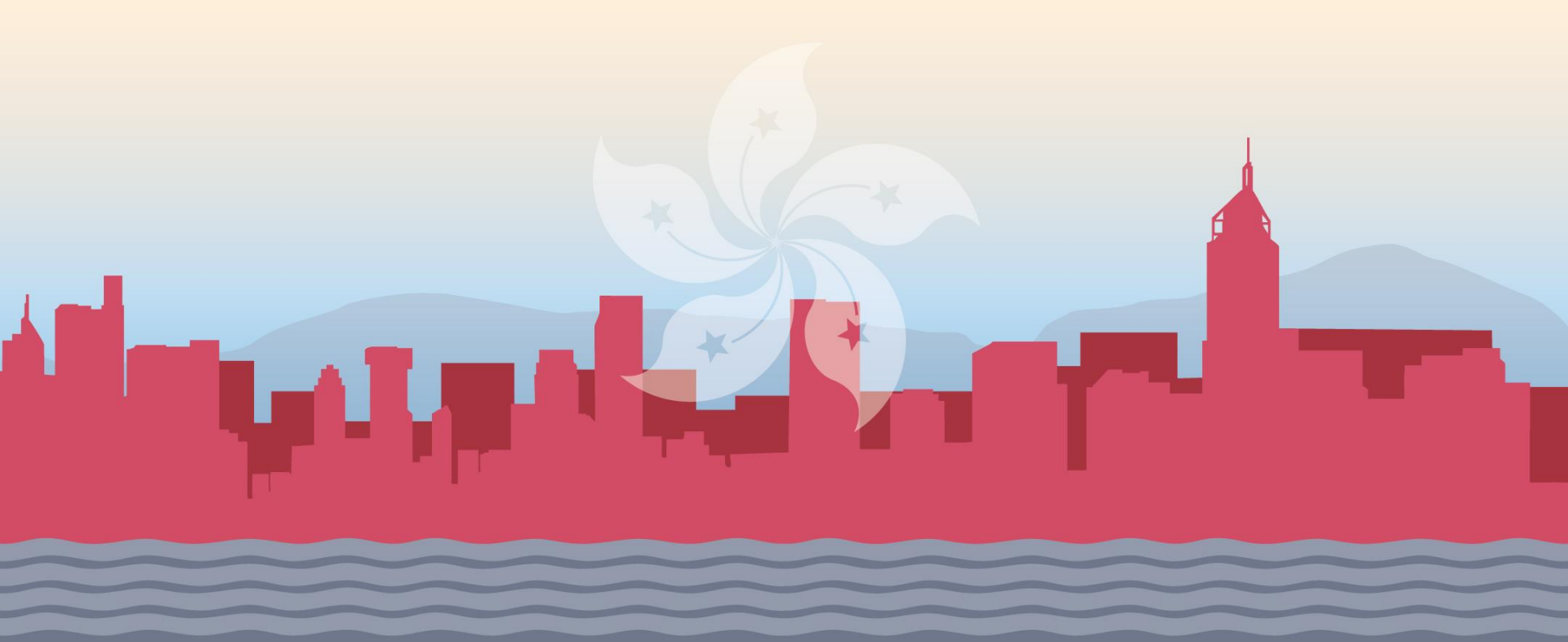


APEC EGNRET48 Meeting

How to Achieve the Renewable Energy Goal in Hong Kong, China

28-31 March, 2017

Outline of Presentation

- Energy and Hong Kong
- Climate Mitigation and Hong Kong
- Renewable Energy and Hong Kong

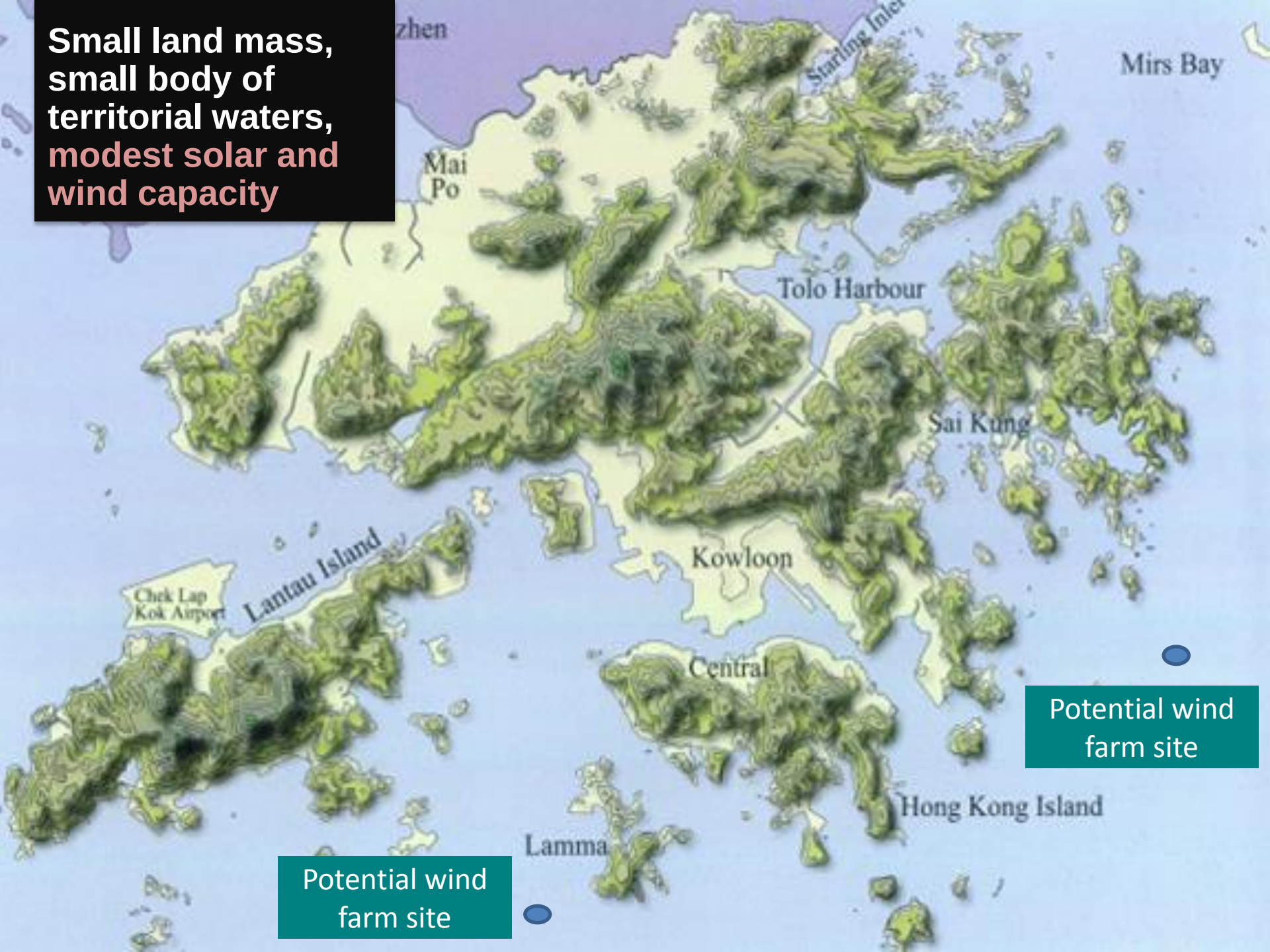
Energy and Hong Kong

Mongolia
North Korea
Japan
China
South Korea
Nepal
Bangladesh
India
Myanmar
Laos
Hong Kong
Taiwan
Thailand
Cambodia
Vietnam
Philippines
Sri Lanka
Malaysia
Singapore
Papua New Guinea
Indonesia
Australia
Cancer
The Equator

UNIQUE FACTS ABOUT HONG KONG (1,100 sq km)

Humid tropical climate

Extreme high density

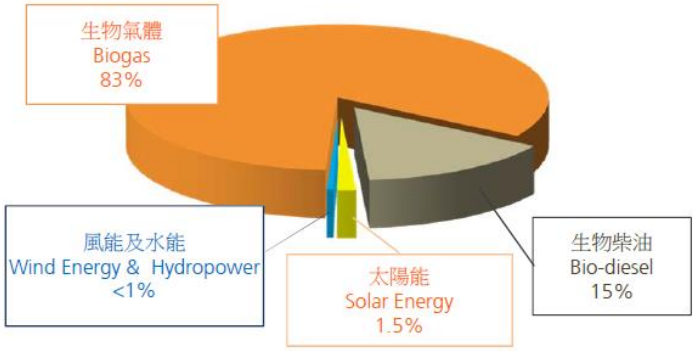

Small land mass, small body of territorial waters, modest solar and wind capacity
Mai Po
Starling Inlet
Mirs Bay
Tolo Harbour
Sai Kung
Kowloon
Lantau Island
Chek Lap Kok Airport
Central
Hong Kong Island
Lamma
Potential wind farm site
Potential wind farm site


HOT, HUMID &
EXTREME HIGH
DENSITY CITY

Energy End-use of RE in Hong Kong, China

- In 2014 the amount of total energy end-users was 289,160 TJ.
- Around 1 993TJ of RE of various types were produced.

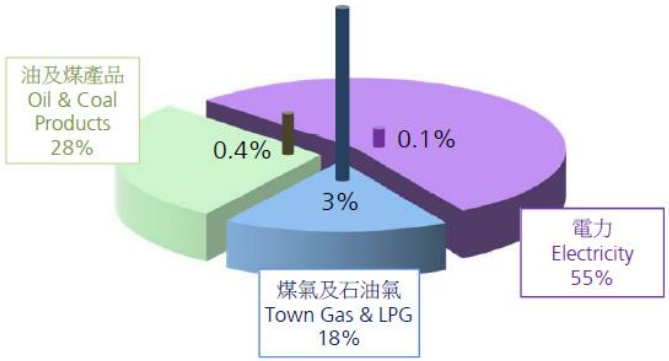
香港的可再生能源 Renewable Energy in Hong Kong



在2014年間，香港本地生產了約1,993太焦耳的各類可再生能源，並用在能源最終用途上。

In 2014, around 1,993 TJ of renewabl energy of various types were produced and consumed by end-uses in Hong Kong.

可再生能源在能源最終用途的比重
Weighting of Renewable Energy in Hong Kong Energy End-use



Source: Hong Kong Energy End-use Data 2016, EMSD

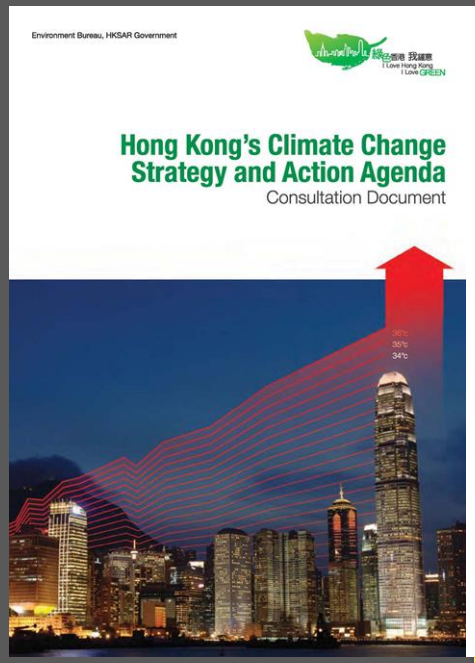
Climate Mitigation and Hong Kong

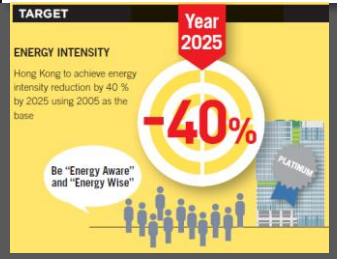
2010 to 2020

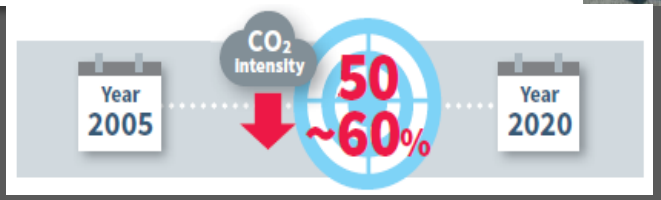
2015 to 2025

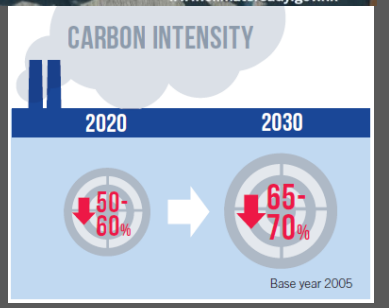
2015 COP21

2017 to 2030









2017 Target for 2030

5-year Review

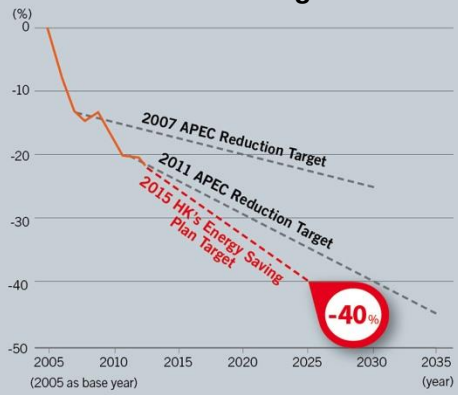
Mitigating carbon emissions in Hong Kong – top/bottom up

Revamping Electricity Fuel Mix

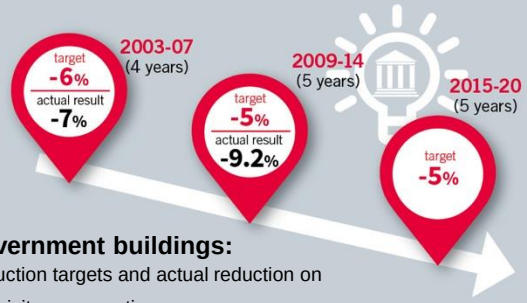
Reduce coal usage

Use cleaner fuels (e.g. natural gas) develop RE and distributed power

Setting Energy Intensity Reduction Targets



Practicing Energy Saving in Buildings



Government buildings:
Reduction targets and actual reduction on electricity consumption

Green building standards, design and construction

Better air conditioning performance

More energy efficient electrical appliances

Improve building management

Extend life span of buildings

Improving 'sinks'

- Better landscape networks
- Enhance biodiversity and native planting / urban agriculture
- Explore blue-green infrastructures to improve external environmental qualities

Greening Transportation

promote electric and energy efficient vehicles and cleaner fuel

Extend rail and prioritise public transport

Energy saving across transport sector

Promote energy efficient vehicles and cleaner fuels

Improve pedestrian experience

Turning Waste-to-Resources

Implement waste reduction, reuse and recycling plans

Recover energy from waste treatment, including organic waste

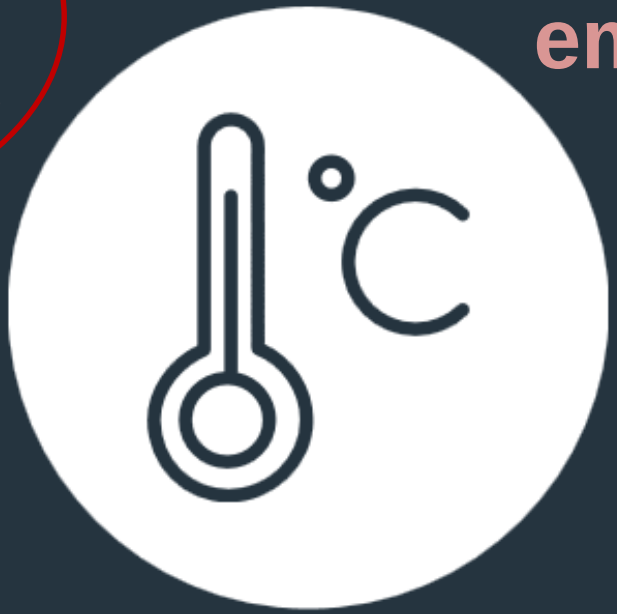
Maximise use of landfill gases

Capture energy from waste water treatment

What Hong Kong is doing

1. Change energy supply where possible

2. Promote energy efficient buildings



3. Reduce emissions from transport

4. Reduce waste and turn waste-to-energy

… in mitigation

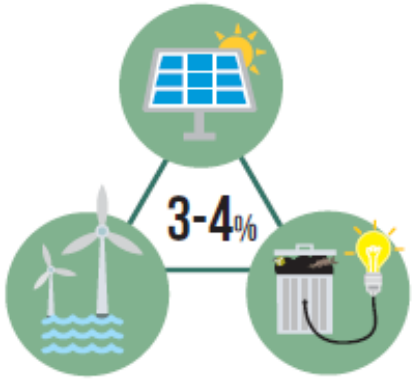
Renewable Energy and Hong Kong

Increasing Hong Kong's Renewable Energy

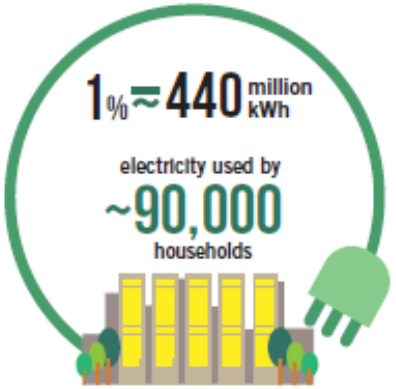
Our Aim

To apply RE on a wider and larger scale with the public sector taking the lead, and to create the conditions to enable the private sector to consider adopting RE.

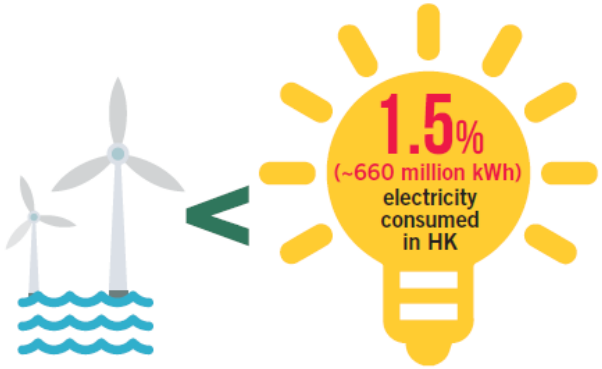
HONG KONG'S REALISABLE RE POTENTIAL UP TO 2030



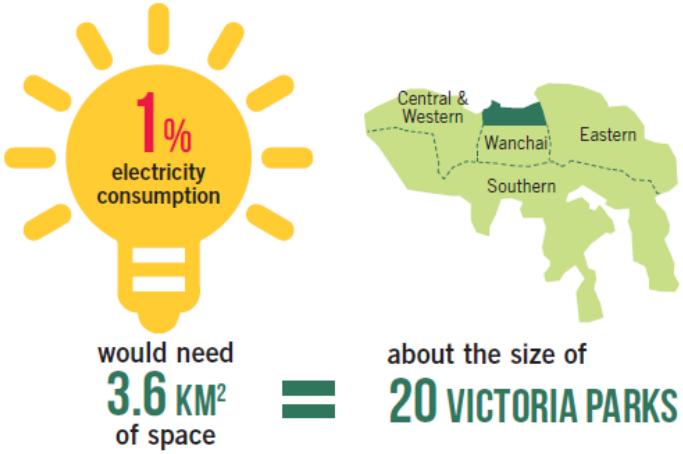
HONG KONG'S MAGNITUDE OF ELECTRICITY CONSUMPTION

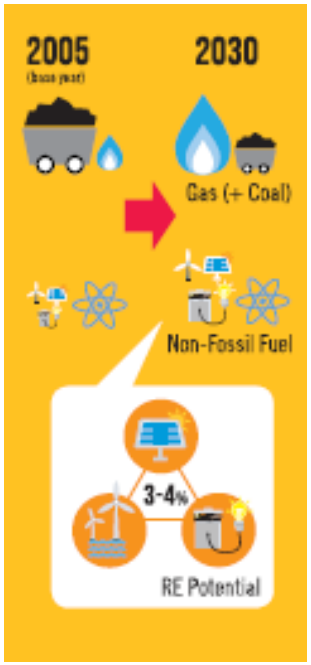


HONG KONG'S WIND CAPACITY



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





Estimated Wind Potential

HONG KONG MAP OF WIND FARMS

PV on Government Buildings

Starting from April 2017, the Government will strengthen its guidelines for government buildings to:

New schools and educational buildings

Upgrade the target of electricity consumption powered by RE from the existing 1% to 1.5%

New open spaces and public parks

Upgrade the RE target from 15% of general public lighting to 25%

New government buildings

Allocate at least 10% of available roof space to incorporate RE technologies

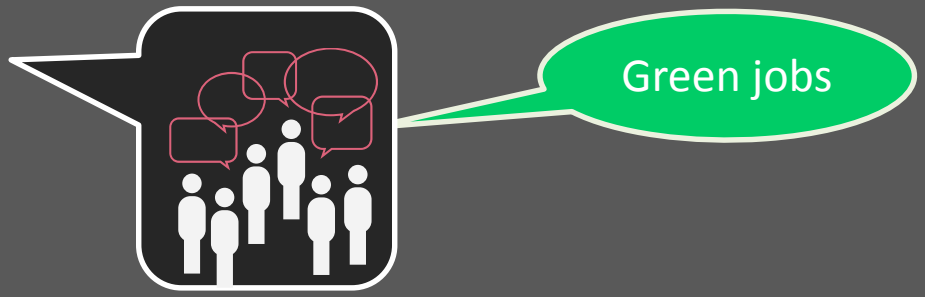
Existing government buildings

Undergo major retrofitting and/or renovation to incorporate RE technologies wherever practicable

Promote concept of RE to public

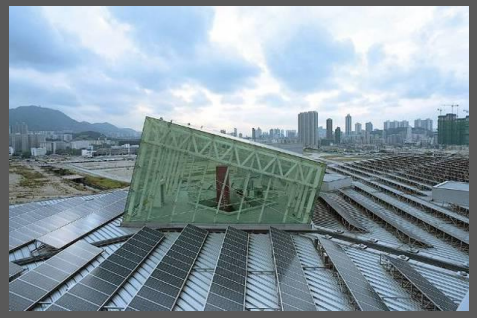
Install display panels, where appropriate, to show the amount of RE generated at prominent locations in Government Buildings

RE examples in HK



Solar water heating
e.g. pool; hospital

PV **EMSD HQ; public housing, schools, lamp posts etc**



PV on Government Facilities

Solar Farm at Siu Ho Wan Sewage Treatment Works

Commissioned in December 2016

1.1 MW Installed Capacity

Supply 25% of electricity needs for the sewage treatment works

PV on Government Facilities

The following types of PV projects are being considered on public infrastructure:

- Roofs or open areas of pumping stations and treatment works
- Reservoirs
- Rock Slopes
- Noise Barriers
- Roofs of covered footbridges and walkways
- Roofs of Public Piers
- Lights in Parks, Public Housing etc.

Pilot floating PV system at Shek Pik Reservoir (photomontage)

Anderson Road Quarry Development site has potential for PV installations

RE on Government Facilities

Tuen Mun Hydropower Plant

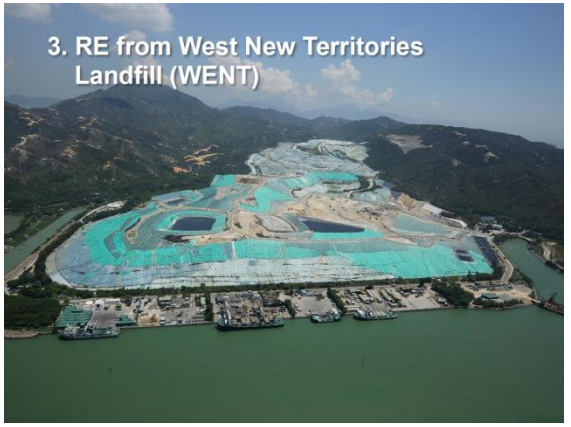
Use residual water from Tai Lam Chung Reservoir for power generation	Two sets of water turbines installed: • 1st completed 2013 • 2nd completed 2017	Rated Power Output **360 kW**	Electricity generated **3 million kWh/year**	Cost Saving **About 10% of annual electricity consumption**	Reduction of CO_2 emissions **2,000 ton/year**

1st set of Hydropower Generator up and running in 2013

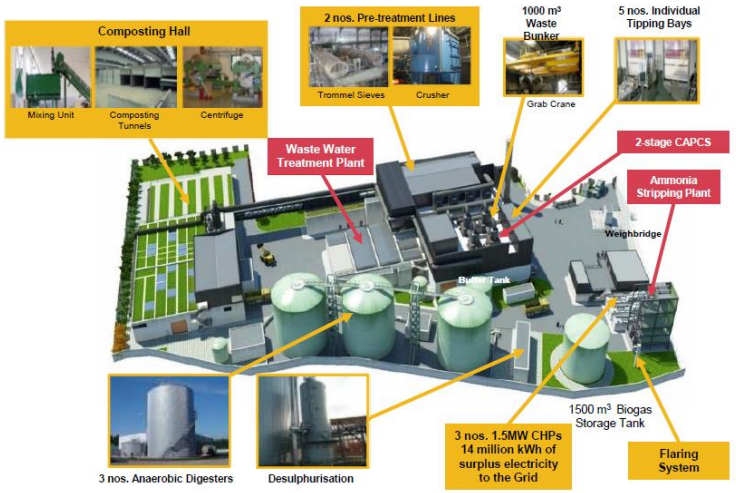
Operator at Central Control Room of Water Treatment Works

Operation of Hydropower Plant via its Local Control Panel

Waste-to-Energy Potential



5. First Organic Waste Treatment Plant



Waste-to-Energy Potential from Sewage Treatment

Biogas from sewage sludge from four major sewage treatment works:

- Shatin Sewage Treatment Works
- Tai Po Sewage Treatment Works
- Shek Wu Hui Sewage Treatment Works
- Yuen Long Sewage Treatment Works

Energy from biogas

32 GWh per year

Tai Po Sewage Treatment Works trials co-digestion

Other Waste-to-Energy Potential

Organic Waste

- A second plant is being planned for commissioning by 2021

Municipal Waste

- A large-scale WTE plant to treat general Municipal Solid Waste is expected to be operational by 2024, which can supply about 480 GWh of surplus electricity each year that equates to the usage of about 100,000 households

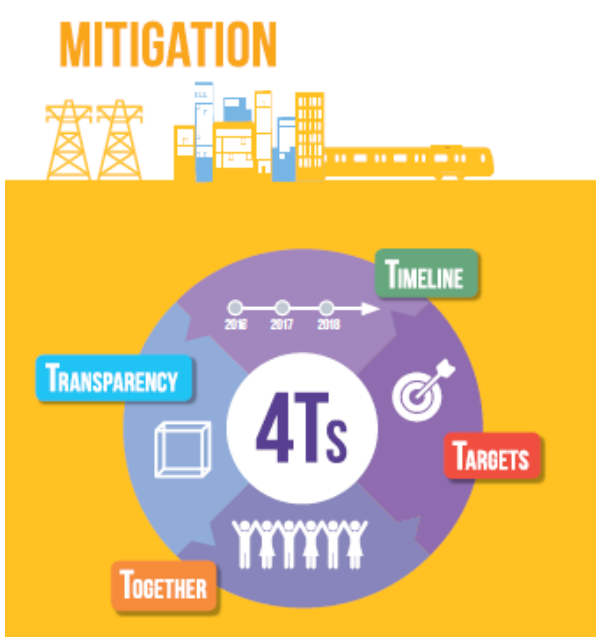
Target

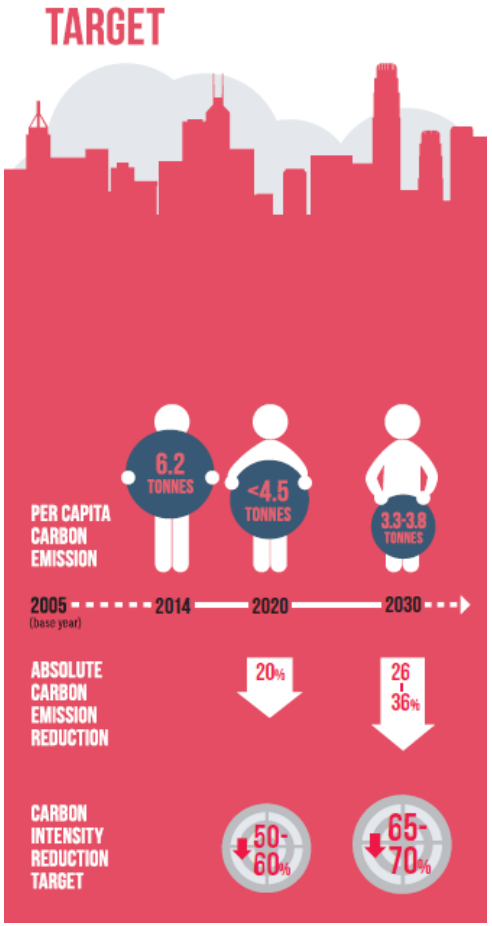
By 2024

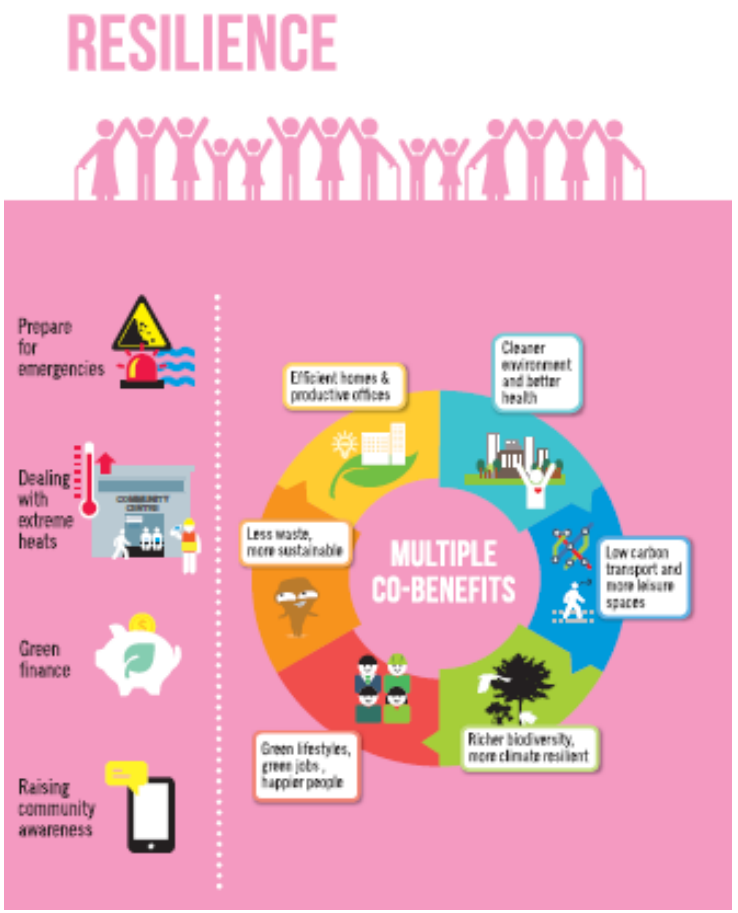
- All the abovementioned WTE projects are expected to provide about 1% of Hong Kong's total electricity needs

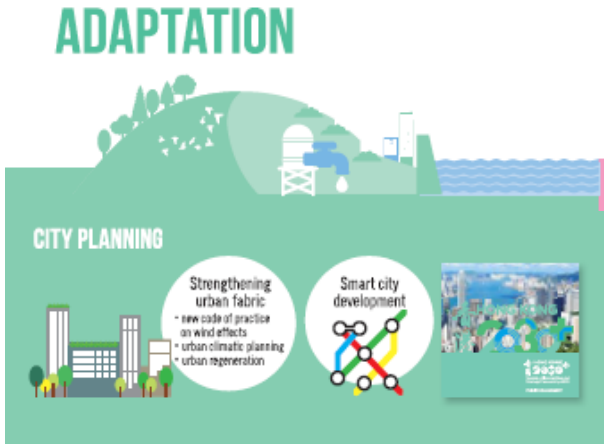
By 2030

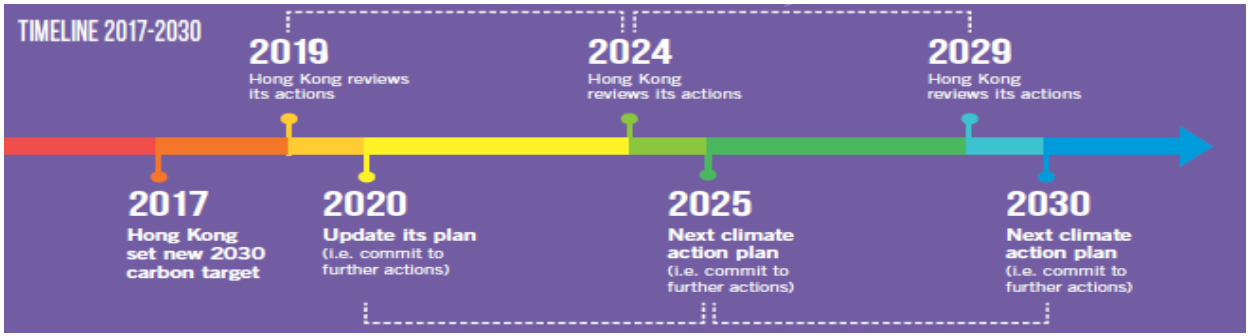
- Another 0.5% maybe possible with new projects – i.e. a total of not more than 1.5% of Hong Kong's total electricity needs maybe derived from WTE projects


MITIGATION
TIMELINE
TRANSPARENCY
4Ts
TARGETS
TOGETHER


TARGET
PER CAPITA CARBON EMISSION
6.2 TONNES
<4.5 TONNES
3.3-3.8 TONNES
2005 (base year)
2014
2020
2030
ABSOLUTE CARBON EMISSION REDUCTION
20%
26 - 36%
CARBON INTENSITY REDUCTION TARGET
50-60%
65-70%


RESILIENCE
Prepare for emergencies
Dealing with extreme heats
Green finance
Raising community awareness
MULTIPLE CO-BENEFITS
Efficient homes & productive offices
Cleaner environment and better health
Low carbon transport and more leisure spaces
Richer biodiversity, more climate resilient
Green lifestyles, green jobs, happier people
Less waste, more sustainable


ADAPTATION
CITY PLANNING
Strengthening urban fabric
new code of practice on wind effects
urban climatic planning
urban regeneration
Smart city development


TIMELINE 2017-2030
2017
Hong Kong set new 2030 carbon target
2019
Hong Kong reviews its actions
2020
Update its plan (i.e. commit to further actions)
2024
Hong Kong reviews its actions
2025
Next climate action plan (i.e. commit to further actions)
2029
Hong Kong reviews its actions
2030
Next climate action plan (i.e. commit to further actions)

Be ‘climate resilient’

Thank You