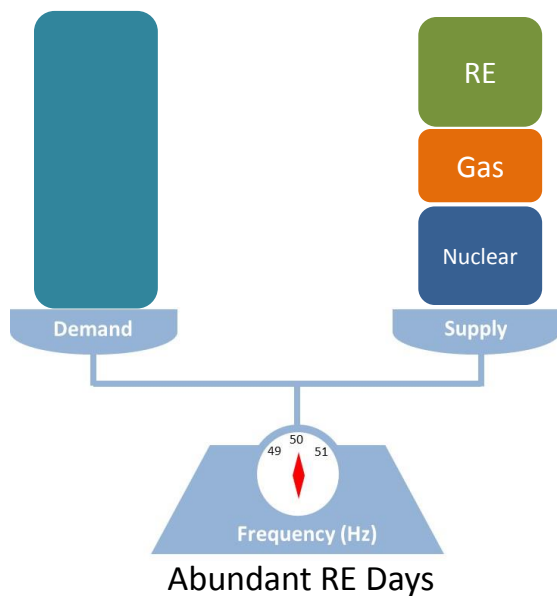


Source : CLP Shandong Windfarms - Actual Daily Generation

Carefully Structure Zero Carbon Power to Maintain Reliability

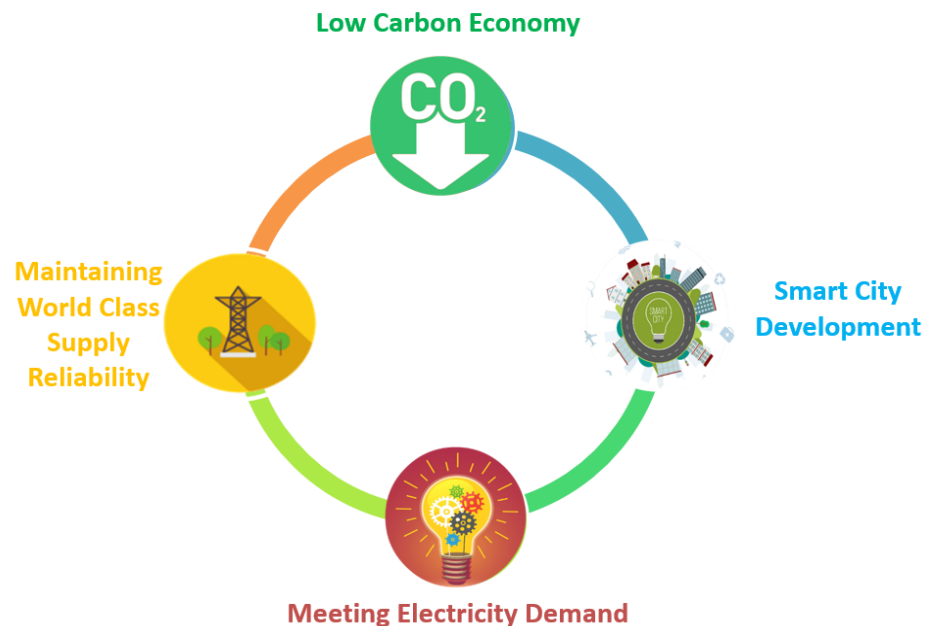
Availability and accessibility of zero carbon sources

- **Wind and solar, in Guangdong** - perhaps with limited volumes or elsewhere (longer distance away)
- **Hydro** - possibly from Yunnan (1,000km+ away)
- **Nuclear** - in Guangdong

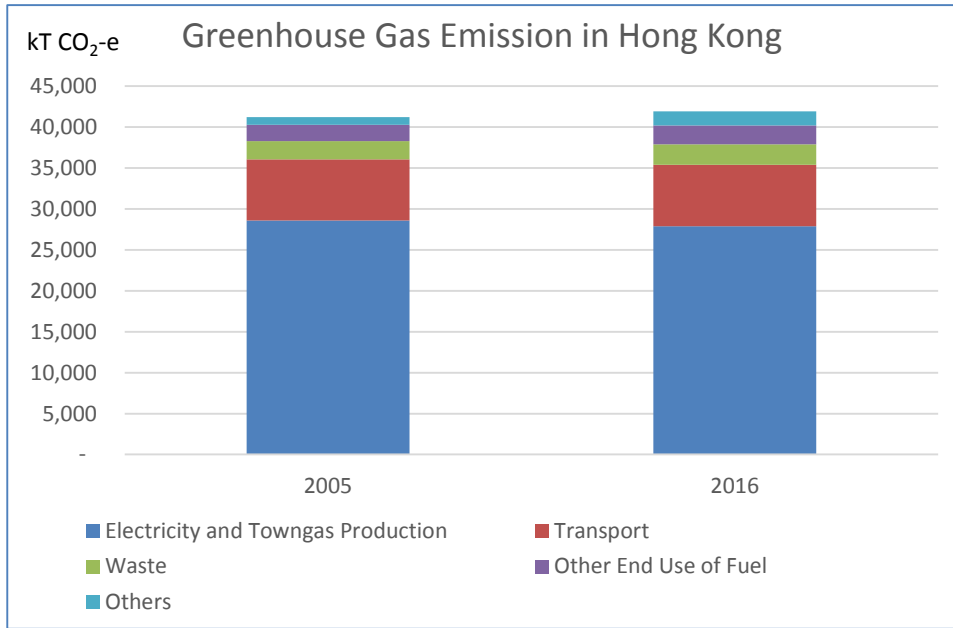


Reducing Carbon – the Opportunity

- Taking steps to replace coal with more gas
- We have an opportunity to plan for the retirement of the remaining coal plants in the mid 2030s
- We could replace with local gas...
...or consider importing more zero carbon energy
- We need to decide soon
- Critical to maintain supply reliability



Other Sectors Have a Key Role to Play



Source : EPD GHG Inventory – Aug 2018

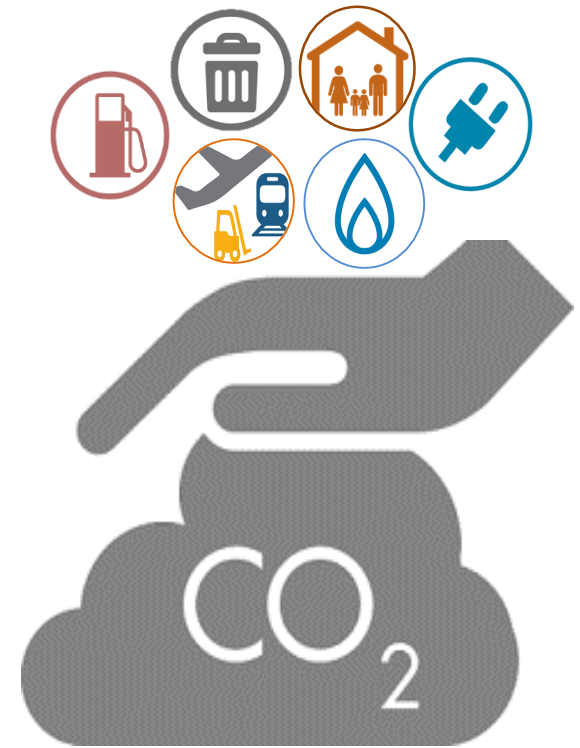
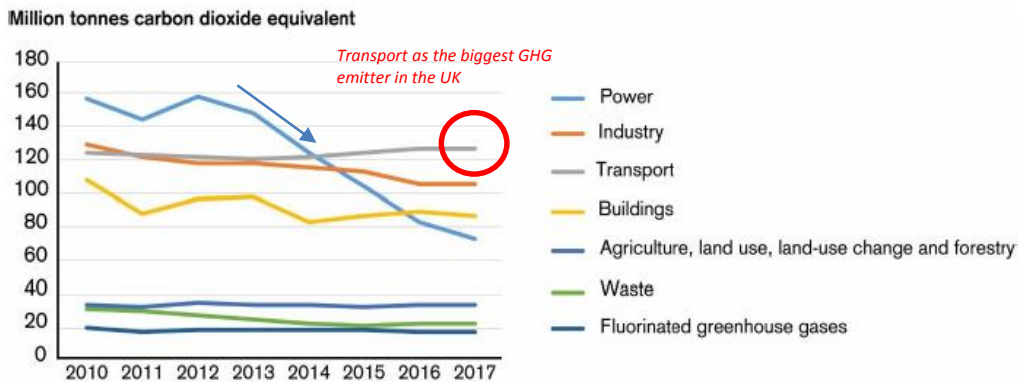


Figure 4.5: UK sectoral greenhouse gas emissions

UK Experience



Source: CCC, Reducing UK emissions – 2018 Progress Report to Parliament (2018).

HK's carbon emissions can go lower
Efforts from all sectors needed

Development of Smart City through Digital Transformation

~ A way to Contribute to Carbon Reduction

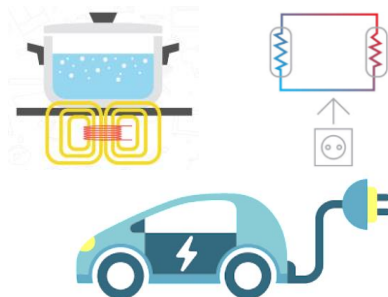


CLP Facilitates Other Sectors in Carbon Reduction

Financial support for building retrofit / retro-commissioning



Low-carbon energy use conversion support



Demand Response to reduce peak demand and defer capacity expansion



Energy audit and advisory service for customers



Smart Meters empowering customers to save energy



- Electricity will be the most important energy source in a low-carbon city
- Demand side efficiency and flexibility facilitate effective decarbonisation

Enabling Smart Living and Energy Management for Customers



CLP Mobile App



Benchmarking

Eco Power 360

- Online energy assessment tool
- Enabling customers to compare their electricity consumption with similar consumption pattern
- Provide consumption projection
- Support energy management and improve energy efficiency

Power Connect



Subsidising Customers to Improve Building Energy Efficiency

CLP New Eco Building Fund

- HK\$100 million a year to subsidise energy saving works in communal areas of 400 buildings each year
- Target to save 48 GWh of electricity annually

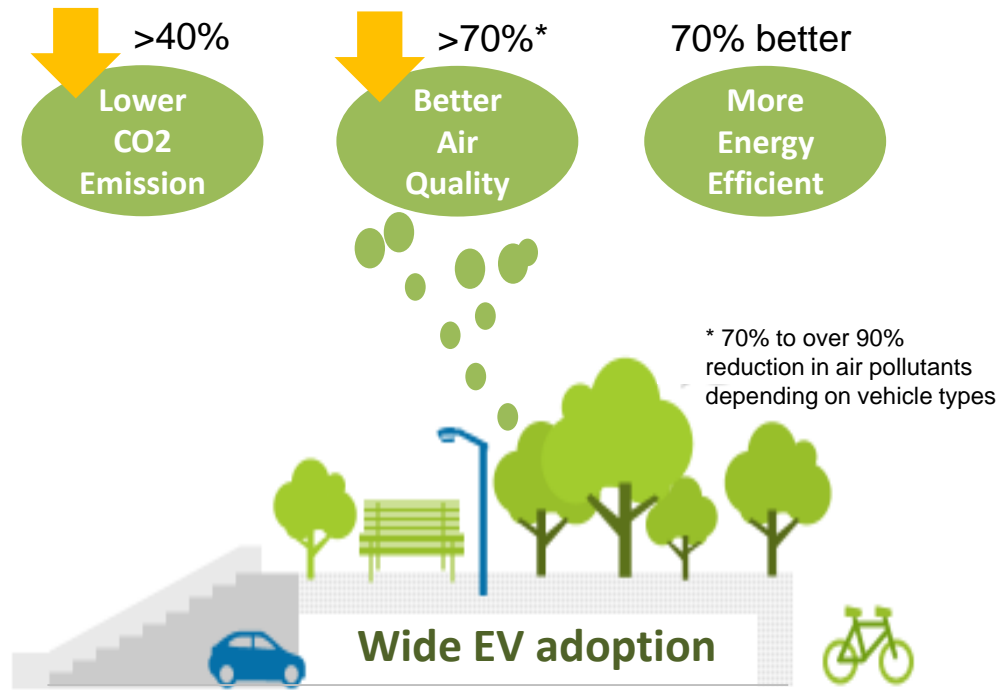


CLP Subsidy Scheme for BEAM Plus

- Encourage greater energy efficiency in the buildings of eligible schools or NGOs
- Offer subsidy of assessment fees to eligible organisations

Electrification of Mobility

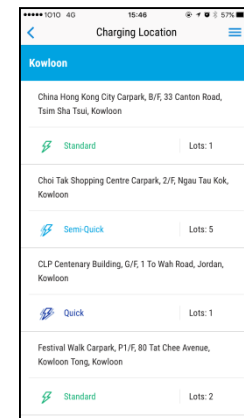
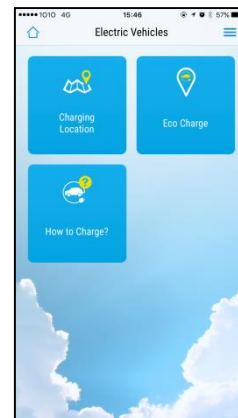
CLP has set up 54 charging stations providing over 160 EV charging points



The CLP-HKT joint venture provides One-stop Hassle-free Solution



Mobile App on EV charging



Promoting Energy Efficiency through Public Education



POWER YOU Kindergarten Education Kit and related outreach activities



Kindergarten

Green Studio



Green Elites Campus Accreditation Programme



Primary

Engineer in School



Liberal Studies Portal



Secondary

CLP Power Academy



Low Carbon Energy Education Centre



Career Talks, Scholarships & Internships



Tertiary Institutions

The Making of a Low Carbon Hong Kong ...

- There are options to go further. How far and how fast does Hong Kong want to go?
- CLP will work on behalf of the community to implement their direction and continue to support Hong Kong with clean reliable and competitively priced electricity





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