



Innovations for Reducing Greenhouse Gas Emissions

Energy For Our Future Generations

Bill Ho
Deputy General Manager (Corporate Development)
HK Electric

HK Electric – About Us

Lighting up Hong Kong since 1890

Serving 579,000 customers on HK side



HK Electric – About Us

Generation Capacity: 3,237 MW,

Network Length: 6,500 kM

Supply Reliability: >99.999% since 1997



Our Innovation Journey – Modernizing Hong Kong



1919
North Point Power Station to strengthen power supply

1889
HK Electric established

Modernizing Hong Kong

Powering Economic Growth, Enhancing Supply Reliability

Protecting the Environment, Enhancing Supply Reliability

Decarbonizing Energy, Promoting Energy Efficiency and Conservation

1890
First electric street lamp in HK, a cornerstone for city modernization.



1968
ApLeiChau Power Station to further strengthen power supply for the growth of HK



Our Innovation Journey – Powering up Economic Growth, Enhancing Supply Reliability

1982

Lamma Power Station commissioned to cope with the demands on electricity



Modernizing Hong Kong

Powering up Economic Growth,
Enhancing Supply Reliability

Protecting the Environment

Decarbonizing Energy,
Promoting Energy Efficiency
and Conservation

1979

First distribution substation equipped with Remote Terminal Unit to enable remote control of equipment so that efficiency and reliability have been further improved

1988

First cable tunnel in HK - greatly enhanced the supply reliability as the cables were protected from external interference.



Our Innovation Journey – Protecting the Environment

1993

First FGD unit in South East Asia (excluding Japan) and low NOx burners to further reduce emissions



Our Innovation Journey – Decarbonizing Energy, Promoting Energy Efficiency and Conservation

2006

First natural gas combined cycle gas turbine (CCGT) unit of HK Electric.



2019+

- Three more new gas-fired generating units;
- Floating Storage & Regasification Unit for natural gas ;
- Launching Smart Power Services to promote EE&C and RE



Modernizing Hong Kong

Serving Economic Growth,
Enhancing Supply Reliability

Protecting the
Environment

Decarbonizing Energy,
Promoting Energy Efficiency
and Conservation

2006

First commercial scale wind turbine in HK.

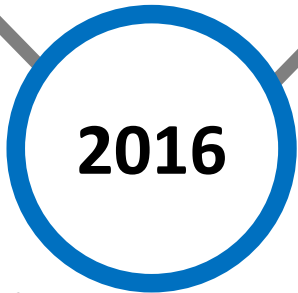
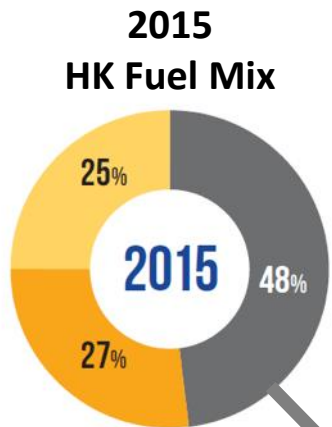


2010

HK largest commercial solar power generating facilities commissioned at the time, further provided greener electricity to our customers



Actions to Combat Climate Change



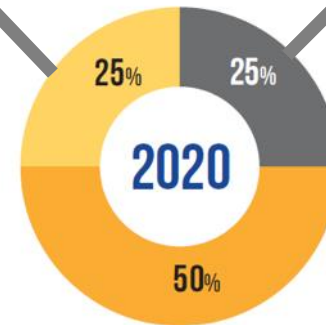
Paris Agreement

- Came into force in Nov 2016
- Achieve peak carbon emissions as soon as possible
- Keep global temperature increase below 2°C relative to pre-industrial level



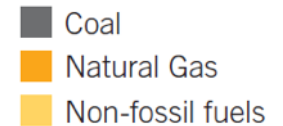
HK's Climate Action Plan 2030+

- Published in Jan 2017
- Electricity generation contributes ~70% of local carbon emissions
- Key strategy to improve power generation fuel mix



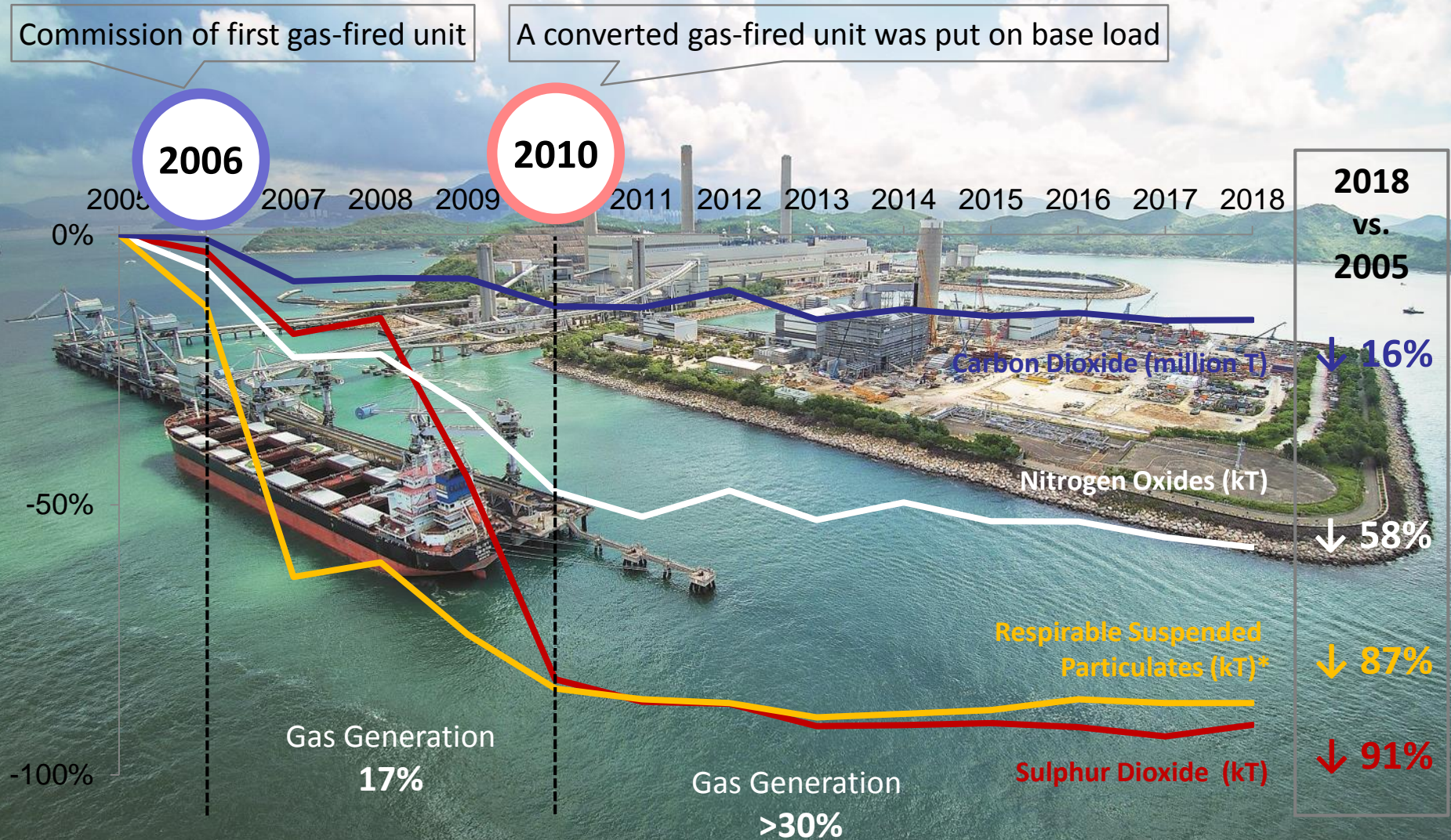
**2020
Fuel Mix Target**

2030 Fuel Mix Outlook



Source : Hong Kong's Climate Action Plan 2030+

Decarbonizing Our Energy (Efforts to Date)



* 2005/2006 figures refer to particulates;
2007-2017 figures refer to respirable suspended particulates

Decarbonizing Our Energy (Way Forward)



2018

2020

2023

Natural Gas
in Fuel Mix

>30%

~50%

~70%

Number of
Gas-fired
Units in
Operations

2

3

4

Decarbonizing Our Energy (Way Forward)

Securing 2nd Gas Supply



Offshore LNG Terminal using Double-Berth Floating Storage & Regasification Unit (FSRU) Technology [Illustration photo]

Proposed Offshore LNG Terminal in Hong Kong Waters

新界
NEW TERRITORIES

青衣
Tsing Yi

香港國際機場
Hong Kong International Airport

九龍
KOWLOON

香港島
HONG KONG ISLAND

南丫島
Lamma Island

Extreme Weather and Supply Reliability



- Despite the challenges from extreme weather in recent years, HK Electric has managed to maintain supply reliability round the clock and throughout the years



Very Hot Weather Warning in force for more than 320 hours between May and June 2018
[Photo from HK01.com]



Typhoon Mangkhut brought large-scale damages to HK causing black-out in many areas
[Photo at Heng Fa Chuen from appledaily.com]

Building Climate Resilience

Sea level rise and erratic rainfall

- Anti-flooding systems at Lamma Power Station
- Flooding alarms, bund walls, sump pumps and switchgear stands at substations
- Advising management offices of buildings with flooding risk to install anti-flooding systems at their switch rooms

01



Stronger typhoons and thunderstorms

- Underground and submarine cables
- Standby typhoon emergency teams

High ambient temperature

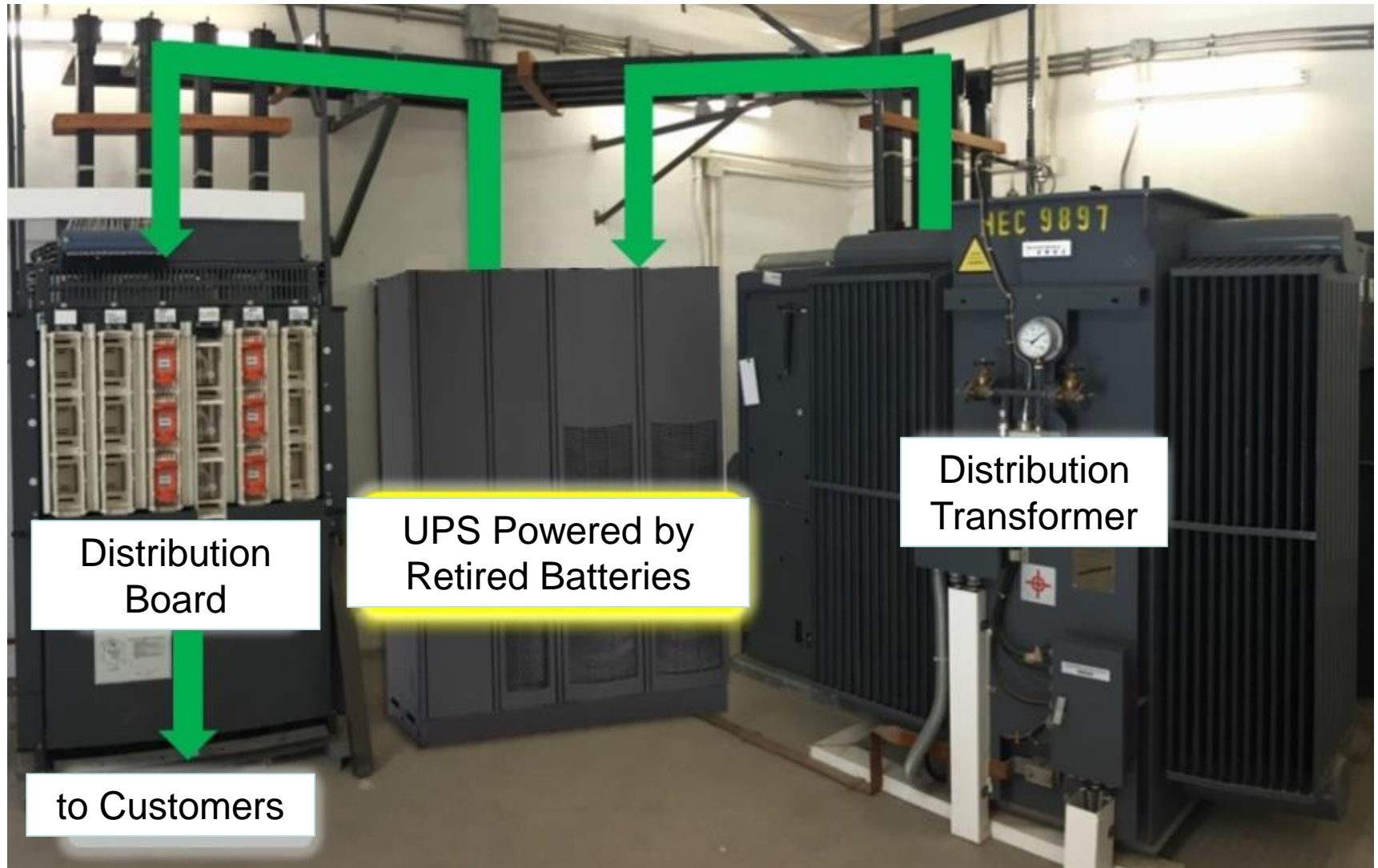
- Converting 11-kV open-ring distribution feeders to 22-kV closed-ring feeders

03

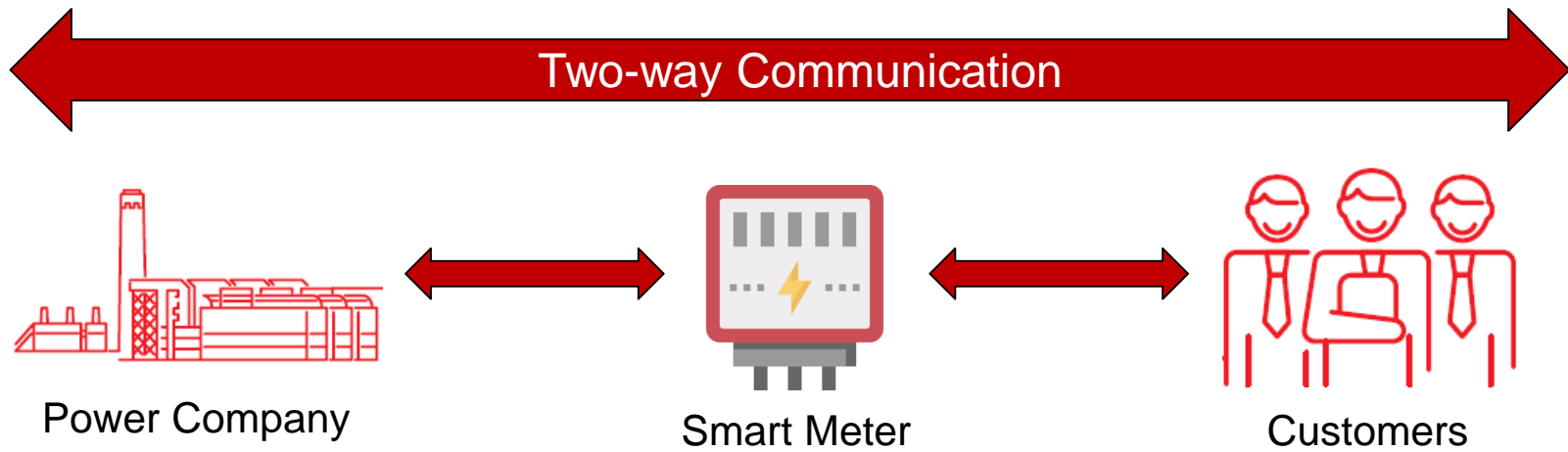
Case Story: Second Life for Retired EV Batteries



Case Story: Riding out Power Interruption in Inclement Weather



Enabling Innovation through Advanced Metering Infrastructure



Enabling Innovation through Public Education and Awareness



A suite of EE&C & RE programmes to promote smart electric-living



Offer Other Learning Experiences to students.



Annual competition focus on Science, Technology, Engineering, Arts and Mathematics (STEAM).



香港第三齡學苑®

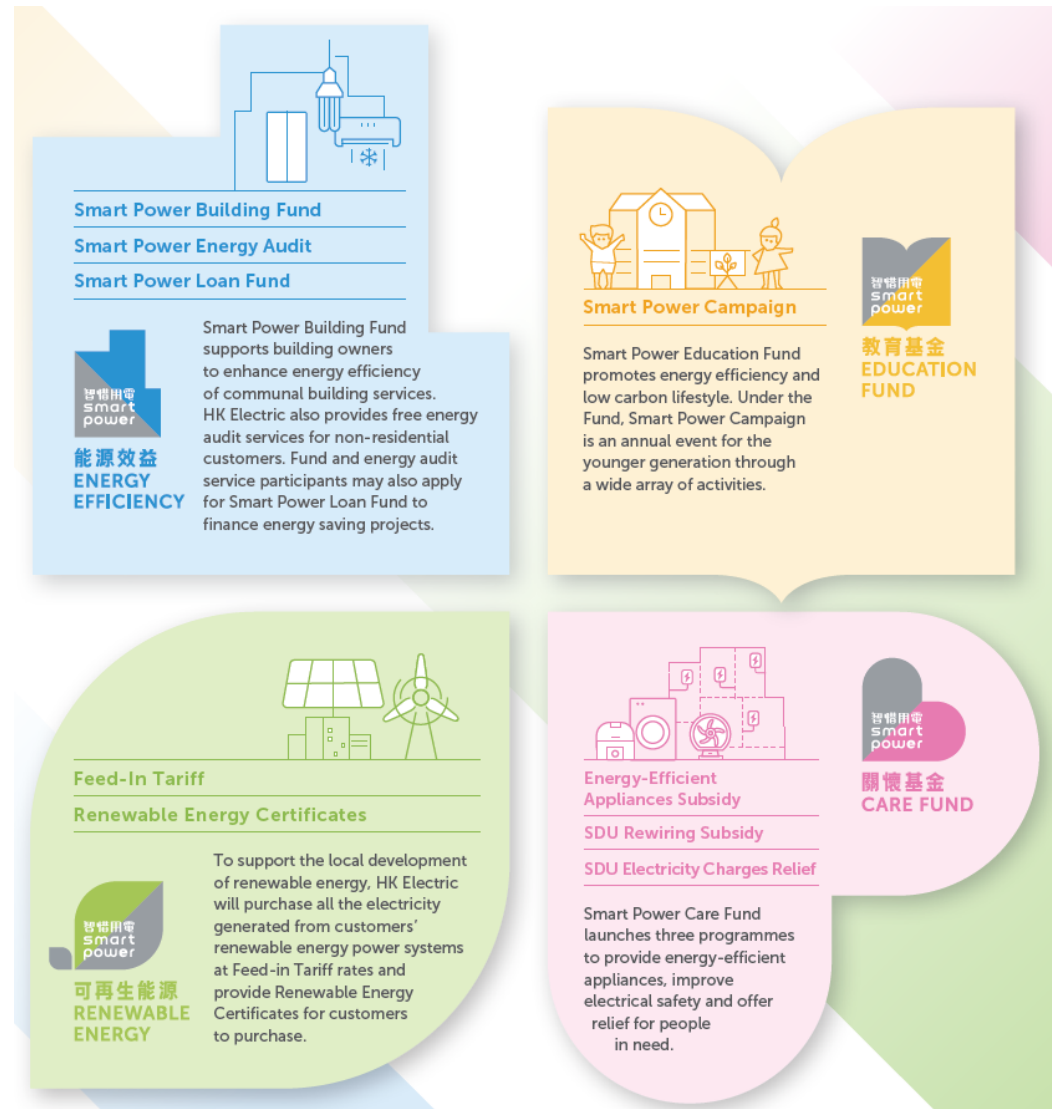
Encourage local retirees to pursue lifelong learning and contribute to the community through volunteering.



Share with different community sectors on energy efficiency, climate change, smart city, etc.

Smart Power Services

- A suite of new funding and services launched in Jan 2019 to encourage the use of RE and to promote EE&C
- With encouraging outcomes so far



Smart Power Building Fund
Smart Power Energy Audit
Smart Power Loan Fund

Smart Power Building Fund supports building owners to enhance energy efficiency of communal building services. HK Electric also provides free energy audit services for non-residential customers. Fund and energy audit service participants may also apply for Smart Power Loan Fund to finance energy saving projects.

Smart Power Campaign

Smart Power Education Fund promotes energy efficiency and low carbon lifestyle. Under the Fund, Smart Power Campaign is an annual event for the younger generation through a wide array of activities.

Feed-In Tariff
Renewable Energy Certificates

To support the local development of renewable energy, HK Electric will purchase all the electricity generated from customers' renewable energy power systems at Feed-in Tariff rates and provide Renewable Energy Certificates for customers to purchase.

Energy-Efficient Appliances Subsidy
SDU Rewiring Subsidy
SDU Electricity Charges Relief

Smart Power Care Fund launches three programmes to provide energy-efficient appliances, improve electrical safety and offer relief for people in need.

智「惜」用電計劃2018
綠色能源夢成真
申請種子基金 早商環保與書

Annual competition for secondary schools. Shortlisted projects covering topics on RE, EE&C and sustainability

Offer Other Learning Experiences such as school talk, training class and visit to HK Electric's facilities to primary and secondary schools



Groom and inspire young people to become Happy Green Ambassadors. Support them to advocate green lifestyle to their peers

University of 3rd Age (U3A)



University of 3rd Age (U3A)



- Running the programme since 2006
- Partnering with the Hong Kong Council of Social Services
- 130 U3A students in 2018; 54 Smart Power Ambassadors pledged to promote energy efficiency and low-carbon lifestyle in their own communities



Promoting Low-Carbon Development to the Belt and Road Regions



Conclusion



With HK Electric's 125+ years track record in providing HK people with reliable, affordable and environmental-friendly services, we have been embracing carbon emissions reduction, and are ready to take a greater role.



Our innovation initiatives have brought in genuine and tangible value for our customers and the society at large.



Innovation is important, collaboration is the big part of it. HK Electric will continue to work together with our partners and the community to combat climate change.



Thank You