



**Asia-Pacific  
Economic Cooperation**

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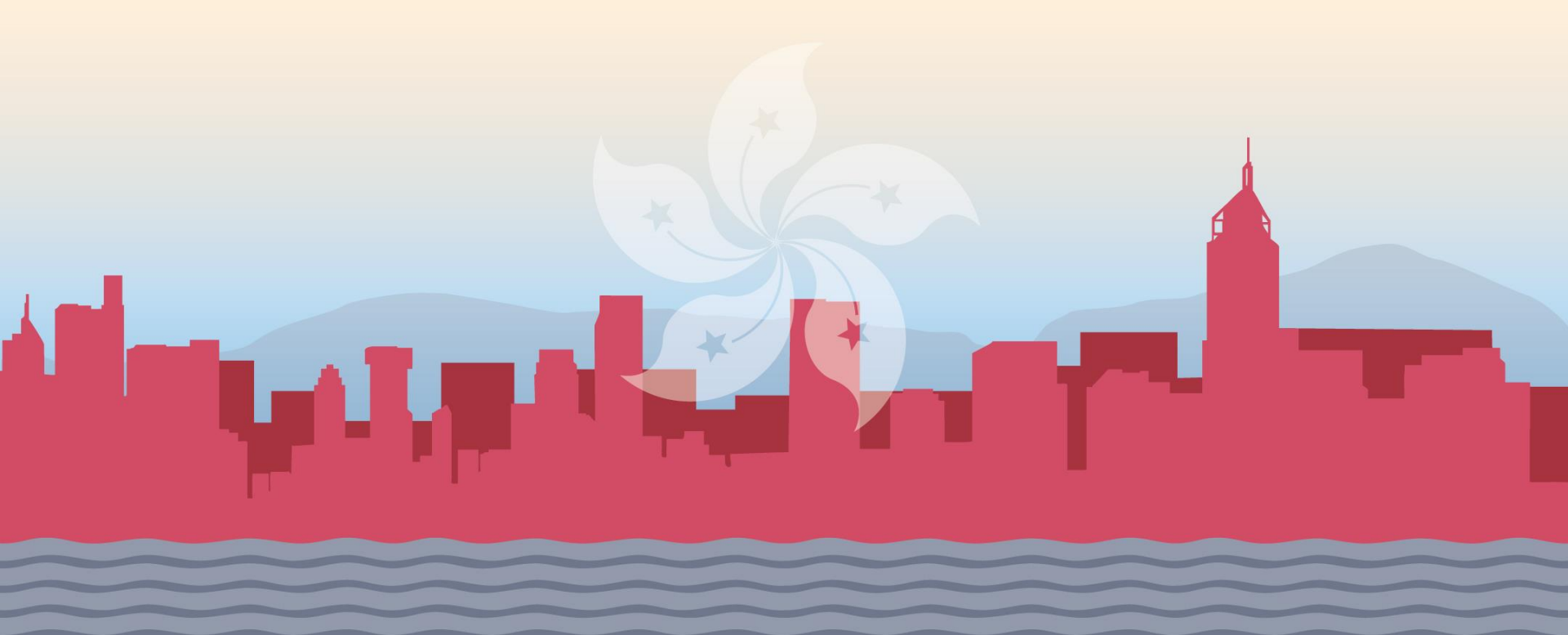
**2017/EWG/EGNRET48/012**

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

Purpose: Information  
Submitted by: Hong Kong, China



**48<sup>th</sup> Expert Group on New and Renewable Energy  
Technologies Meeting  
Jeju, Korea  
29-30 March 2017**



APEC EGNRET48 Meeting

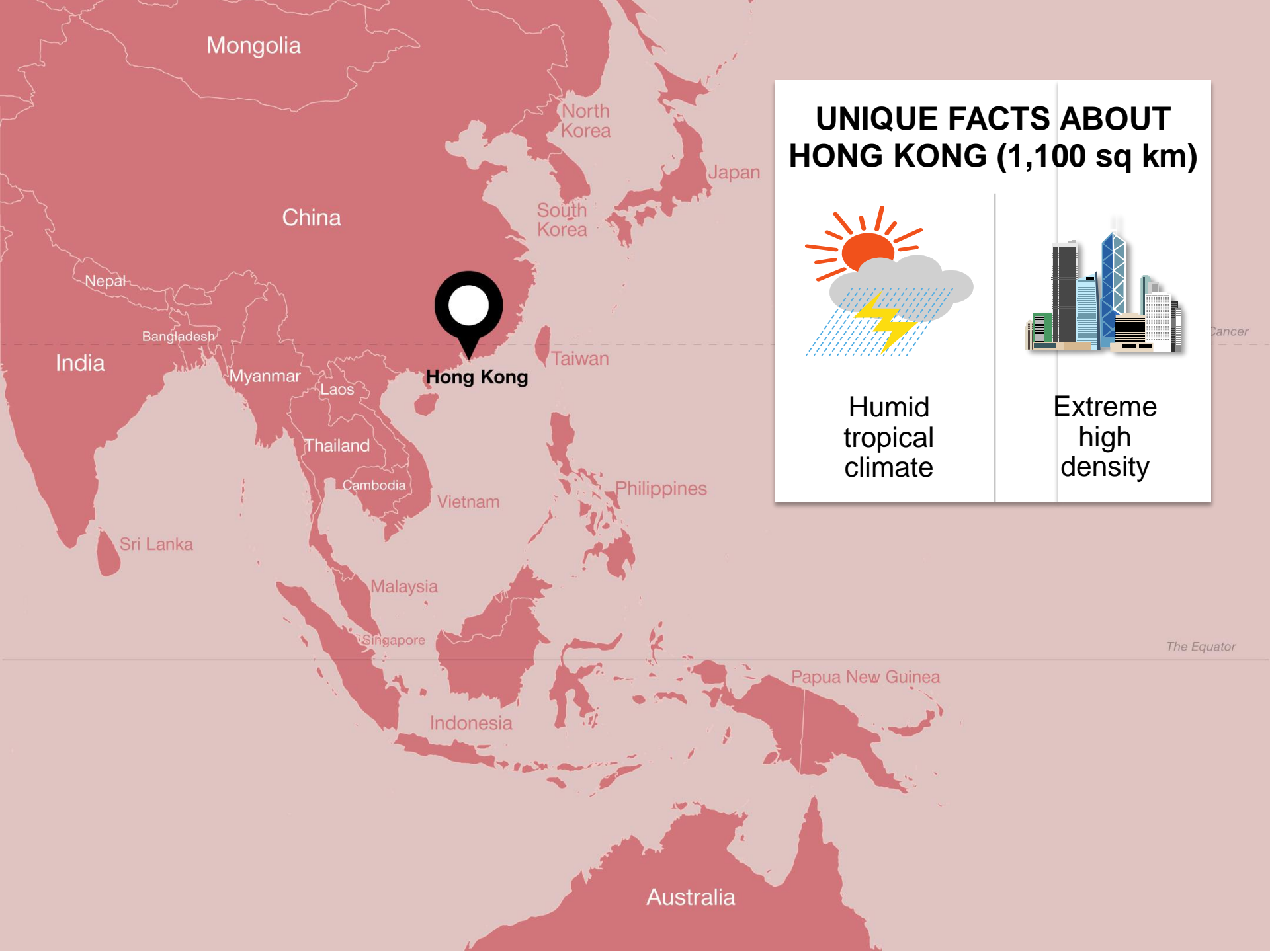
# How to Achieve the Renewable Energy Goal in Hong Kong, China

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



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



Humid tropical climate



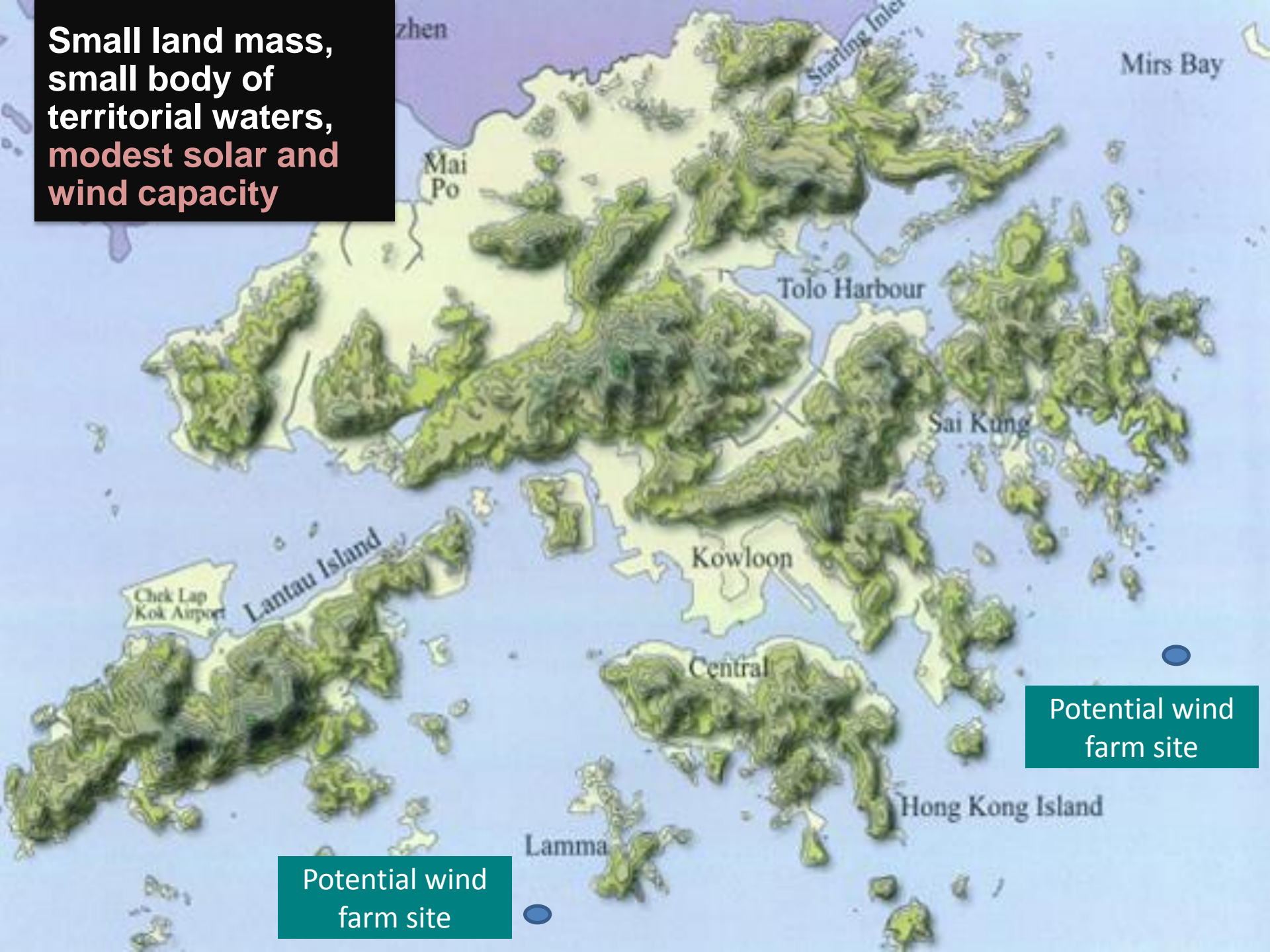
Extreme high density

Cancer

The Equator

Australia

Small land mass,  
small body of  
territorial waters,  
modest solar and  
wind capacity



Potential wind  
farm site

Potential wind  
farm site



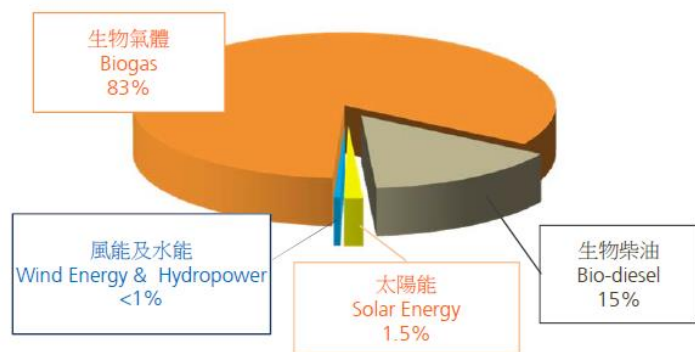
An aerial photograph showing a dense urban landscape. On the left, a steep hillside is covered in thick, vibrant green forest. To the right, a cluster of tall, modern high-rise apartment buildings and office towers rises vertically. In the background, a large body of water is visible, with several ships and more distant city buildings under a hazy sky. The overall scene depicts a high-density city environment.

**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.

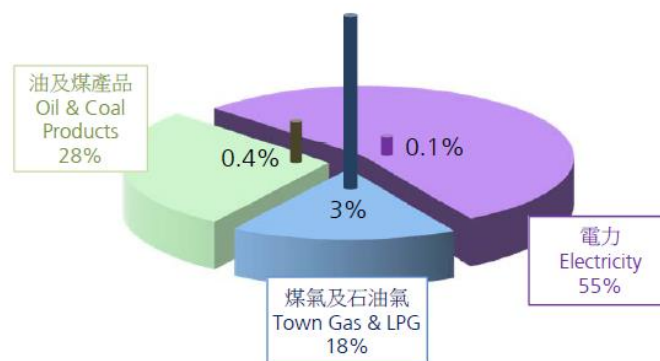
香港的可再生能源 Renewable Energy in Hong Kong



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 renewable energy of various types were produced and consumed by end-users 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





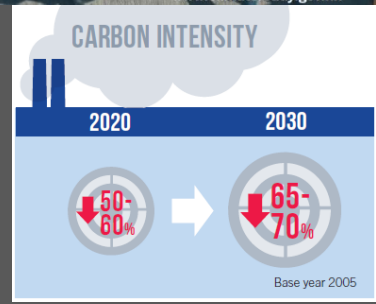
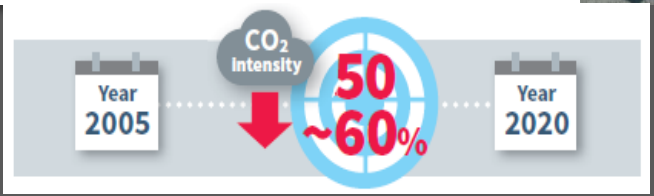
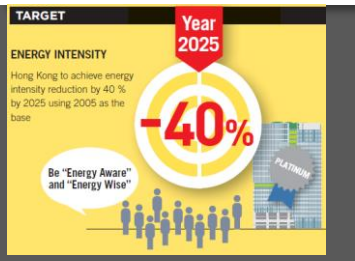
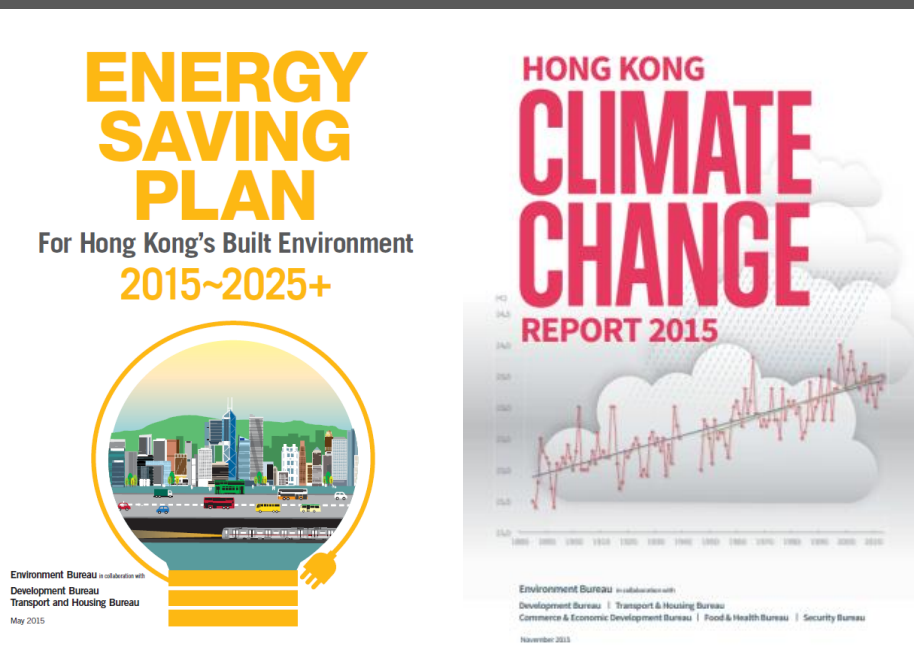
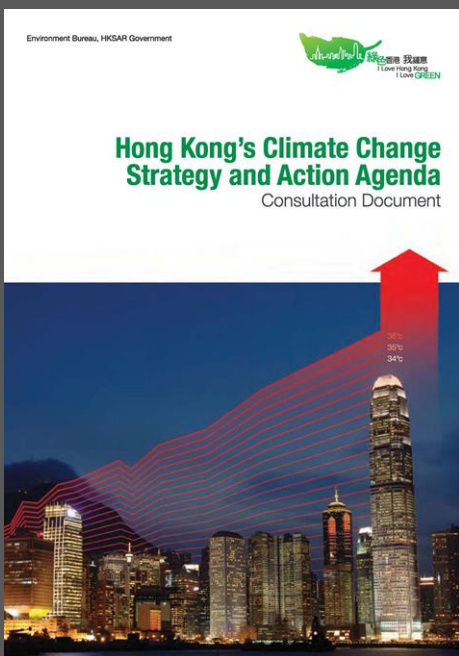
# Climate Mitigation and Hong Kong

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

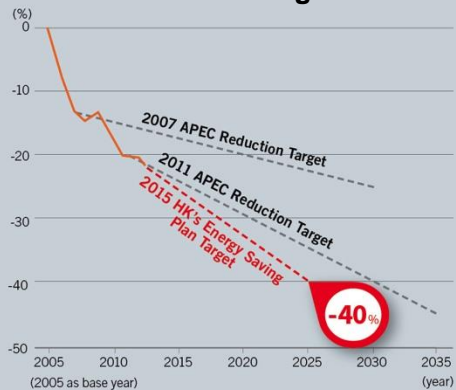
## Revamping Electricity Fuel Mix



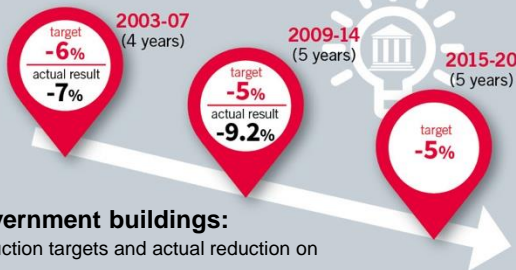
Reduce coal usage

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



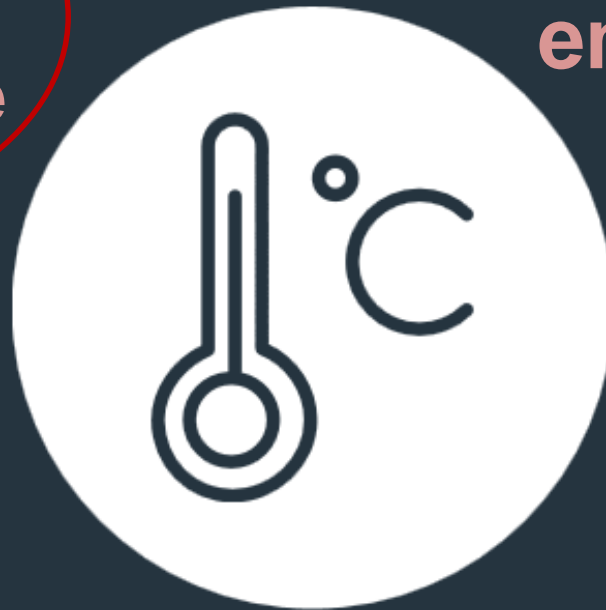
Capture energy from waste water treatment

# 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

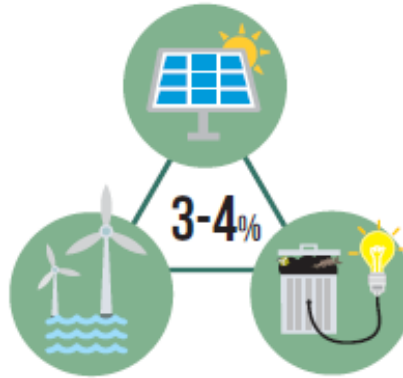
# Renewable Energy and Hong Kong

# Increasing Hong Kong's Renewable Energy

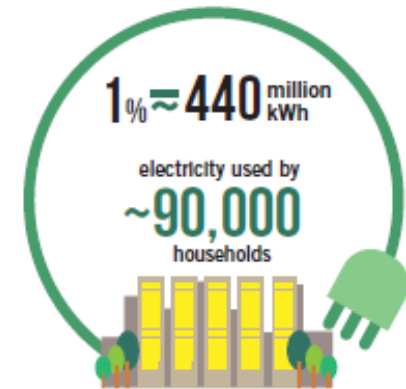
## Our Aim

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.

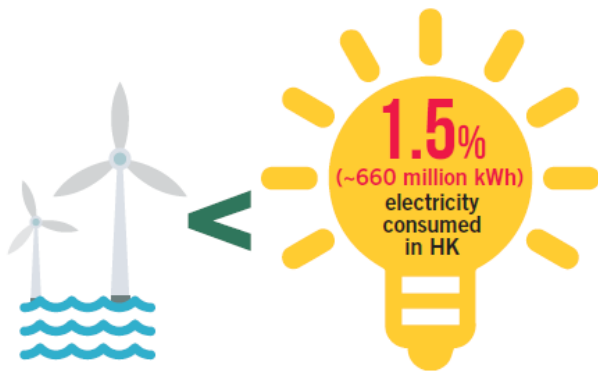
HONG KONG'S REALISABLE RE POTENTIAL UP TO 2030



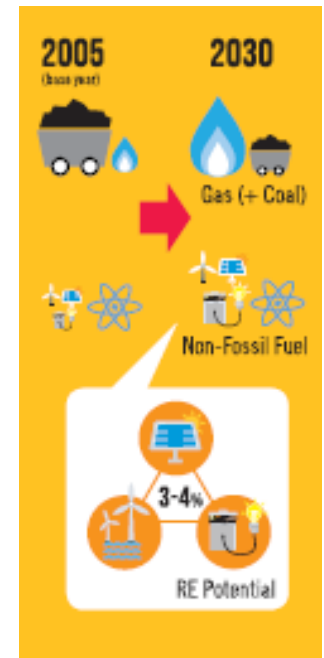
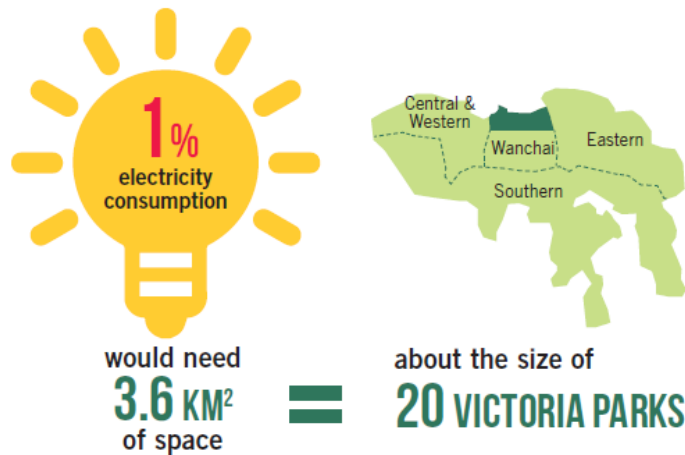
HONG KONG'S MAGNITUDE OF ELECTRICITY CONSUMPTION



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



Green jobs

**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:

- 1<sup>st</sup> completed 2013
- 2<sup>nd</sup> completed 2017

Rated Power Output

**360 kW**

Electricity generated

**3 million kWh/year**

Cost Saving

About **10%** of annual electricity consumption

Reduction of CO<sub>2</sub> emissions

**2,000 ton/year**



1<sup>st</sup> set of Hydropower Generator up and running in 2013

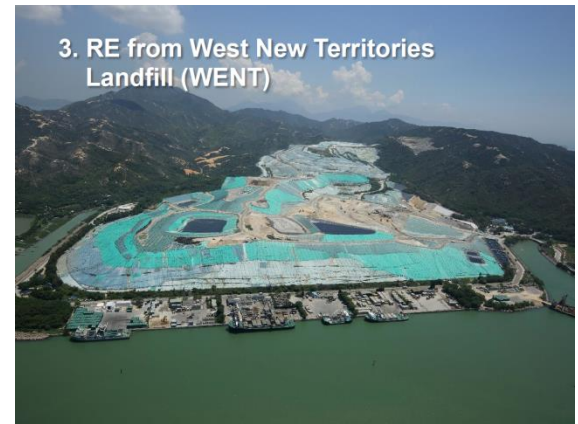


Operator at Central Control Room of Water Treatment Works



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

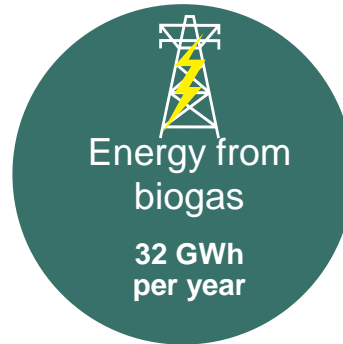
**Biogas from sewage sludge from four major sewage treatment works:**

**Shatin  
Sewage  
Treatment  
Works**

**Tai Po  
Sewage  
Treatment  
Works**

**Shek  
Wu Hui  
Sewage  
Treatment  
Works**

**Yuen Long  
Sewage  
Treatment  
Works**



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

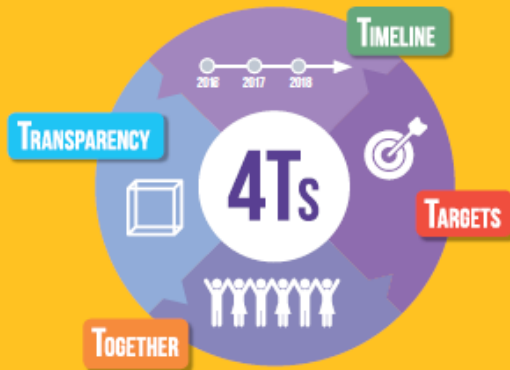
### By 2024

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

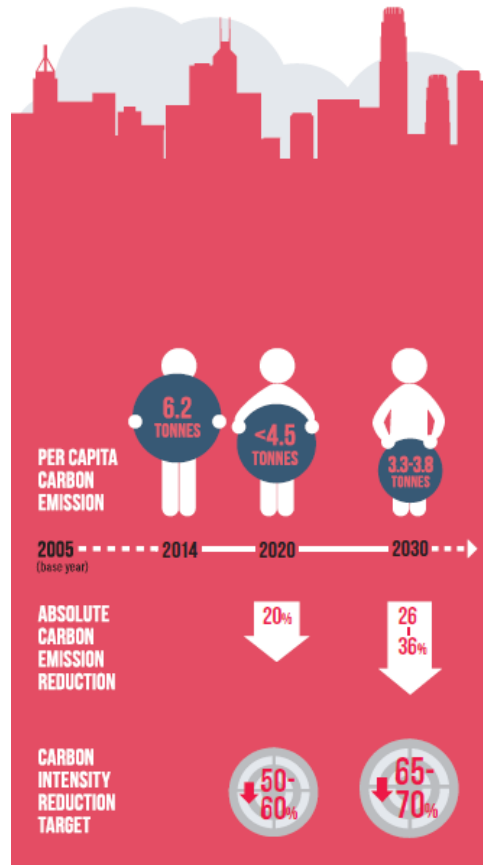
### By 2030

- 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

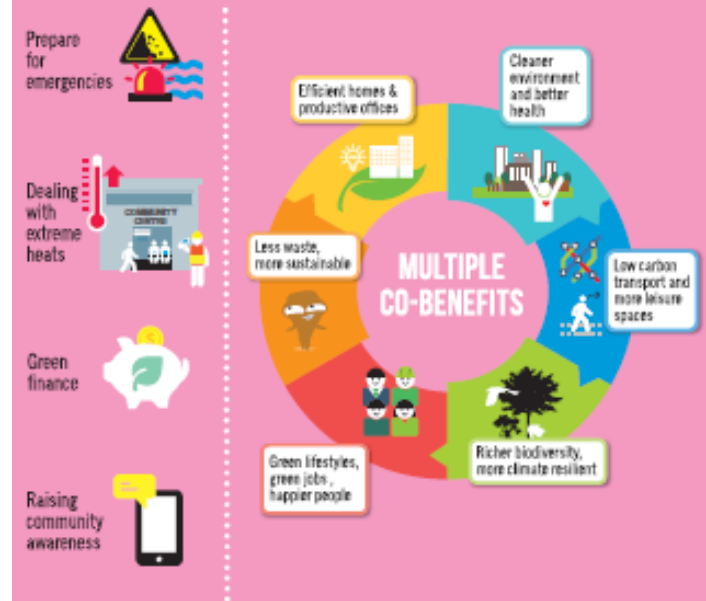
# MITIGATION



# TARGET



# RESILIENCE



# ADAPTATION



## CITY PLANNING

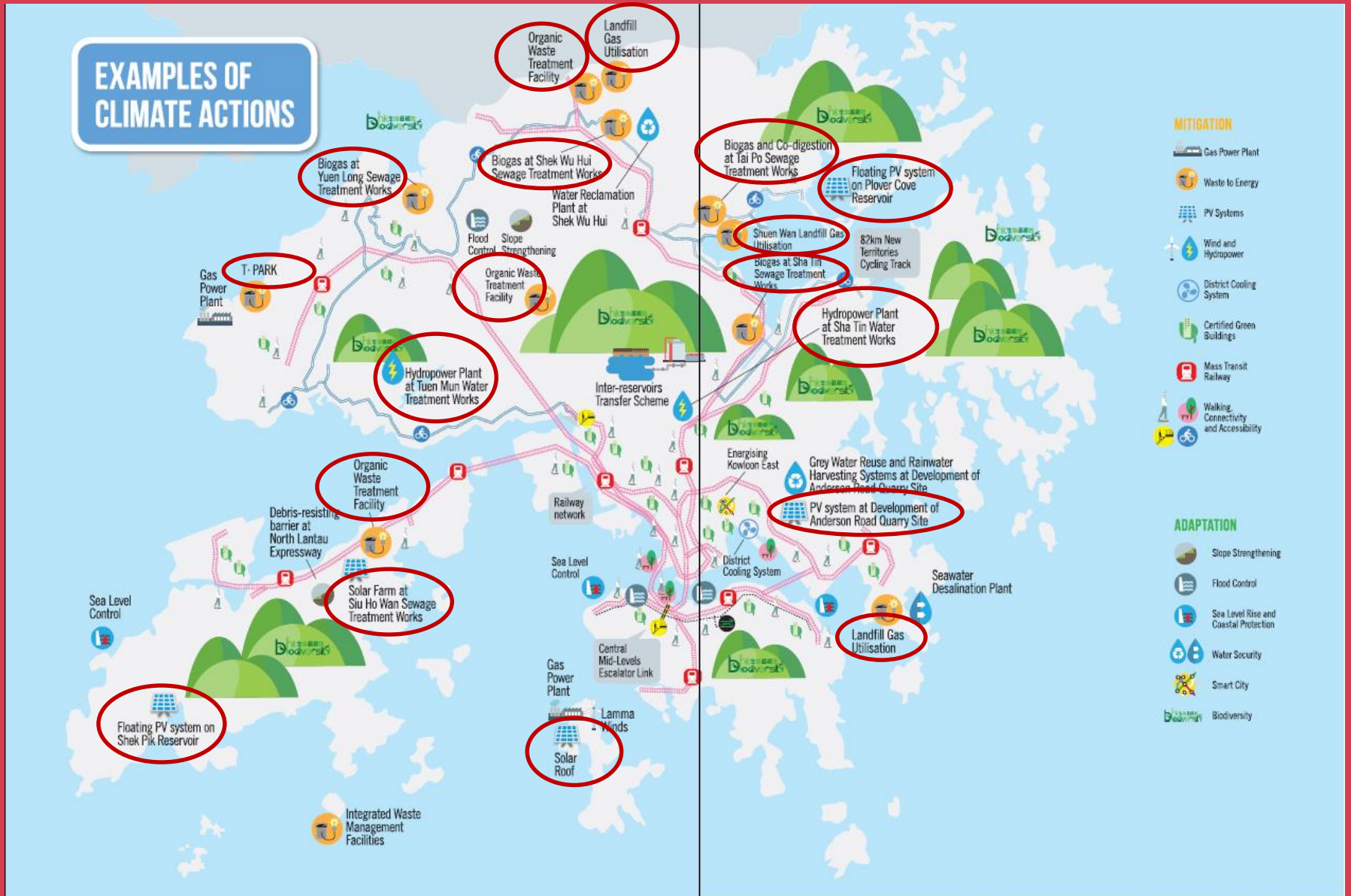


## TIMELINE 2017-2030





# Be 'climate resilient'



**Thank You**