

OUR JOURNEY OF DECARBONISATION



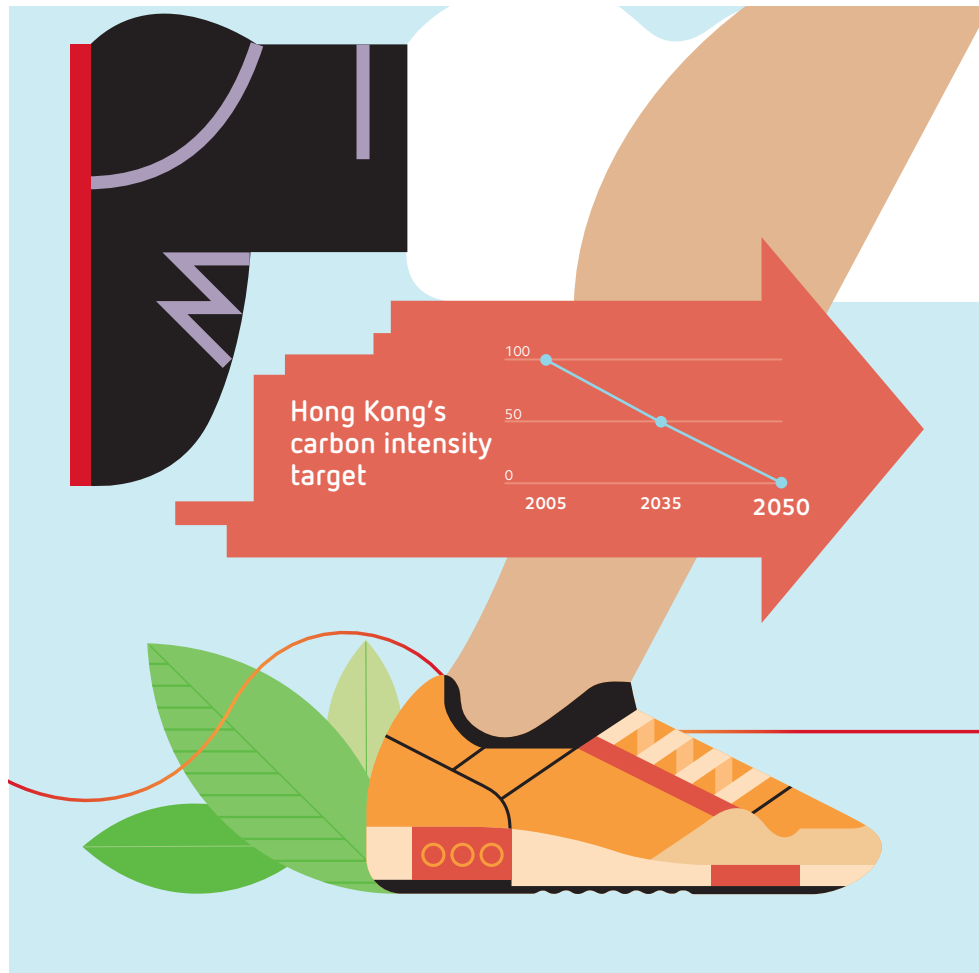
Why are We Embarking on this Journey?

Climate change, caused largely by the emission of greenhouse gases generated by human activities, is one of the most significant and imminent challenges faced by mankind. To avoid the irreversible impact of climate change, we need a substantial and long-term reduction in carbon emissions through decarbonising various aspects of our daily life.

The 2015 Paris Agreement was a crucial step forward in marking global cooperation on this journey to reduce carbon emissions as it set a target to cap global average temperature rises well below 2°C.

China is a signatory country of the Paris Agreement and as part of China, Hong Kong adopted the Agreement. In November 2020, the Chief Executive announced in her policy address the target for Hong Kong to achieve carbon neutrality before 2050. In October 2021, the HKSAR Government issued the “Hong Kong's Climate Action Plan 2050” aimed to reduce Hong Kong's carbon emissions by half by 2035, using 2005 as the base year.

As electricity generation is among the largest carbon-emitting sectors locally, HK Electric keenly supports this global and national vision to minimise carbon emissions. We will make reference to the updated Action Plan to advance our own planning and commit the necessary resources to support government and global decarbonisation efforts.



Our Guides and Compass

As a power utility, we are fully aware of the impact that electricity generation has on carbon emissions. Consequently, we have continued to adopt pragmatic carbon reduction strategies and initiatives to decarbonise our own business and operations.

Underpinning this is one of the Company’s missions – to care for the environment in all our activities – which is guided by our [Sustainability Policy](#) and [Environmental Policy](#) covering all key aspects of our operations.

Supporting the United Nations’ Sustainable Development Goals

The United Nations’ Sustainable Development Goals (SDGs) aim to end poverty, protect the planet and ensure peace and prosperity for all people by 2030. The SDGs, together with the Paris Agreement on Climate Change, call for deep transformations in every country. They are also the foundations guiding us as we design our pathways on our decarbonisation journey and shape our sustainable development priorities.



Among the 17 SDGs, there are 3 goals in particular that HK Electric is working towards:

- Goal 7: Affordable and Clean Energy
- Goal 9: Industry, Innovation and Infrastructure
- Goal 13: Climate Action

We have developed a set of near to mid-term targets to achieve these goals, covering our own operations as well as assisting our customers and business partners in going low-carbon. These targets will be reviewed regularly.

SDGs material to HK Electric	Corresponding internal targets
<div>7 AFFORDABLE AND CLEAN ENERGY</div>	<ul style="list-style-type: none"> to maintain better than 99.999% supply reliability rating to commission the offshore liquefied natural gas (LNG) terminal in 2023 to gain access to diverse and cost-competitive gas supplies worldwide to subsidise 4,000 underprivileged households for adopting energy-efficient electrical appliances by 2023 to increase the aggregate electricity generated from renewable energy of HK Electric and its customers to over 6 GWh/year by 2023 to complete 1,000 free energy audits for non-residential customers and subsidise 500 buildings in implementing energy efficiency enhancement projects by 2023

SDGs material to HK Electric

Corresponding internal targets

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



- to complete full-scale smart meter deployment by 2025
- to complete anti-flooding enhancement for low-lying substations within 100 m of northern coastal line by 2021

13 CLIMATE ACTION



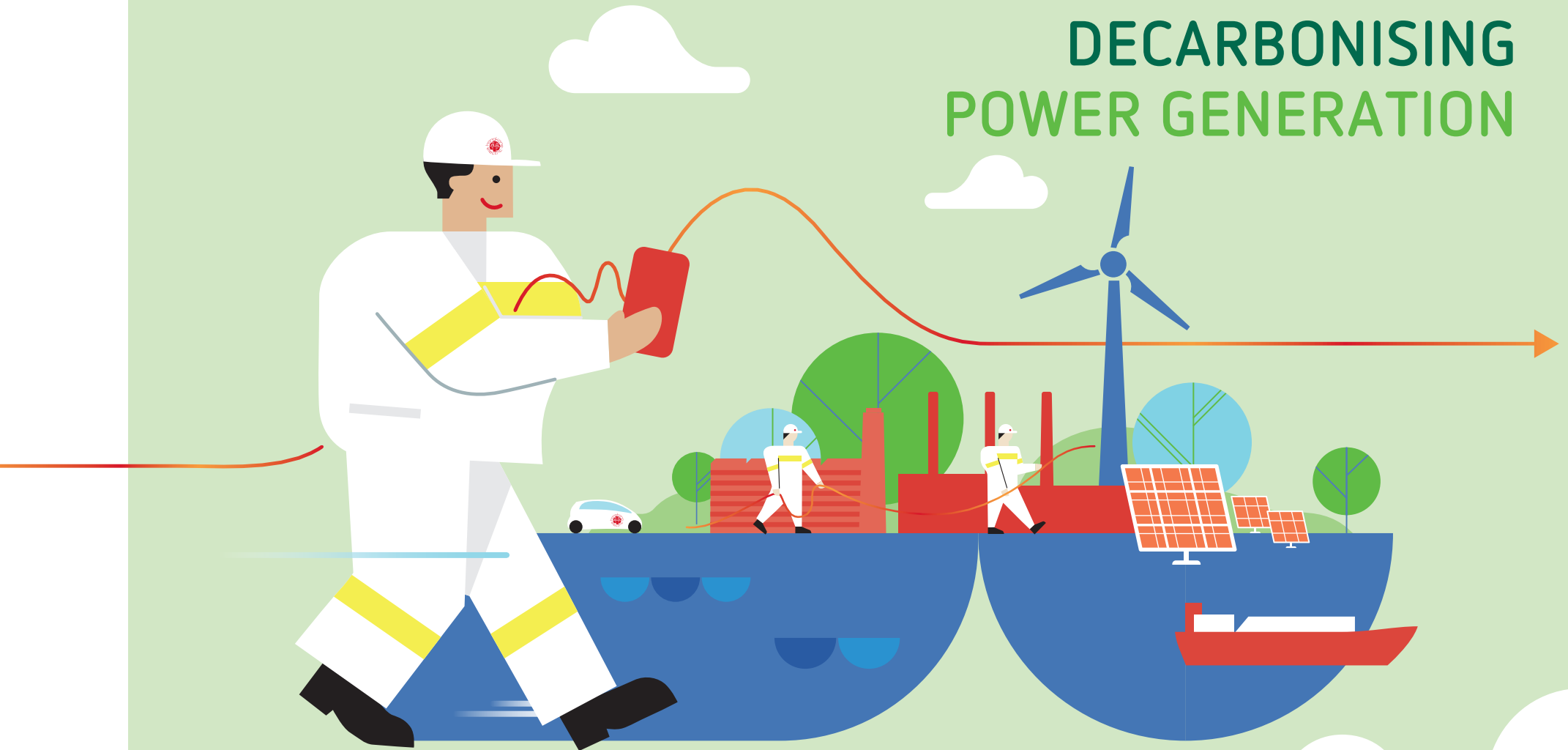
- to commission three new gas-fired units, L10, L11 and L12, in 2020, 2022 and 2023 respectively
- to reduce carbon emissions per unit of electricity generated by 68.4% by 2035
- to organise 1,000 education and promotion activities on combating climate change and adopting low-carbon lifestyle by 2023

Working towards a Science Based Target

As a power utility, HK Electric fully supports the government's goal of leading Hong Kong to achieve carbon neutrality. We will also help Hong Kong achieve the challenging goal of "net-zero power generation" before 2050. We have updated our science-based carbon reduction target and committed to reduce carbon emissions per unit of electricity generated by 68.4% in 2035. This target aligns with the Paris Agreement and is in line with a well-below 2°C trajectory. It has been validated and approved by the Science Based Targets initiative (SBTi), a global partnership encouraging organisations to set science-based reduction targets towards net-zero. Our approved target is published on [SBTi's website](#).



DECARBONISING POWER GENERATION



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Our Journey of Decarbonisation

Why are We
Embarking on
this Journey?

Our Guides
and Compass

Decarbonising Power Generation

Greener
Power
Generation

Working
Smarter and
Greener

Reducing
Our Carbon
Footprint

Partnering with the Community

Deploying
Smart Meters

Delivering
Smart Power
Services

Bringing More
Electric Vehicles
on the Road


Educating All
to Go Green

Decarbonisation –
a Journey for All

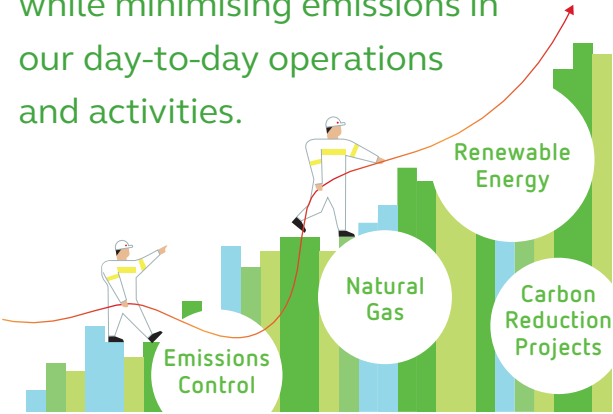
Greener Power Generation



Lamma Power Station

 **Lamma Power Station:**
The Power behind Hong Kong

Currently, a majority of Hong Kong’s carbon emissions comes from electricity generation. As a result, decarbonising the electricity generating sector is clearly one of the most critical ways to reduce the city’s carbon footprint. At HK Electric, we strive to achieve this by replacing coal-fired generation with gas-fired generation and by harnessing renewable energy and studying to introduce zero-carbon solutions, while minimising emissions in our day-to-day operations and activities.



Transitioning from coal to gas

We commissioned our first gas-fired combined cycle generating unit, L9, at our Lamma Power Station in 2006. This was followed by the conversion of old oil-fired combined cycle unit into a gas-fired combined cycle unit, GT57, in 2010 and the commissioning of two new gas-fired units, L10 and L11, in February 2020 and April 2022 respectively. Consequently, in 2022 we were able to generate about 50% of our total electricity output by natural gas.

Natural gas is a cleaner fuel with the application of more efficient technology as compared with coal. It generates about 50% less emissions of carbon dioxide and greatly reduces nitrogen oxides and sulphur dioxide.

We believe that this ongoing coal-to-gas transition to generate electricity is a pragmatic approach that helps Hong Kong move forward towards the long-term carbon reduction goal. At present, we are progressing

well with the construction of another gas-fired generating units L12, which will come into operation in 2023. By then, our gas-fired generating capacity will increase to over 50% of total output.

By increasing the use of natural gas, we envisage a progressive reduction in absolute carbon emissions, reaching to more than 28% in 2023 when compared with the base year of 2005.

Gas-fired generating unit L12 under construction



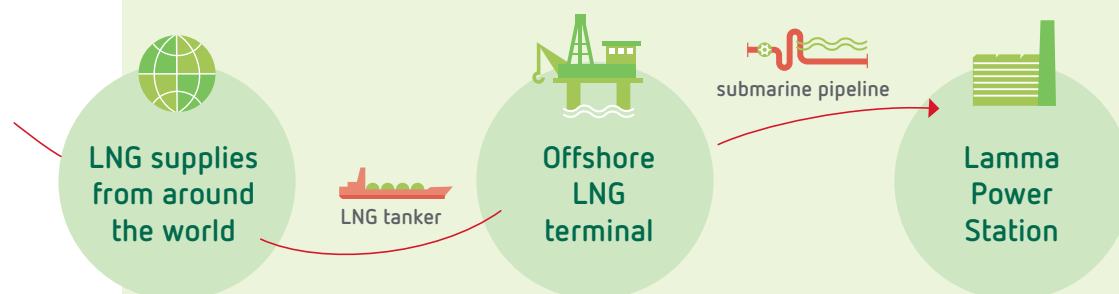
Power generation from coal to gas



Farewell to the Coal Era – Usher in a New Era of Gas-fired Generation




Floating Storage and Regasification Unit vessel



Securing natural gas supply

Given the substantial increase in natural gas consumption, we need to secure a stable and reliable gas source. The existing supply of liquefied natural gas (LNG) comes from Australia's North-West Shelf and Qatar. Re-gasified LNG from the Guangdong Dapeng LNG Receiving Terminal in Shenzhen is then delivered to Lamma Island via a dedicated 92-km pipeline.

To ensure a smooth transition from coal to gas, we are partnering with CLP Power to develop an offshore LNG terminal using Floating Storage and Regasification Unit technology. This major project is scheduled to be commissioned by mid-2023 and will provide a new channel for HK Electric to receive cost-competitive LNG supplies from different parts of the world, thereby enhancing the security of our gas supply.

 **HK Electric – Your Partner for a Low-carbon Future**

Harnessing renewable energy

Harnessing renewable energy (RE), which brings zero-carbon power, has played a supplementary role in our decarbonisation journey. At HK Electric, we have been developing and operating RE systems since 2006. Our 1.1-MW Solar Power System at Lamma Power Station and the 800-kW wind power station, Lamma Winds, are among the largest commercial-scale RE installations in Hong Kong. In addition, 1.2-MW solar power systems are being installed at the rooftop of some substation buildings and Lamma Power Station. These systems can generate close to 3.6 GWh of green electricity annually.

~3.6GWh

GREEN
ELECTRICITY



Going forward, HK Electric has the potential to substantially increase the share of RE in our generation fuel mix through the proposed development of an offshore wind farm to the south-west of Lamma Island. If built, the



150-MW wind farm will be able to produce around 400 GWh of zero-carbon electricity annually, or about 4% of the Company's annual electricity output. With the Environmental Impact Assessment and various engineering studies completed, and the Environmental Permit granted by relevant authorities, the technical feasibility of the project has been ascertained. As the Government has updated the Climate Action Plan in 2021, we will continue to work with them on the way forward for this project.



Lamma Winds

Minimising other emissions

On top of reducing carbon, HK Electric also strives to minimise other emissions to help bring cleaner air to Hong Kong. Our new gas-fired units are equipped with advanced emissions control systems while the Selective Catalytic Reduction Systems can further reduce emissions of nitrogen oxides by about 90%.

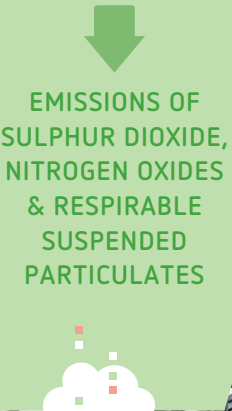
Our coal-fired units are installed with Flue Gas Desulphurisation Plants, Low Nitrogen Oxides Combustion Burners and Electrostatic Precipitators to minimise the emissions of sulphur dioxide, nitrogen oxides and particulates. Leveraging these emissions control technologies has further contributed to minimising the impact of our electricity generation on air quality.

Selective Catalytic Reduction Systems under installation

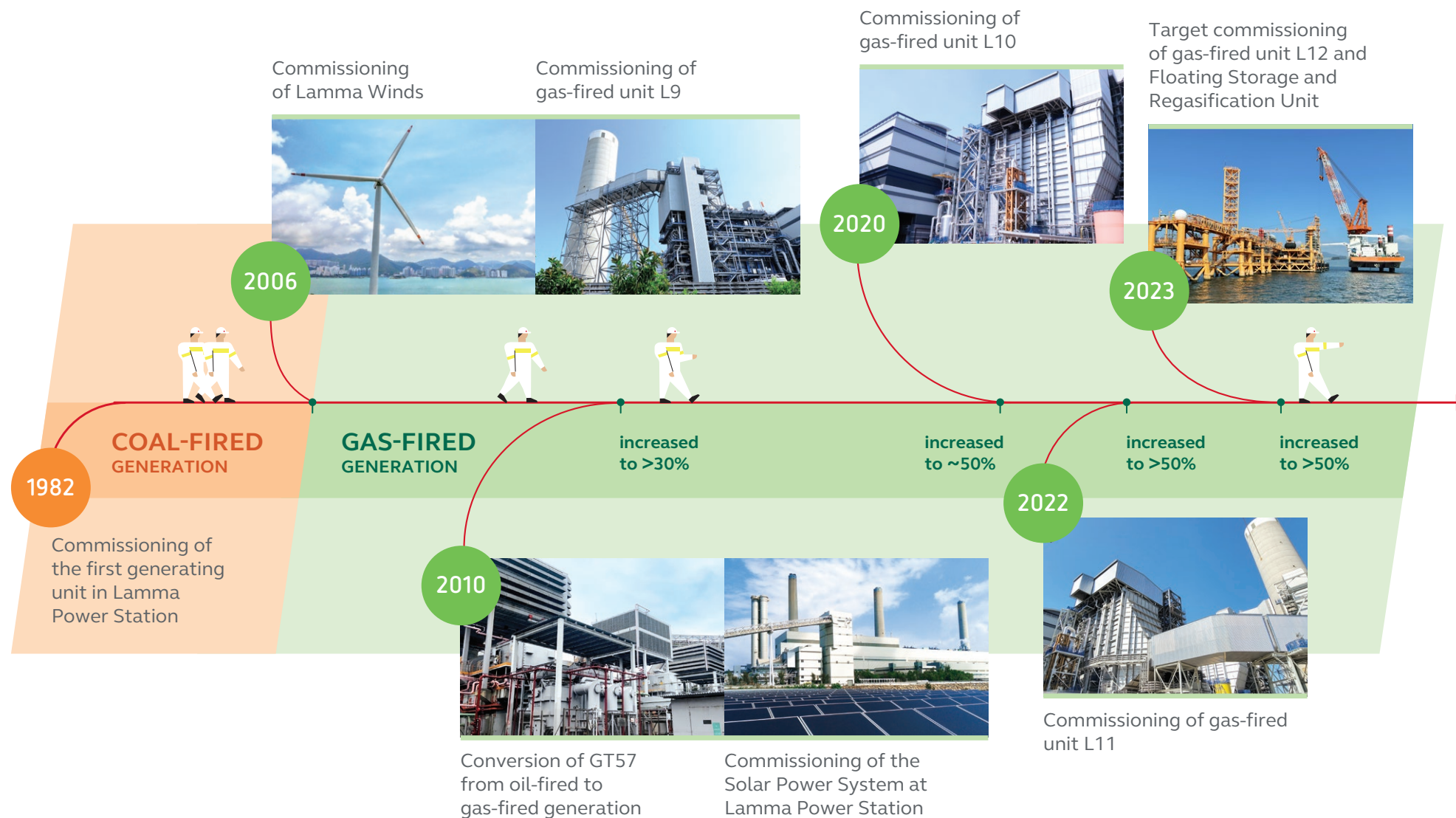


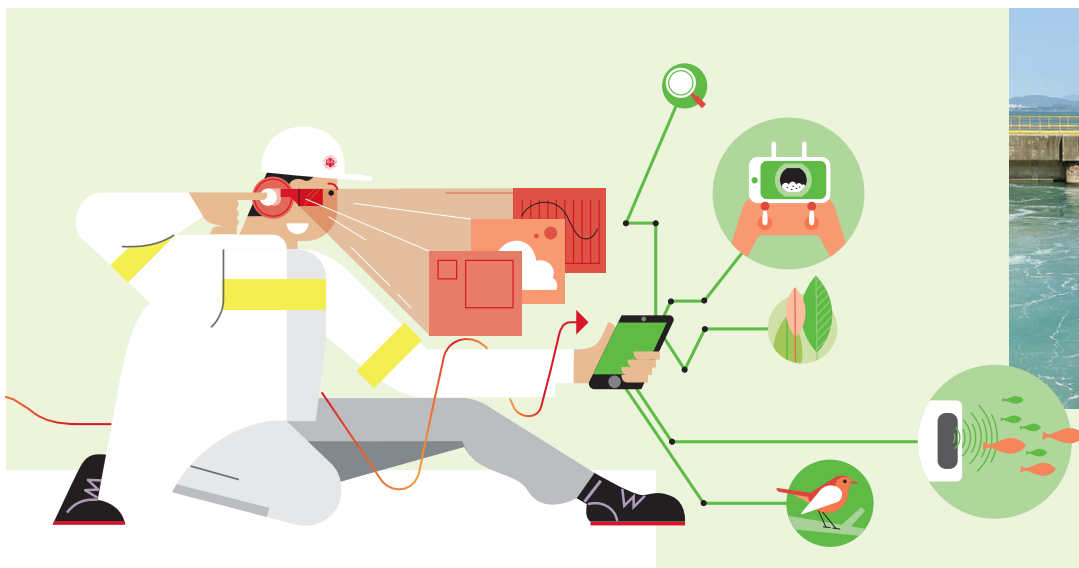
Emissions control facilities

- Gas-fired units
 - Advanced Emissions Control Systems
 - Selective Catalytic Reduction Systems
- Coal-fired units
 - Flue Gas Desulphurisation Plants
 - Low Nitrogen Oxides Combustion Burners
 - Electrostatic Precipitators



Milestones of our green electricity generation





Remotely-operated underwater vehicle is used for inspecting submerged structures



Regular analysis of leaf samples to ensure the natural environment is not affected by our operations

Working Smarter and Greener

At HK Electric, we encourage our employees to apply their skills and creativity to enhance our operational performance while protecting the environment. New technologies such as drones, remotely-operated vehicles and robotics are used to optimise our workflow and minimise safety risks and maintenance time. Apps and an Electronic Permit to Work system have also been developed to streamline work processes and minimise paper consumption in our daily operations.

Other environmental measures, such as regular analysis of leaf samples collected from Lamma villages, sea water analysis and noise measurement at and around the power station, are implemented to ensure that the natural environment is not affected by our operations. Various other innovative and green initiatives are also adopted at the power station, such as electric vehicles being widely used for commuting within the station and the use of solar-powered lamps. A fish deterrent system is also in place to protect small fish from entering our circulating water system, a move which both enhances operational reliability and conserves wildlife.

In order to ensure that the ecosystem of Lamma Island is unaffected by our operations, we conduct regular surveys of bird species that provides insights into local biodiversity and acts as a valuable reference for the power station's sustainability planning.

Reducing Our Carbon Footprint

In addition to decarbonising our power generation, HK Electric strives to reduce the carbon footprint of our day-to-day operations across all our premises through:



PARTNERING WITH THE COMMUNITY



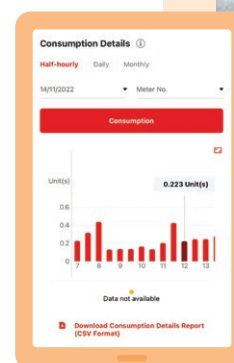


HK Electric is committed to supporting the HKSAR Government in transforming Hong Kong to a greener and smarter city. We believe that decarbonisation is a joint venture requiring the collaborative efforts of the entire community and are keen to encourage our customers and different sectors in society to join us through various services and schemes.

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Provide more granular consumption data via the HK Electric App

Deploying Smart Meters

We are installing smart meters in phases for all 580,000 customers, with a target for completion by 2025. Smart meters allow customers access to more granular energy consumption data via the HK Electric App or website to better understand their energy consumption habits and patterns. This will facilitate energy-saving behaviours that would reduce carbon emissions, while also contributing to Hong Kong's transformation into a smart city.





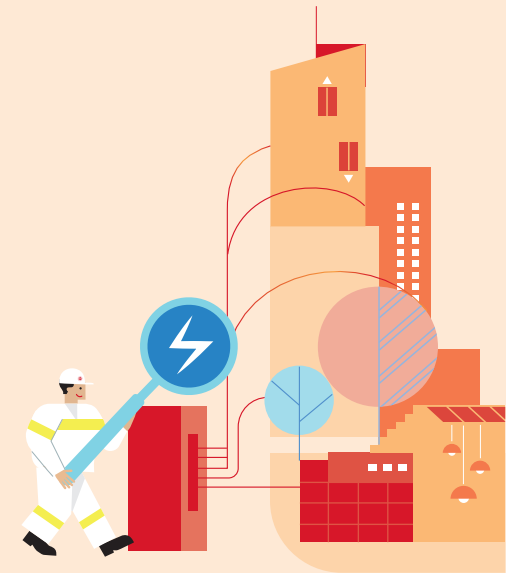
Delivering Smart Power Services

In support of the Government's energy and environmental policy objectives, as well as to help tackle climate change by reducing carbon emissions, HK Electric offers a suite of Smart Power Services (SPS) to promote energy efficiency and the use of renewable energy in the community. SPS have been devised to cater for different sectors of the community, including property owners, electric vehicle users, education and welfare organisations as well as underprivileged members of society.



Buildings, both commercial and domestic, account for around 90% of the city's electricity use and approximately 60% of total greenhouse gas emissions. Enhancing the energy efficiency of buildings will help reduce emission levels. Our **Smart Power Building Fund** provides subsidies to building owners to enhance the energy efficiency of communal building services installations, while our free **Smart Power Energy Audit** helps non-residential customers to identify energy saving potential.

In support of the Government's pledge to achieve carbon neutrality before 2050, our one-stop **Smart Power for Construction Site** service timely provides electricity for construction site to help reduce carbon emissions throughout the construction life cycle.



Provide free energy audit services



Smart Power Building Fund helps enhance energy efficiency of communal building services installations



Smart Power for Construction Site helps customer in reducing carbon emission throughout the construction life cycle

To support a wider use of RE in the community, we encourage customers to install RE power systems to connect to our electricity grid. In return, HK Electric will purchase all the electricity generated from these RE systems through the **Feed-in Tariff (FiT) Scheme**. As at end of 2021, more than 230 customer RE installations with a combined capacity of about 4.5 MW have been connected to our grid.



Lei Tung Estate, Ap Lei Chau (top) and Mercedes-Benz Brand Centre, Hong Kong Island (left) support our FiT Scheme



Support FiT to combat Climate Change



Customers can also demonstrate their support for local RE development by purchasing **Renewable Energy Certificates** from HK Electric.

The **Smart Power Care Fund** was set up to subsidise various sectors in society in adopting a low-carbon lifestyle. A number of programmes are in place to support NGOs, schools, SMEs, the elderly as well as disadvantaged households living in sub-divided units.



Bringing More Electric Vehicles on the Road

Transportation is the second largest source of greenhouse gas emissions in Hong Kong, representing about 17% of the total. To help improve roadside air quality, it is essential to accelerate the use of electric vehicles (EVs).

HK Electric first introduced EVs to our operation fleet in 1984. By the end of 2020, they made up more than 50% of our vehicle fleet. 12 EV charging stations are available across Hong Kong Island for public use. To encourage the wider adoption of EVs,

we offer a one-stop free **Smart Power EV Charging Solution** service to help customers install electric vehicle charging-enabling infrastructure in car parks of private residential buildings. This is in support of the Government’s \$3.5 billion EV Charging at Home Subsidy Scheme.



We also provide advisory service and technical support to the Government and public transport operators for installing charging facilities. We also support MTR, an efficient and environmentally-friendly public transportation system in Hong Kong, by providing a reliable electricity supply to both its existing and future railway lines.



Educating All to Go Green

Enhancing public awareness of the impact of climate change is fundamental to encouraging more to join us on this decarbonisation journey. HK Electric has invested extensively in educating the general public, especially younger generations, on green initiatives.

Smart Power Education Fund

Under the Smart Power Education Fund, we offer a range of green education programmes targeting different audiences:



Happy Green Campaign takes on different themes every year, with activities organised to promote energy efficiency, the use of renewable energy and a low-carbon lifestyle to the general public.



Happy Green School Network offers a variety of Other Learning Experiences to students of member schools in the network, such as visits to Lamma Power Station and Smart Power Gallery, STEAM workshops, drama and talks, eco-tours and more.



Smart Power x Happy Green Ambassadors Programme provides training and life planning experiences to local retirees and secondary school students to enrich their knowledge of environmental protection, energy efficiency and a low-carbon lifestyle.



Green Energy Dreams Come True Competition encourages students to realise their green energy dreams, which promote energy efficiency and conservation or renewable energy, through providing funding and technical advice.

Smart Power Gallery


To provide another learning platform for green education, HK Electric has set up the Smart Power Gallery, an interactive learning space for education purposes. Located in Sheung Wan, the gallery showcases our efforts and achievements in helping the city progress on its green journey. Visitors can uncover the stories behind HK Electric and our power systems, learn about climate change, renewable energy, smart city and reducing carbon footprint at home and at work through our Smart Power Services.



To aid the learning experience, the gallery features a range of multimedia displays and interactive games, while workshops engage students in fun and interesting ways by bringing our technology to life.

Apart from physical guided tours, virtual tours and remote learning are also provided on an online interactive platform. Technology start-ups can also use the space to demonstrate their new smart and low-carbon solutions.



 **Smart Power Gallery Virtual Tour**





Promoting low-carbon living

HK Electric organises talks for students and local communities on ways to save energy and improve energy efficiency. We also provide customers with energy efficiency information and safety tips on our website and our mobile app to help motivate individuals to take actions to save energy.

We run an educational programme, Green Hong Kong Green, to promote Hong Kong's eco-heritage resources and enhance environmental awareness through developing eco-heritage routes on Hong Kong and Lamma islands. By taking the public to tour these routes, we hope to instil in them an appreciation of the value of these natural and historical resources and inspire them to cherish and preserve them for our future generations.

Green Hong Kong Green eco-tours take the public to appreciate local eco-heritage treasures





Decarbonisation – a Journey for All

Achieving carbon neutrality for Hong Kong before 2050 may seem a long way off, but HK Electric is committed to this journey. While there is room for us to achieve full coal-to-gas transition after 2023, we will work closely with the Government and other stakeholders on the best way forward on the city's decarbonisation efforts, including exploring zero-carbon energy sources and carbon reduction technologies. We are also encouraging everyone in the community to share this mission as we believe that decarbonisation is a collective endeavour where each and every one of us in Hong Kong has a role to play.

To find out more about HK Electric's views on Hong Kong's long-term decarbonisation strategy, please see our [Sustainability Reports](#).



With our expertise and experience in the electricity sector, HK Electric is well prepared to contribute to the city's decarbonisation efforts and will work closely with the Government under the Scheme of Control Agreement framework for meeting Hong Kong's carbon neutrality target before 2050.



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