# CLP INFORMATION KIT

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11. 2018  Electronic version of this Information Kit is available on CLP website:
         https://www.clp.com.hk/infokit-EN

To facilitate readers’ navigation in the Information Kit, useful links to further information
available online are marked in blue text with underline and provided with QR codes.

This Information Kit is printed on environmentally friendly paper
1 ABOUT CLP

Who We Are

- **CLP Power Hong Kong Limited** is a wholly-owned subsidiary of CLP Holdings Limited. CLP Holdings Limited is a company listed on the Hong Kong Stock Exchange and is one of the largest investor-owned power businesses in Asia.

- CLP Power operates a vertically integrated power supply business in Hong Kong, covering electricity generation, transmission and distribution, and marketing and customer services.

- CLP Power has been serving Hong Kong for 117 years. It supplies highly reliable electricity to over 80% of Hong Kong’s population.

- In 2014, CLP Power, in collaboration with China Southern Power Grid International (HK) Co., Limited (CSG HK), a wholly-owned subsidiary of China Southern Power Grid Co., Limited, completed the acquisition of 60% interest in Castle Peak Power Company Limited (CAPCO) held by ExxonMobil Energy Limited. Separately, CLP Power also acquired ExxonMobil’s 51% stake in Hong Kong Pumped Storage Development Company, Limited (PSDC). Following the acquisition, CLP Power holds 70% of CAPCO and 100% of PSDC whilst CSG HK owns the remaining 30% of CAPCO.

- To offer better services tailored to customers’ needs and in the ongoing digital transformation of our business, we will continue to focus on the development of new smart service platforms for households and businesses, as well as technologies such as robotics solution, digitalisation, and data analytics to enhance our operational performance, and contribute to a greener and smarter Hong Kong. CLP Power is collaborating with partners such as the Hong Kong Science and Technology Parks Corporation and the Energising Kowloon East Office’s Smart Energy Community in Kai Tak area to pilot innovative solutions.
### Facts and Figures (June 2018 figures)

#### CLP Power in Hong Kong

<table>
<thead>
<tr>
<th></th>
<th>1901</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Founded</td>
<td>1901</td>
</tr>
<tr>
<td>Supply area</td>
<td>Kowloon, New Territories and most of the outlying islands</td>
</tr>
<tr>
<td>No. of customer accounts</td>
<td>2.58 million</td>
</tr>
<tr>
<td>Population served</td>
<td>About 6.0 million</td>
</tr>
<tr>
<td>Total generation capacity</td>
<td>8,963MW</td>
</tr>
<tr>
<td>Total electricity sales</td>
<td>34,505GWh (as of December 2017)</td>
</tr>
<tr>
<td>No. of employees</td>
<td>3,831 (as of December 2017)</td>
</tr>
<tr>
<td>Financial performance</td>
<td>SoC Revenue: HK$39,259 million (as of December 2017)</td>
</tr>
<tr>
<td>Regulated by</td>
<td>HKSAR Government under the Scheme of Control Agreement</td>
</tr>
</tbody>
</table>

#### Generation Facilities

<table>
<thead>
<tr>
<th>Power Stations</th>
<th>Since</th>
<th>Fuel Type</th>
<th>Generation/Purchase Capacity (MW)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castle Peak Power Station</td>
<td>1982</td>
<td>Coal</td>
<td>4,108</td>
<td>Owned by Castle Peak Power Company Limited (CAPCO), in which CLP has 70% stake and China Southern Power Grid International (HK) Co., Limited has 30% stake</td>
</tr>
<tr>
<td>Black Point Power Station</td>
<td>1996</td>
<td>Natural Gas</td>
<td>2,575</td>
<td></td>
</tr>
<tr>
<td>Penny’s Bay Power Station</td>
<td>1992</td>
<td>Oil</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Guangzhou Pumped Storage Power Station</td>
<td>1993</td>
<td>Hydro</td>
<td>600</td>
<td>CLP has the right of use of 600MW of Phase 1 through Hong Kong Pumped Storage Development Company Limited in which CLP has 100% stake</td>
</tr>
<tr>
<td>Daya Bay Nuclear Power Station</td>
<td>1994</td>
<td>Nuclear</td>
<td>1,380</td>
<td>Owned by Guangdong Nuclear Power Joint Venture Company Limited, in which CLP has 25% stake</td>
</tr>
</tbody>
</table>
Electricity Output by Generation Fuel Type in 2017

Transmission and Distribution (*June 2018 figures*)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of primary substations</td>
<td>233</td>
</tr>
<tr>
<td>No. of secondary substations</td>
<td>14,581</td>
</tr>
<tr>
<td>Transmission and high voltage distribution lines</td>
<td>About 15,758 km</td>
</tr>
<tr>
<td>Average network loss (five-year average as of 2017)</td>
<td>4.04% of total energy consumption</td>
</tr>
<tr>
<td>Average unplanned Customers Minutes Lost per year (2015-2017)</td>
<td>1.57 minutes</td>
</tr>
</tbody>
</table>

Electricity supply reliability: Above 99.999%

Our Customers

Customer Type as of Percentage in Total Local Sales in 2017

- Residential: 28%
- Commercial: 40%
- Infrastructure and Public Services: 27%
- Manufacturing: 5%
Our Shareholders

- CLP Holdings Limited had over 19,000 registered shareholders at the end of 2017. The actual number of investors in CLP shares will be much greater, taking into account those people and organisations who have an indirect interest in our shares through intermediaries such as nominees, investment funds and the Central Clearing and Settlement System of Hong Kong.

![Shareholding by Category (2017)]

- The Kadoorie Family became a shareholder in 1928 and participated in the Company’s policy making. In guiding CLP forward, the Kadoorie family follows the traditional values of previous generations, which include being forward-looking, financially prudent, showing integrity in business dealings, and having a sense of obligation to society. The Kadoorie family is also engaged in a host of civic and philanthropic activities which benefit people across the city.

- Shareholder value is delivered through a relatively stable price appreciation over the past ten years and maintenance of a stable dividend stream.

- CLP attaches great importance to effective communications with shareholders through various channels. Our Annual General Meeting is well-attended by an average of about 1,572 shareholders each year in the past five years — an exceptionally high number for a Hong Kong company. Our Shareholders’ Visit Programme, unique amongst Hong Kong Companies, welcomed about 38,100 shareholders and their guests (as of June 2018) to various CLP facilities since the programme was initiated in 2003.
What is the Scheme of Control Agreement (SCA)?

- CLP’s electricity business in Hong Kong is regulated by the Hong Kong SAR Government under the Scheme of Control Agreement (SCA).

- The SCA is an agreement signed between the Hong Kong SAR Government and CLP/Castle Peak Power Company Limited (CAPCO). It defines the companies’ role as an electricity provider, and provides a regulatory framework for the Government to monitor its operating performance and financial affairs.

- Under the regulatory regime, power companies have obligations to provide sufficient and reliable electricity supply in their service areas. Customers obtain quality electricity supply at a reasonable price and in an environmentally responsible manner, while the power companies earn a return which is reasonable in relation to the risks involved and the capital invested.

- The SCA also provides an effective and stringent regulatory framework for the Government to monitor power companies’ operating and financial performance. Operating performance covers supply reliability, operational efficiency, customer service and energy efficiency. Financial performance covers power companies’ capital investment, operating expenditure, rate of permitted return and tariff adjustment.

- The first SCA was signed between CLP and the Government in 1964. A 15-year term has been adopted in all the agreements except the fourth one that came into effect in October 2008. The duration of the agreement was 10 years with an option for the Government to extend the SCA for another 5 years. In April 2017, CLP Power signed a new SCA with the Government for a 15-year term, effective from 1 October 2018 until 31 December 2033.
## Key Terms in the Current SCA

<table>
<thead>
<tr>
<th>Key Term</th>
<th>What it is</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Targets</td>
<td>Performance targets of power companies are set for supply reliability, operational efficiency, customer services, supply restoration, energy efficiency, demand response and renewable energy development. More performance targets on supply restoration are being introduced to enhance the service level.</td>
</tr>
<tr>
<td>Basic Tariff</td>
<td>Basic Tariff is set at a level to cover the require operating cost (including a standard cost of fuel) and return. (See also Chapter 3 on Electricity Tariff)</td>
</tr>
<tr>
<td>Fuel Cost Adjustment</td>
<td>Fuel Cost Adjustment is either a surcharge or rebate to cover the difference between the actual cost of fuels spent and the standard cost of fuel collected through the Basic Tariff.</td>
</tr>
<tr>
<td></td>
<td>A new arrangement for Fuel Cost Adjustment has been introduced, with revisions made more frequently from once a year to once a month to take into account the actual prices of fuels used. Such an arrangement is more transparent and reacts to fuel price changes in a more timely manner.</td>
</tr>
<tr>
<td>Fuel Clause Recovery Account</td>
<td>The Account through which the difference between the standard cost of fuel and the actual cost of fuel is captured and passed onto the customers by way of rebates or charges.</td>
</tr>
<tr>
<td>Tariff Stabilisation Fund (TSF)</td>
<td>If the gross tariff revenues collected exceed or are less than the total revenue required, the amount will be added to, or deducted from, the TSF.</td>
</tr>
<tr>
<td></td>
<td>The TSF aims to ameliorate tariff increases or stabilise tariff levels.</td>
</tr>
<tr>
<td>Permitted Rate of Return</td>
<td>Power companies are permitted to earn a fixed rate of return of the total value of their average net fixed assets. The permitted rate of return under the current SCA is 8%.</td>
</tr>
</tbody>
</table>
## Regulatory Process

- Government monitoring of the power companies under the SCA covers the following: Development Plan Review, Annual Tariff Review, Annual Auditing Review and Interim Review.

### Development Plan Review
- CLP submits to the Government a detailed 5-year plan to meet electricity demand for the development of Hong Kong. The plan, approved by the Executive Council, covers the required capital expenditure, operating and fuel costs, projected electricity sales and basic tariff rate.
- It is required whenever the current Development Plan is about to expire or major capital expenditure is planned.

### Annual Tariff Review
- CLP submits to the Government a tariff proposal for the coming year before end of October each year. The proposal includes: sales forecasts, total capital expenditure, total operating expenditure, cost of fuels and projected basic tariff rate, etc.
- Any proposal to increase the Basic Tariff by more than 5% above the level approved in the Development Plan will require further approval by the Executive Council.
- The adjusted tariff will be effective from 1 January of the following year after the Government’s review.

### Annual Auditing Review
- CLP submits detailed information to the Government before the end of March every year for auditing and review purpose.
- The Government will compare the actual results for the previous year with the corresponding estimates made at the last Development Plan, and monitor the Company’s financial, technical and environmental performance.

### Interim Review
- A review is conducted every five years of the SCA on SCA-related matters. Changes can be made by mutual agreement by the Companies and the Government.

### Links to reference information:

*Period covering October – December 2018*
Evolution of the SCA

- Over the years, the terms in the SCAs have been evolving to reflect continuous refinements made to the regulatory framework in the areas of enhancing operation efficiency and services quality, promoting energy saving and improving environmental performance, increasing information transparency and economic benefits to customers.

- The Hong Kong SAR Government conducted a public consultation on the future development of the electricity market in 2015. The majority of the respondents considered that the power supply in Hong Kong was reliable and safe at reasonable prices. The views collected generally agreed that improvements need to be made to the SCA but the requisite conditions for introducing competition were not present at that stage.

- After detailed discussion and taking into account of Hong Kong’s long-term carbon reduction target for 2030 and results of the public consultation on the future development of the electricity market, the Government and CLP Power signed the fifth SCA, a 15-year term, in April 2017. The new agreement took effect from 1 October 2018 and runs until 31 December 2033.
Current SCA (2018-2033)

- The current SCA is an agreement achieved through the joint efforts of both the Government and CLP Power. Taking into consideration of the Government’s long-term carbon reduction target for 2030 which requires gradual migration to a generation fuel mix composed mainly of natural gas, the 15-year agreement provides a clear and certain regulatory framework for the future development of the electricity industry in Hong Kong. It also enables power companies to plan ahead and make appropriate investments to meet the Government’s energy policy objectives.

- The incentive and penalty scheme of the previous agreement continues to apply, but with more stringent performance targets on supply reliability and customer services. New performance targets on grid supply restoration are introduced to enhance service levels.

- In support of the Government’s environmental policy to address climate change, a series of new initiatives are being introduced from the fourth quarter of 2018. These include the Feed-in Tariff (FiT) scheme and Renewable Energy Certificates to encourage participation from various sectors of the community to support local RE development. Other initiatives also include New Eco Building Fund, Community Energy Saving Fund and energy audits to help our customers achieve demand side management, energy saving, and enhancing public education.

- The Fuel Cost Adjustment (FCA) in the total tariff is revised more frequently from once a year to once a month under the SCA to reflect changes in fuel prices in a more timely way and with enhanced transparency.

- Links to reference information:
  Scheme of Control Agreement (2018 - 2033)

CLP Press Releases:
  CLP Power Signs Scheme of Control Agreement with Hong Kong SAR Government
  CLP Power Launches Initiatives to Promote Low-Carbon Living under New Scheme of Control Agreement
  New CLP Eco Building Fund Awards HK$100 Million a Year to Help 400 Buildings Save Energy
  CLP Power Announces Price of Renewable Energy Certificates
The table below shows a list of key refinements made to the current SCA (2018-2033) compared with the previous one (2008-2018).

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Duration</strong></td>
<td>15-year term</td>
<td>10-year term, with a Government option to extend for 5 years</td>
</tr>
</tbody>
</table>
| **Permitted Rate of Return** | 8% on Average Net Fixed Assets  
The same return rate applies to assets of both renewable and non-renewable energies | 9.99% on Average Net Fixed Assets  
Investments on renewable energy facilities can earn a rate of return of 11% |
| **Tariff Adjustment** | The annual tariff adjustment mechanism is maintained. The Fuel Cost Adjustment (FCA) in the total tariff is revised more frequently from once a year to once a month | FCA in the total tariff is revised once a year |
| **Incentives / Penalties on a number of performance categories** | **Operational Performances**  
The existing incentive and penalty scheme continues to apply, but with more stringent performance targets. New performance targets on grid supply restoration are being introduced | The rate of return is linked to various performance targets under the incentive and penalty scheme:  
– Emissions (2008-2013)$^1$  
– Energy efficiency  
– Supply reliability  
– Operational efficiency  
– Customer services  
– Renewables |
|                      | **Energy Saving and Demand Side Management**  
Performance targets for Energy Audit and energy saved from the initiatives under the current SCA are set at about four times the previous targets  
Demand Response programmes are offered to businesses and industrial customers in order to lower the overall system demand, resulting in a lower requirement for investments in new generation units in the long term. The target for this initiative is to achieve a reduction of up to 60MW from the demand peak | |

$^1$ CLP agreed to remove the “Emission Performance Linkage Mechanism” in the SCA subsequent to the 2013 Interim Review of SCA
### Areas of Refinement

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>• A new five-year energy saving target has been set. CLP Power must achieve at least 4% of energy saving on the basis of the average annual sales within a five-year period in order to earn incentive. More incentives will be given if the said energy saving reaches 5%</td>
<td></td>
</tr>
<tr>
<td>• Renewable Energy Award will be given if:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The ratio of RE in the local generation fuel mix achieves the target set (RE generated from projects directly owned by the Government is excluded)</td>
</tr>
<tr>
<td></td>
<td>• The annual target of new RE connections to the grid is met</td>
</tr>
<tr>
<td></td>
<td>• CLP Power is incentivised to sell RE Certificates</td>
</tr>
</tbody>
</table>

### New Environmental Initiatives

<table>
<thead>
<tr>
<th>New Eco Building Fund to promote energy saving for buildings has been set up. Incentive target set for this initiative is to provide subsidies to 400 residential blocks and commercial and industrial buildings per year to carry out improvement work to enhance the energy efficiency of the communal areas of the buildings. The energy saving target is set at 48GWh per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CLP Power is entitled to 35% of the incentives in relation to Energy Audit, energy saved from these audits and promoting energy saving for buildings, while the remaining 65% will be allocated to a new CLP Community Energy Saving Fund to enhance energy efficiency</td>
</tr>
</tbody>
</table>

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2 Eco Building Fund was set up as a result of 2013 Interim Review of SCA
### Areas of Refinement

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support RE Development</strong></td>
<td>Investments on renewable energy facilities can earn a rate of return of 11%</td>
</tr>
<tr>
<td>▪ The CLP Public Education Fund has been increased from HK$5 million to HK$10 million a year</td>
<td></td>
</tr>
<tr>
<td>▪ Introduce Feed-in Tariff (FiT) Scheme to encourage the RE development in the community. By connecting the systems to CLP Power’s electricity grid, CLP will pay for electricity generated by these systems at a rate offered through the scheme</td>
<td></td>
</tr>
<tr>
<td>▪ Introduce RE Certificates Scheme to allow customers who prefer clean energy and offers different platforms for the community to participate in RE development</td>
<td></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
</tr>
<tr>
<td>▪ If there is excessive capacity when an additional generating unit is commissioned, 100% of the net asset value of the mechanical and electrical equipment of the said unit will be deducted from the fixed assets and the permitted return calculation</td>
<td>▪ If there is excessive capacity when an additional generating unit is commissioned, 50% of the net asset value of the mechanical and electrical equipment of the said unit will be deducted from the fixed assets and the permitted return calculation</td>
</tr>
<tr>
<td>▪ More information such as cost data will be disclosed to customers and the public to improve information transparency</td>
<td></td>
</tr>
</tbody>
</table>
CLP’s new Five-year Development Plan (2018-2023)

- Approved by the Executive Council, the first Five-year Development Plan under the current SCA covers the period from October 2018 to December 2023. The projected capital investment for the period is HK$52.9 billion. The Development Plan aims to support the Government’s carbon reduction target in 2030 by planning and constructing the electricity infrastructure needed to secure a reliable and stable electricity supply to meet Hong Kong’s continuous development, as well as to ensure the city’s transition from coal-fired to gas-fired generation for a low carbon footprint in future. This will also create a greener and smarter energy system, paving the way for Hong Kong’s smart city development.

- Of the total approved investment, around 38% will be dedicated to maintaining supply reliability, 30% to lowering carbon and emissions, 24% to meeting new electricity demand and the remaining 8% to building a smart city and digitalisation.

- The Development Plan features a number of important capital projects to support the Government’s environmental policy, to make possible the phasing out of coal-fired generation units at Castle Peak A Power Station, the move to local gas-fired generation and the transformation of Hong Kong into a smart city. They include: construction of an additional gas-fired generation unit at the Black Point Power Station; construction of an offshore liquefied natural gas (LNG) terminal; enhancement of Clean Energy Transmission System to increase reliability and transmission capacity of the existing cross-border transmission overhead line circuits connecting Hong Kong and Mainland China and to provide greater flexibility for the increased use of zero-carbon energy in future; and the digitalised development with smart meters upgrade for all residential and small and medium business customers and strengthening smart grid.
Links to reference information:

CLP’s Performance under the SCA

- **A stable and long-term regulatory regime** can provide an effective mechanism to address the electricity industry’s requirements for long-term and capital-intensive infrastructural investments.

- The SCA is recognised as a balanced and effective regulatory regime that has served Hong Kong well. Such a regime has supported CLP in delivering an electricity service that meets all four energy policy objectives – supply is safe and very reliable, environmental performance is improving and tariffs are reasonable. The SCA enables CLP to contribute to Hong Kong’s long-
term development as a world-class city, and to play a role in enhancing Hong Kong’s competitiveness and sustainable growth.

- The challenge for the electricity industry comes from the tensions that are apparent in the Energy Trilemma – how to deliver a safe and reliable supply to acceptable environmental standards whilst containing tariff adjustment at reasonable levels. With the SCA, the electricity industry of Hong Kong has been able to strike a balance in managing the energy trilemma.

Managing the Energy Trilemma

* The Energy Trilemma is initiated by the World Energy Council, which advocates that different economies should strike a balance among the three objectives for energy development.

Reliable and Safe Supply

- A reliable and safe power supply is an important pre-requisite for Hong Kong to maintain its competitiveness and attractiveness for organisations to set up their businesses. Maintaining high reliability is critical for our customers in an economy which is built around service industries that depend on a reliable electricity supply.

- Hong Kong has no indigenous energy resources. It is densely populated and over 50% of people live or work above the 15th floor using more than 66,000 elevators in daily operation. Hong Kong is a key international financial centre and over 5 million trips are taken every day on electrically powered transportation networks. These unique characteristics make exceptional power supply reliability essential for Hong Kong.

- Under the SCA, **CLP provides world-class supply reliability over 99.999%**.

- Power interruption in Hong Kong is at an extremely low level. Between 2015 and 2017, on average a customer might experience 1.57 minutes unplanned power interruptions in a year. This compares to 8.5 minutes for Sydney CBD, 19 minutes for New York, as well as London’s 21 minutes.
- High electricity supply reliability has been instrumental in enabling Hong Kong’s status as a world-class city, and in powering the long-term social and economic development of Hong Kong.

### Reliability Levels in Major Metropolitan Cities

<table>
<thead>
<tr>
<th>City</th>
<th>Unplanned customer minutes lost per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>0.5</td>
</tr>
<tr>
<td>CLP Power</td>
<td>1.57</td>
</tr>
<tr>
<td>Sydney (CBD)</td>
<td>8.5</td>
</tr>
<tr>
<td>New York</td>
<td>19</td>
</tr>
<tr>
<td>London</td>
<td>21</td>
</tr>
</tbody>
</table>

**Notes:**
1. 2015-2017 average for CLP Power Hong Kong and New York
2. 2014-2016 average for other cities
3. Singapore’s power supply network is mostly underground, and is less exposed to the influence of weather and other external interferences than overhead lines.

- Hong Kong has been ranked third out of 190 economies in the ease of getting electricity in the Doing Business 2019 rankings published by the World Bank, supporting the fact that our customer service levels meet those of any developed economy.

- To ensure top service quality and reliability, CLP’s **reserve margin is maintained at an appropriate level** and is within the recommended range of 20% to 35% by the International Energy Agency.

- See also Chapter 4 on **Reliable Electricity Supply**.

### Reasonable Tariff

- **CLP’s tariff level is reasonable and competitive** when compared to other key metropolitan cities in the world. In October 2018, our average tariff for typical residential customers in CLP’s service areas is HK$1.147/kWh while tariff for New York is almost double of Hong Kong.
Cities with lower tariff than CLP are mostly characterised by: having government subsidies, being state-owned power companies, or having relatively abundant natural resources to support power generation.

Source: Web search

Notes:
1. Comparison based on average monthly domestic consumption of 275kWh
2. CLP’s tariff as of Oct 2018; Tariff as of Jun 2018 for other cities
3. Exchange rate of Jun 2018 was applied
In Hong Kong, electricity expenses account for 1.6% of total household expenditure, lower than other metropolitan cities like Sydney (2%), London (1.8%), Singapore (2.2%).

**2014/15 Household Expenditure Survey**

- **Electricity** 1.6%
- Food 35.8%
- Housing 19.4%
- Gas and water 7.5%
- Alcoholic drinks and tobacco 3.2%
- Clothing and footwear 27.3%
- Durable goods 1.1%
- Miscellaneous 0.5%
- Transport 3.5%


- **The upward adjustments of tariff in recent years have mainly been due to fuel cost increases.** Globally, fuel prices have been highly volatile. In addition, in order to meet the increasingly tightened emissions caps set by the Government, we will need more natural gas. The cost of natural gas is generally higher than that of other fuels, leading to further challenges in tariff management.

- CLP has taken actions to minimise the cost impact as a result of significant fuel cost fluctuation and to maintain tariff at a reasonable level. These actions include enhancing generation efficiency, making the most use of the existing gas reserves and cost control.

- The significant drop in fuel prices in 2015 and CLP’s constant cost control efforts have enabled customers to enjoy a special fuel rebate in August 2015 and eventually a reduction of the 2016 tariff. In 2017, CLP froze the tariff at the level of 2016 as promised. A rebate of nearly HK$800 million have been returned to all CLP customers. Together with the special rebate the company offered in 2015, a total of HK$2 billion were returned to customers over the course of two years.

- See also Chapter 3 on **Electricity Tariff**.
Care for the Environment

- Over the years, CLP has been supporting the community’s expectations for **better air quality** and a **reduction in greenhouse gas emissions** by deploying the best practical technologies and operational excellence, and through changes to our fuel mix.

- Our **emissions control measures** — including installation of emissions control facilities — helped improve Hong Kong’s emissions performance substantially.

- **Managing our fuel mix** is also a key contributor to resolving the issues of climate change and air quality. CLP has made sustained efforts in improving the environment through the use of low sulphur coal, natural gas and nuclear. We started to import nuclear energy from Daya Bay Nuclear Power Station in 1994. In 1996, we pioneered the use of natural gas for power generation in the region.

- CLP’s emissions have reduced over 88% since 1990 while electricity demand has grown by over 84% during the same period.

CLP is also committed to **energy efficiency and conservation**. A wide range of tools and programmes have been developed to provide practical assistance to both residential and commercial customers to achieve energy saving and change their habits of electricity consumption.

- CLP helps customers reduce energy consumption through: public education, the provision of tools and technical support, the provision of related information and energy-saving tips and offering useful enablers.
- We also conduct **energy audits** for business customers. CLP’s professional engineers are assigned to conduct detailed analysis of energy usage and energy efficiency at customers’ premises. Professional reports and practical advice are provided after evaluation which greatly enhance customers’ awareness of energy conservation.

- **Concerted efforts from all sectors in the community** and a change of the public’s lifestyle and habits are required to effectively conduct energy efficiency and conservation work.

- See also Chapter 7 on **Energy Management**.

- Links to reference information: [Scheme of Control Financial & Operating Statistics 10-year Summary](#)
3 ELECTRICITY TARIFF

CLP Tariff Components

- CLP’s tariff is made up of two major components:

  1. Basic Tariff
     - Basic Tariff is set at a level to cover the total costs of electricity supply, including operating cost, standard cost of fuels and return
  
  2. Fuel Cost Adjustment
     - Fuel Cost Adjustment is either a surcharge or rebate to cover the difference between the actual cost of fuels spent and the standard cost of fuel collected through the Basic Tariff

- At-a-glance table of CLP’s tariff in the past five years:

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Tariff</td>
<td>88.6</td>
<td>87.1</td>
<td>88.9</td>
<td>92.2</td>
<td>94.5</td>
<td>91.0</td>
</tr>
<tr>
<td>Fuel Cost Adjustment</td>
<td>22.4</td>
<td>27.0</td>
<td>24.3</td>
<td>21.0</td>
<td>22.0</td>
<td>27.8</td>
</tr>
<tr>
<td>TOTAL TARIFF</td>
<td>111.0</td>
<td>114.1</td>
<td>113.2</td>
<td>113.2</td>
<td>116.5</td>
<td>118.8</td>
</tr>
<tr>
<td>Rent and Rates Special Rebate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>NET TARIFF</td>
<td>111.0</td>
<td>114.1</td>
<td>113.2</td>
<td>113.2</td>
<td>115.4</td>
<td>117.7</td>
</tr>
</tbody>
</table>

1 The tariff for October 2018 to December 2019 is the average tariff rate effective from 1 October 2018
2 At some point in Q4 2018 or in 2019, the Rent and Rates refund available from Government as a “Rent and Rates Special Rebate” is expected to be used up.

- In April 2017, CLP Power signed a new Scheme of Control Agreement (SCA) with the Hong Kong SAR Government. The permitted rate of return has been reduced from 9.99% to 8% under the current SCA which came into effect in October 2018. This has helped deliver a 3.7% reduction in Average Basic Tariff in the tariff package. However, this is more than offset by the rise in fuel costs, resulting in a slight increase of 2% to 117.7 cents per unit in the Average Net Tariff.

- Since January 2018, CLP Power has offered a Rent and Rates Special Rebate of 1.1 cents per unit of electricity to all customers using the Rent and Rates refund available from the Government. In 2012 and 2013, CLP Power also offered a total of HK$1.6 billion Rent and Rates Special Rebate to customers.

- CLP Power also provided a one-off special fuel rebate to all customers in August 2015 subsequent to reduced fuel price earlier in the year. The rebate was calculated at 8 cents per unit based on customers’ electricity consumption between January and June in 2015. CLP announced another fuel rebate of 2.3 cents per unit to all customers based on their electricity consumption between January and December in 2016. Together with the special rebate CLP Power offered in 2015, a total of HK$2 billion will have been returned to customers over the course of two years.
Links to reference information:
Tariff Component
Energy Costs

Annual Tariff Review

- CLP submits to the Government a tariff proposal before the end of October every year.
- The proposal includes: sales and maximum demand forecasts, total capital expenditure, total operating expenditure, cost of fuels, basic tariff rate, etc.
- The basic tariff rate agreed with the Government will be implemented on 1 January of the following year.

Monthly Fuel Cost Adjustment

- After the current SCA came into effect on 1 October 2018, the Fuel Cost Adjustment (FCA) in the tariff package is revised automatically during the year on a monthly basis to take into account of the actual prices of fuels used. This arrangement is more transparent and reacts to fuel price changes in a more timely way.
- The monthly FCA is calculated based on the average actual fuel prices over three preceding months as compared with the fuel prices projected at the most recent tariff review. The revised FCA will be applied the following month after a process of data collection and verification. The monthly FCA is published on CLP Power website.

Links to reference information:
2018* and 2019 Tariff Review Presentation
2018* and 2019 Tariff Review Information
New Arrangement for Fuel Cost Adjustment

*Period covering October to December 2018
Tariff Structure

- CLP has four tariff categories, namely:
  1. **Residential Tariff** (Residential customers)
  2. **Non-Residential Tariff** (Small business customers)
  3. **Bulk Tariff** (Large businesses and public services with monthly consumption demand not less than 20,000 units)
  4. **Large Power Tariff** (Large businesses and public services with monthly consumption demand not less than 3,000 KVA)

- CLP’s tariff structure is designed to be fair and cost reflective for each tariff group of customers, and it therefore avoids cross-subsidies between the customer groups.

- The cost of electricity supply to each tariff group takes into account the investment and resources needed to supply them and the efficiency with which these resources are used. In general, fixed operating costs like metering, billing and customer services are lower per unit for higher-consuming customers.

- For **Residential Tariff**, an inclining block structure is applied. Under this structure, there are seven blocks with different rates. Higher consumption is charged at a progressively higher unit rate. This encourages the efficient use of energy by residential customers, and the lower blocks provide protection for residential customers with lower household incomes and incentive for those with low consumption to encourage energy saving. Inclining tariff structures for residential customers are common in many cities worldwide.

- Unlike Residential Tariff customers, inclining tariff structures for businesses and public services are uncommon in other cities in the world.

- A fixed rate is applied for **Non-Residential Tariff**. Customers are charged according to their consumption. High consumption customers under **Bulk Tariff** and **Large Power Tariff** categories have a declining tariff structure of two blocks with a slight difference per unit. They have two tariff features:
  - They have to pay a Demand Charge in addition to the cost of the energy units they consume. The Demand Charge reflects the capacity of the supply customers draw from CLP’s network based on their maximum energy demand.
  - In addition, under a Time-of-Use tariff feature, they also pay a premium for energy used at peak times but are able to reduce costs if they can move this to off-peak periods. This facilitates demand side management and better utilisation of power generation facilities.
At-a-glance table of CLP tariff structure:

<table>
<thead>
<tr>
<th>Tariff Categories</th>
<th>Customer Type</th>
<th>Basic Tariff</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Energy Charge</td>
<td>Demand Charge</td>
<td></td>
</tr>
<tr>
<td>Residential Tariff</td>
<td>Residential customers</td>
<td>√</td>
<td>With 7 inclining blocks</td>
<td>-</td>
</tr>
<tr>
<td>Non-Residential Tariff</td>
<td>Small business customers</td>
<td>√</td>
<td>Uniform rate</td>
<td>-</td>
</tr>
<tr>
<td>Bulk Tariff</td>
<td>Large businesses and public services with monthly consumption demand not less than 20,000 units</td>
<td>√</td>
<td>With Time-of-Use feature</td>
<td>√</td>
</tr>
<tr>
<td>Large Power Tariff</td>
<td>Large businesses and public services with monthly consumption demand not less than 3,000 KVA</td>
<td>√</td>
<td>With Time-of-Use feature</td>
<td>√</td>
</tr>
</tbody>
</table>

Link to reference information: CLP Tariff Table 2018* and 2019

*Period covering October to December 2018
Tariff and Fuel Costs Challenge

- Compared to other key metropolitan cities in the world, CLP’s tariff level is very competitive. Cities with a lower tariff than CLP are mostly characterised by having government subsidies, being state-owned power companies, or having relatively abundant natural resources to support power generation.

Residential Tariff Comparison with Other Cities

Notes:
1. Comparison based on average monthly domestic consumption of 275kWh
2. Tariff and exchange rate in January 2018

- CLP has for many years adopted a diversified fuel mix to ensure the reliability of electricity supply and to meet statutory environmental requirements at a reasonable cost. Its fuel mix comprises natural gas, coal, imported nuclear electricity, oil, and renewable energy.

- CLP is facing significant challenges from rising fuel costs due to its need to meet tightening emissions caps starting from 2015 and the need to increase usage of natural gas.

- In support of the Government’s environmental policy and the transition from coal-fired to gas-fired generation, CLP will continue to increase substantially the usage of natural gas to 50% by 2020. As the coal firing units will gradually retire, and to meet the Government’s target of carbon intensity reduction in the Hong Kong’s Climate Action Plan 2030+, the use of natural gas in generation is expected to continue to increase to take up the largest portion of the fuel mix.

- As the cost of power generation by natural gas is more than double of that by coal, fuel costs will increase considerably and will add pressure on tariff.
- The upward adjustments in total tariff in recent years have mainly been due to the increases in fuel costs.

- Globally, fuel prices have been highly volatile. The following chart shows the volatility of fuel prices in the past decade.

- Since 1996, the Yacheng field in the South China Sea has been supplying natural gas to CLP. This reserve is depleting fast and the gas supply to CLP is being supplemented by the natural gas supplies from the Second West-East Gas Pipeline (WEP II) since 2013. The gas price of WEP II, which is partially affected by the market price, is more expensive than that of the Yacheng supply. The Yacheng supply was contracted some 20 years ago when fuel prices were significantly lower than current market price.
In view of the need of increasing usage of natural gas which will put pressure on CLP’s fuel costs in the coming years, CLP is taking actions to minimise the impact of high fuel costs and to contain tariff increases to a reasonable level. Measures adopted include:

- Diversifying gas sources and planning to construct an offshore liquefied natural gas (LNG) terminal to ensure a reliable and stable supply of natural gas to Hong Kong in the long term, while allowing Hong Kong to purchase competitively-priced LNG directly from the global market;
- Enhancing the operational performance of our generation fleet;
- Continuing stringent cost control;
- Securing a temporary additional supply of a small amount of nuclear power from Daya Bay starting from the fourth quarter of 2014.

To enhance tariff information transparency, CLP has been providing data and information related to energy costs for electricity generation and electricity sales on our website on a monthly basis since November 2013. The published data enables our customers to better understand the latest fuel mix, fuel cost and tariff components.

Commencing 1 October 2018, the Fuel Cost Adjustment is revised more frequently from once a year to once a month. This arrangement is more transparent and reacts to fuel prices changes in a more timely manner. The Fuel Cost Adjustment will be published monthly on CLP Power’s website.

Alleviating Tariff Pressures

The Scheme of Control Agreement has mechanisms to stabilise tariff. It sets out a role for two balancing funds – the Tariff Stabilisation Fund and the Fuel Clause Recovery Account, which are designed to act to smooth out volatility in adjusting the Basic Tariff and the Fuel Cost Adjustment respectively.

CLP tries its very best to alleviate the pressure of rising tariffs, especially due to the impact of fuel price fluctuations. It works hard in containing tariff increases to a minimum level through prudent cost management and control, as well as supporting customers with practical help and advice in both energy saving and reducing bills.

CLP has provided an Energy Saving Rebate Scheme for low-consumption residential and small business customers since 2013 to help them reduce tariffs and encourage energy saving. Under the Scheme, customers consuming 400 units or less per bill can enjoy savings in their electricity bills.

CLP also offers a Concessionary Tariff for the Elderly. Customers aged 60 or above who live alone or with other similarly qualified elderly, and who are relying on or entitled to Comprehensive Social Security Assistance are eligible for the concessionary tariff. The approved applicant will be offered a 50% reduction for the first 400 units of electricity consumed in each two-month billing period plus an exemption of the minimum charge on each bill.
CLP introduced the **Power Your Love Programme** in 2015 which encourages CLP’s residential customers to save energy in summer and donate the energy saved to families in need by offsetting their electricity expenses. In the past three years, over 510,000 residential customers participated in the campaign, with a total of 30GWh saved. Around 20,000 households in need received the subsidy amounting to HK$6 million made available by CLP shareholder’s fund, with each household receiving HK$300 of subsidy.

See also Chapter 10 on **Community Commitment**.

Under the current Scheme of Control Agreement, a **CLP Community Energy Saving Fund** has been set up which will begin operations in January 2019. Under this fund, a **CLP Power Connect** programme will be launched to encourage residential customers to save energy and in return CLP will offer financial assistance to disadvantaged groups in the preference of the participating customers to offset against their electricity expenses. A total of HK$20 million will be allocated to subsidise around 40,000 households in need each year, including single elderly or elderly couple, low income families, the disabled and subdivided unit households, with each receiving HK$500 of electricity subsidy.

See also Chapter 7 on **Energy Management**.
4 RELIABLE ELECTRICITY SUPPLY

Why is Reliable Power Supply Critical to Our Customers?

- A reliable and safe power supply is an important pre-requisite for Hong Kong to maintain its competitiveness and attractiveness for organisations to set up their businesses. Maintaining high reliability is critical for our customers in an economy which is built around service industries that depend on a reliable electricity supply.

- Hong Kong is unique. It is a densely populated city with over 50% of people living or working above the 15th floor, and more than 66,000 elevators in operation daily. It is also a key international financial centre and over 5 million trips are made every day on electrified mass transit network. These unique characteristics make exceptional power supply reliability essential for Hong Kong.

CLP’s Supply Reliability

- CLP provides reliable and safe electricity supply in Hong Kong at a world-class reliability of over 99.999%.

- Power interruption in Hong Kong is at an extremely low level. Between 2015 and 2017, on average a customer might experience 1.57 minutes unplanned power interruption in a year. This compares to 8.5 minutes for Sydney CBD, 19 minutes for New York, as well as London’s 21 minutes.

Reliability Levels in Major Metropolitan Cities

![Bar chart showing reliability levels in major metropolitan cities]

<table>
<thead>
<tr>
<th>City</th>
<th>Unplanned Customer Minutes Lost per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>0.5</td>
</tr>
<tr>
<td>CLP Power</td>
<td>1.57</td>
</tr>
<tr>
<td>Sydney (CBD)</td>
<td>8.5</td>
</tr>
<tr>
<td>New York</td>
<td>19</td>
</tr>
<tr>
<td>London</td>
<td>21</td>
</tr>
</tbody>
</table>

Notes:
1. 2015-2017 average for CLP Power Hong Kong and New York
2. 2014-2016 average for other cities
3. Singapore’s power supply network is mostly underground, and is less exposed to the influence of weather and other external interferences than overhead lines.
- High electricity supply reliability has been instrumental in enabling Hong Kong’s status as a world-class city, and in powering the long-term social and economic development of Hong Kong.

- Hong Kong has been ranked third out of 190 economies in the ease of getting electricity in the Doing Business 2019 rankings published by the World Bank, supporting the fact that our customer service levels meet those of any developed economy.

Maintaining World-Class Supply Reliability

- CLP’s high supply reliability cannot be taken for granted. It is the result of our power expertise, and long-term commitment to generation, network and operations excellence. The following areas demonstrate CLP’s ongoing efforts to uphold its world-class supply reliability.

Sufficient Generating Capacity

- Reserve capacity is essential to cater for any loss of generating capacity due to planned maintenance and unforeseen outages even at peak load. Reserve margin is similar to keeping a spare tyre in a car, which is crucial for contingency management.

- Take CLP’s Castle Peak Power Station as an example, the loss of one larger generating unit will reduce the Station’s available generation capacity by about 15%, adding uncertainty to the highly reliable power supply provided by CLP. Reserve capacity is therefore important to meet emergency needs.

- CLP sets the level of reserve margin by making reference to the maximum electricity demand as one of the most important indicators for planning and operations. This is in line with the practices adopted in the electricity industry all over the world.

- To ensure top service quality and reliability, CLP’s reserve margin is maintained at an appropriate level and is within the recommended range of 20% to 35% by the International Energy Agency.

Facilities and Network Upgrades to Address New Demand

- To maintain the highly reliable supply, a key challenge is meeting our customers’ demand for electricity in Hong Kong. A large number of territory-wide development and infrastructure projects are in progress simultaneously, and they call for increasing power supply. These important projects for Hong Kong are needed to support population growth, new housing, railway expansions, the new West Kowloon Cultural District, the Hong Kong-Zhuhai-Macau Bridge, the development of the Lok Ma Chau Loop, data centre infrastructure, and so on.

- These projects are closely linked with Hong Kong’s ongoing social and economic growth, and a safe and reliable electricity supply is a key contributing factor to their successful developments.
To cope with the demand growth, and in the absence of building new electricity generation facilities for a number of years, CLP has been adopting different measures to **enhance our generation and network infrastructure** to address the challenge.

In 2018, CLP announced a new Five-year Development Plan (2018-2023) which features a number of important projects to support the Government’s environmental policy of moving towards more local gas-fired generation and transforming Hong Kong into a smart city. The Development Plan also enables the planning and construction of infrastructures needed to secure a reliable and stable fuel mix as well as environmentally friendly electricity supply at competitive prices to meet future customer demand and more stringent carbon reduction requirements.

For our **generation facilities**, in response to the Government’s plan to increase the percentage of local gas-fired generation to around 50% of the total fuel mix in 2020 and to ensure a reliable power supply service, CLP is constructing an additional gas-fired generation unit with an advanced design at Black Point Power Station. The new unit would feature a Combined Cycle Gas Turbine (CCGT) configuration which would give it an efficiency of around 60%, higher than that of the existing gas-fired units. To allow for the gradual phasing out of the coal-fired generation units at Castle Peak Power Station’s ‘A’ Station, the construction of another gas-fired generation unit in Black Point Power Station has been planned and is expected to be ready for operation by 2022/2023.

Upgrading the efficiency of existing and aging generation facilities is essential to ensure we increase output, meet increased demand and maintain reliability. Efficiency upgrades in our plants are also important to improving our emissions performance. Since 2015, three of the eight gas turbine systems at Black Point Power Station have been upgraded, increasing the capacity of each system by 25MW (8%), at the same time enhancing their nitrogen oxides emissions performance and driving improvements in efficiency and fuel cost.

**On power systems**, expansion and reinforcement of our supply networks are crucial to ensure adequate and reliable electricity supply. These will include continuous improvements to, and extensions of, our transmission and distribution facilities to meet new demand and ensure reliable delivery of supply to customers.

In CLP’s Five-year Development Plan (2018-2023), CLP will implement a project to enhance the reliability and transmission capacity of the existing 400kV cross-border transmission overhead lines connecting Hong Kong and Mainland China. This enhancement will increase the system’s resilience and provide the necessary infrastructure to enable greater flexibility to tap into cleaner energy and for possible increased use of non-fossil energy in future.

Network enhancements also cover refurbishing current facilities such as switchgears and transformers, and replacing components to ensure continuous smooth operations.

### Advanced Technology

A reliable and secure power grid is critical to ensuring supply reliability. CLP’s strategy is to incorporate the latest and the most relevant technologies to improve the performance of our power system.
Smart Grid Development

- Smart grid development is an emerging global trend of power grid modernisation. CLP is one of the few power companies worldwide which develops smart grid in a vertically integrated approach, covering all aspects including power generation, transmission and distribution, as well as customer services. By integrating information and communications system and advanced monitoring technology into the traditional power grid, it can open up new opportunities to engage customers in energy saving and demand side management. It also enhances the reliability, efficiency, safety, and quality of power supply to customers.

  - **Real-time monitoring system:** CLP has equipped the generation units of Black Point Power Station with the real-time monitoring system. Developed by CLP, the system comprises intelligent sensors which are installed at key generation facilities, allowing engineering staff to continuously monitor and analyse different parameters such as temperature and pressure and vibration of the power plants, so as to timely identify potential faults for maintenance.

    Since its commissioning in the second quarter of 2015, the real-time monitoring system has enhanced CLP’s reliability of power generation and reduced the maintenance cost of the generation units. To further increase the reliability of power generation, CLP is extending the application of the system by installing intelligent sensors at more facilities at Black Point Power Station and introducing similar system at Castle Peak Power Station.

  - **11kV overhead line automatic restoration system:** CLP applies smart technology to carry out real-time analysis to protect and control the power grid. When the 11kV overhead lines equipped with automatic restoration system are interfered by external factors such as lightning strikes or falling trees, the system will automatically isolate the faulty section, and shift to other sources for immediate supply restoration.

  - **Intelligent transmission substations:** As a pilot scheme, CLP has built two intelligent transmission substations, namely Eastern Road Substation and Chui Ling Road Substation, featuring with the most advanced and fully automated equipment. Among all the smart features, the self-healing system can significantly shorten the power restoration time from several minutes to less than one second.

  - **Smart distribution substations:** CLP is also evaluating the application of smart technologies for distribution substations where intelligent electronic devices were installed at the power distribution equipment. By comparing the operational data with pre-set parameters such as the amount of electric current, voltage, temperature, relative humidity, dust level and water level, it enables CLP to conduct online condition monitoring of electrical plants and auxiliary equipment at the substations. Alarm of the system will be activated when the equipment is found abnormal. This trial project built up our experience on applications of the smart technologies. Further trial on emerging cost-effective technologies will be conducted.

  - **Online condition monitoring:** Aside from intelligent substations, CLP also introduces online condition monitoring systems at some transformers and switchgears for conducting round-the-clock health checks. Once irregularities are observed, the system will automatically issue alerts to relevant engineering staff, so that inspection or repair can be conducted at an early stage. The data collected can also serve to support the implementation of Condition Based Maintenance.
- **Smart meters for all customers:** To support Hong Kong's transformation into a smart city, all conventional meters of CLP's residential and small to medium-sized business customers will be upgraded to smart meters in phases from November 2018 to 2025. Smart meters connected through a telecommunication system form the Advanced Metering Infrastructure (AMI) system. It can provide detailed electricity usage information and a range of digitalised services and solutions to customers, empowering them to efficiently manage their consumption, reduce energy use and demand at peak times, so as to move into low-carbon living. The AMI system can also further improve supply reliability and enhance customer experience.

**Other Technologies**

- **Airborne LiDAR scanning:** There are a large number of fast-growing tree species in Hong Kong, and fallen trees or branches that make contact with overhead lines under strong wind and heavy rain can disrupt electricity supplies. CLP has adopted vegetation management techniques since 2001. The vegetation management team carries out pruning work on trees which might affect overhead lines. In addition, CLP has adopted airborne LiDAR scanning to accurately and efficiently measure the clearance between transmission overhead line conductors and nearby vegetation. By building 3-D models and mapping the vegetation along the overhead lines, we can manage vegetation works more systematically and enhance the efficiency and effectiveness.

- CLP continuously explores the use of advanced technologies and applies industry best practices to drive innovation into its maintenance regimes. Various innovative technologies are being applied in the operations of CLP’s power stations. They include the use of drones to carry out pre-maintenance inspections for high or hard-to-reach locations within power stations, 3D printing for certain mechanical replacement parts, VR technology for welding and safety training, as well as the use of robotics for various work types such as boiler inspections.
Power Quality

- Power quality has become a concern of our customers in recent years with the increased use of sophisticated computing, automation and control technologies especially in the financial, medical, communication and industrial sectors. One of the most common power quality issues is **voltage dip**.

- A voltage dip is not a power supply suspension. It is a voltage fluctuation in a very short period of time. Voltage dip can be caused by various factors, for example, overhead lines are exposed and susceptible to the influence of adverse weather such as typhoons, lightning strikes, or third party interference including trees and wildlife, all of which may cause voltage dip in the power system. For these reasons, occasional voltage dips are unavoidable. Power companies all over the world have not been able to totally eliminate the occurrence of momentary voltage dips.

- In general, voltage dips last for less than 0.1 second. Individual users may experience momentary dimming or flickering of lights. Some electrical installations sensitive to voltage fluctuation, such as lifts, may trip as a result of the activation of the equipment’s protection mechanism.

- CLP’s professional engineers have been carrying out an ongoing study to improve the quality of our power supply. CLP is always willing to engage and share with customers and industry practitioners engineering solutions for mitigating the impact of voltage dip such as ride-through devices.

Measures against Extreme Weather

- As reliable electricity supply is regarded as very important by our customers, CLP constantly reviews and explores new technologies to sharpen our emergency preparedness. In recent years, extreme weather conditions occur more frequently as a result of climate change, with stronger destructive power, posing threat to supply reliability. CLP’s power supply is at particular risk from super typhoons, storm surge, lightning strikes and high temperature. Therefore, we adopt a number of measures to enhance the resilience of our power equipment against extreme weather, aiming to maintain a reliable power supply and minimise the impact on critical services and infrastructure, as well as our customers.

- More than 30% of CLP’s transmission network consists of overhead lines. There are more than 700 400kV transmission towers that form the backbone of our supply system. Overhead lines are exposed and susceptible to the influence of weather and the external environment. If a tower is destroyed by strong winds or collapses because of a landslip, it could take several months to be restored.

Linesmen are connecting conductors on a 70-feet high temporary mast. The construction of a temporary mast takes a little over 10 days, which is 10 times faster than repairing a damaged tower.
Hong Kong is exposed to increasing challenges posted by high-impact extreme weather events including super typhoons. CLP constantly reviews and enhances its measures for emergency preparedness. These include: **strengthening the tower structures and foundations of 400kV overhead lines** that can withstand super typhoons with wind gusts up to 300km/h; and **introducing an Emergency Restoration System** that enables rapid construction of temporary masts that the time to restore power supply can be shortened to just two weeks when an existing tower is damaged. In addition, CLP has also established a typhoon response protocol and coordinating system. Drills are conducted in a regular basis.

Hong Kong may also be vulnerable to storm surges caused by tropical cyclones. To counter the potential impact of storm surge on the power supply, CLP has since 2014 introduced a **flood calculator**, which evaluates the flooding risk at substations during typhoons based on real-time data and forecasts released by the Hong Kong Observatory, allowing for meticulous monitoring and timely coordination by our engineering staff. Upgraded mitigation measures have also been taken at flood-prone transmission substations and distribution substations such as **installing flood gates, sealing the cable inlets** and **equipping the substations with sump pumps and flood alarm systems.** In addition, flood prevention measures have also been put in place at our power generation facilities. These measures ensure all CLP’s transmission and distribution substations could withstand an extreme sea water level due to super typhoon with a return period of once in 200 years.

Overhead lines are exposed and susceptible to lightning strikes. To minimise voltage dips caused by lightning, CLP has installed **line arresters** on transmission towers and poles. Line arresters can drain tremendous lightning current to the earth and hence help stabilise the system voltage. As a result, supply reliability and power quality are enhanced.

In view of the more frequent **high temperature** days, a study was conducted in 2006 to assess the impact of a high ambient temperature up to 40°C on power systems equipment. All equipment were found to maintain operation, but the rating capability of some equipment such as transformers may be lower. Since 2007, a new operating condition at substations against high temperature of 45°C for new equipment has been incorporated in CLP guidelines. CLP will closely monitor the performance of the power supply facilities to avoid heavily loaded situation.
Government’s Environmental Policy

- With the community’s increasing environmental awareness, the Government and the community are more concerned about monitoring and managing emissions. **Carbon dioxide** is a kind of greenhouse gas that contributes to climate change. **Air emissions** refers to the emission of air pollutants. At present, the Hong Kong Government monitors emission of the following pollutants: sulphur dioxide (SO₂), nitrogen oxide (NOx), respirable suspended particulates (RSP/PM10), fine suspended particulates (FSP/PM2.5), volatile organic compounds (VOC) and carbon monoxide (CO).

Carbon Reduction

- In addressing the increasingly stringent challenges brought by climate change, global cooperation and concerted efforts by every member in the society are needed. The Central Government announced its target in 2009 to reduce **carbon intensity** (in terms of carbon dioxide emissions per unit GDP) by 40%-45% by 2020, as compared with the 2005 level. In 2015, the Central Government further announced a new commitment to lowering the nation’s overall carbon intensity by 60-65% from the 2005 level by 2030.

- In 2014, the Environment Bureau conducted a public consultation on the Future Fuel Mix for Electricity Generation. Having regard to the results of the public consultation, the HK SAR Government planned to implement the following fuel mix to meet the pledged environmental targets for 2020. Natural gas for power generation will be increased to **around 50%** in the fuel mix. The Government also set a voluntary carbon intensity reduction target. The Government proposed Hong Kong to reduce its carbon intensity by 50%-60% by 2020 when compared to 2005.

- Following China’s announcement of the new commitment, the Hong Kong SAR Government stated in its Climate Change Report 2015 that it will use this target as reference to continue sharpening our mitigation plans.

- In 2015, the Paris Agreement brought clear direction for low-carbon energy development at the international level. In 2017, the Hong Kong SAR Government also announced a new carbon intensity target in the **Hong Kong’s Climate Change Action Plan 2030+** published by Environment Bureau. Carbon intensity will be reduced by 65%-70% by 2030, using the level in 2005 as the base. In order to meet the new target, Hong Kong will continue to phase down the remaining coal plants in the next decade and replace them with natural gas and non-fossil fuel sources. Furthermore, possible options of utilising more zero carbon energy will be explored by the Council for Sustainable Development in the first quarter of 2019 through the Public Engagement exercise on Long-term Decarbonisation Strategy.
Air Quality Improvement

- Locally, the HKSAR Government in 2008 issued its first Technical Memorandum (TM) under the Air Quality Control Ordinance to cap the emission allowances for power companies using the levels of 1997 actual emissions as a base. Power companies must fulfil the requirements starting from 2010 as specified in the TM. The emission allowances have been continuously tightened in subsequent years of 2015, 2017, 2019, 2020, 2021 and 2022. The emissions allowances will be reviewed at least every two years to ensure continuous improvement of air quality in Hong Kong. Having regard to the results of the public consultation carried out in 2014 on future fuel mix, the Government announced the target to reduce carbon intensity by 50% to 60% by 2020 when compared to 2005; and to reduce the emission of SO2, NOx and RSP by 35% to 75%, 20% to 30% and 15% to 40% respectively by 2020 when compared to 2010.

Sources: Hong Kong’s Climate Action Plan 2030+ Website
Powering Responsibly and Reducing Emissions

- CLP manages the environmental impact of electricity generation responsibly. We adopt the world’s best practices to improve our operational efficiency, safety and environmental performance. We have also established effective environmental management systems which conform to the globally recognised ISO 14001 Standard. Over the years, CLP has diligently put in effort to manage carbon and air emissions in our operations.

CLP’s Emissions Management Measures

- CLP has successfully met the increasingly stringent emissions caps for our power plants set by the Government. We continually seek to adopt new technologies, fuel sources and processes to help make the air in Hong Kong cleaner. We have successfully achieved significant emissions reduction through a combination of emissions reduction technologies and changes to our fuel mix including the introduction of natural gas, nuclear power, low-emission coal and the addition of sophisticated emissions control facilities.

- From 2010 to 2011, we retrofitted by phases the largest four units of the coal-fired Castle Peak Power Station with large-scale desulphurisation and nitrogen oxide reduction facilities which have significantly improved the emissions performance of the station. In addition, gypsum produced during the desulphurisation process are re-cycled as material for the construction industry such as plasterboard, bringing extra environmental benefits to the society.

- Since 2015, turbine upgrade has been carried out on one of the eight gas-fired power generation units at Black Point Power Station resulting in a reduction of its nitrogen oxides emissions. In the meantime, its generation capacity is increased by 8% and reliability and fuel efficiency improved. Similar upgrades have been carried out for two more units in 2018. The remaining five gas-fired generation units at Black Point Power Station will be given similar upgrades.

- More than 88% emissions reduction in SO₂, NOx and RSP have been achieved since 1990, while electricity demand has grown by over 84% during the same period. Electricity generation emissions have fallen greatly as a result of various emissions reduction efforts. The chart below illustrates these efforts.
Ongoing Improvement in CLP’s Environmental Performance

Emissions performance of CLP’s power stations in Hong Kong in 2017

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Carbon Emissions (kT)</th>
<th>Air Emissions (kT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CO₂</td>
<td>SO₂</td>
</tr>
<tr>
<td>Black Point</td>
<td>3,906</td>
<td>0.08</td>
</tr>
<tr>
<td>Castle Peak</td>
<td>13,492</td>
<td>4.7</td>
</tr>
<tr>
<td>Penny’s Bay</td>
<td>0.8</td>
<td>0.000004</td>
</tr>
</tbody>
</table>

Source: CLP Sustainability Report 2017

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Carbon Emissions (kg/kWh, sent-out basis)</th>
<th>Air Emissions (kg/kWh, sent-out basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CO₂</td>
<td>SO₂</td>
</tr>
<tr>
<td>Black Point</td>
<td>0.409</td>
<td>0.00001</td>
</tr>
<tr>
<td>Castle Peak</td>
<td>0.970</td>
<td>0.00034</td>
</tr>
<tr>
<td>Penny’s Bay</td>
<td>1.369</td>
<td>0.00001</td>
</tr>
</tbody>
</table>

Last update: November 2018
Hong Kong Government has introduced the emission allowances for CLP since the first Technical Memorandum (TM) under the Air Quality Control Ordinance was effective in 2010. The emission caps of sulphur dioxide, nitrogen oxide and respiratory suspended particulates have been substantially reduced by 67%, 38% and 37% respectively in 2017 when compared with those set in 2010. In the same year, the Government issued the 7th Technical Memorandum to further tighten the emission allowances for CLP effective from Year 2022. When effective, the emissions allowances for the three pollutants will see a material reduction ranging from over 50% to 80% compared with those in 2010. Meeting the tightened control on emission allowance is challenging.

Emission caps for power stations have been increasingly tightened

On carbon reduction, being a leading power company in Hong Kong, CLP recognises its role in addressing climate change. At CLP, we voluntarily set and strengthen a group-wide Climate Vision 2050, which aims to cut the carbon intensity of our generation portfolio by 82% by 2050, as compared to 2007 levels. In Hong Kong, CLP is supportive to HKSAR’s overall approach to build community awareness of the issue and be ready to play a part in a range of initiatives to help Hong Kong with Mitigation, Adaptation and Resilience strategies.

The carbon intensity of CLP’s operations in Hong Kong remains stable. The carbon intensity of the electricity used by our customers in Hong Kong in 2017 was 0.50 kg CO2/kWh, a decrease from 2016 level of 0.54 kg CO2/kWh. This was a result of reduced coal consumption and maintaining the increased consumption of natural gas, in line with the Government’s emissions requirements in Hong Kong, plus increased output from Guangdong Daya Bay Nuclear Power Station (GNPS) in Mainland China.
Link to reference information: CLP Sustainability Reports

Meanwhile, CLP is planning to develop an Offshore Liquefied Natural Gas Receiving Terminal to increase the energy security and the bargaining power in purchasing gas supplies. It will also enhance the Clean Energy Transmission System which would allow more flexibility for the company in planning power generation and increasing the use of clean energy to support the Government’s environmental policy.
Other Environmental Initiatives

Caring for environment is one of CLP’s core values. We strive to introduce various initiatives in the process of operations that contribute to improving the environment we live.

CLP Sky Woodland

- To promote city greening, CLP teamed up with the University of Hong Kong in 2006 to pioneer a study on Sky Woodland. In May 2013, the concept was turned into the largest Sky Woodland in Hong Kong, located in covering area of 520m² on the rooftops of two substation blocks, together with 500m² of vertical greening on the substation walls.

- The Sky Woodland is far more than just a rare stretch of urban greenery. It is a slice of genuine woodland in the city with its building structures tailor-made to replicate a natural woodland environment, hosting 80 trees made up of 32 native species. Since its launch in 2013, the Sky Woodland has attracted an abundance of birds and insects. In addition to its ecological benefits, the Sky Woodland also contributes to a better living environment by improving air quality, enhancing buildings’ energy efficiency by reducing the indoor and outdoor temperature through solar heat absorption and transpiration.

- The Sky Woodland project was presented with the Gold Award for the Transmission and Distribution Project of the Year at the Asian Power Awards in 2013 for its distinctive feature and sustainable design.

Waste Management

- Waste generated during power generation is also treated responsibly. For example, the coal ash from coal combustion is classified at the Ash Classification Plant in Castle Peak Power Station in accordance with the British Standard. Classified pulverised fuel ash (CPFA) that fully complies with the standard is sold to local concrete production companies as a direct replacement for cement in concrete production while the lower quality ash, such as furnace bottom ash (FBA), raw PFA and reject PFA are sold to local plants for cement production.
Green Driving

- In recent years, CLP has developed and introduced various vehicle charging technologies to enhance the electric vehicle (EV) charging network, aiming at promoting green driving in Hong Kong.

- Following the launch of “Trial Network of Charging Stations” in 2009, CLP has set up 54 semi-quick and quick charging stations in Kowloon, the New Territories and Lantau Island by the third quarter of 2018, providing more than 160 charging points in CLP’s supply area. Drivers can charge their EVs for free until the end of 2018. They can also locate nearby EV charging stations through the “CLP Hong Kong App”.

- In response to the rapid development of the EV market in Hong Kong, CLP introduced the first multi-standard EV quick charger in Hong Kong in June 2015, and added more chargers of the same type in districts across the city to support the majority of EV models available in Hong Kong. CLP’s quick charging stations are now available at driving intervals averaging 10 km throughout Kowloon and the New Territories. We also offered an Eco Charge one-stop charging service which makes it easier for EV drivers to arrange installation of EV charging facilities in the car parks of residential and commercial buildings.

- Link to reference information: Electric Vehicles
## 6 CLEANER FUEL MIX FOR ELECTRICITY GENERATION

### Getting to Know the Fuels for Power Generation

- Different fuels used for electricity generation have their own unique properties and each plays different roles in the fuel mix.

- Hong Kong has no indigenous energy resources and most of the fuels needed for electricity generation are imported. CLP takes into careful consideration of the properties of different fuels to strive for an optimal fuel mix to achieve a balance among safety and reliability, environmental performance and cost. The following introduces them in terms of cost and efficiency etc.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coal</strong></td>
<td>- Provides high reliability, can be stored on site and a quick response to meet changes in demand</td>
</tr>
<tr>
<td></td>
<td>- Generation cost is relatively low</td>
</tr>
<tr>
<td></td>
<td>- High carbon emissions and other air emissions even with the latest available abatement measures are the major drawbacks</td>
</tr>
<tr>
<td><strong>Natural gas</strong></td>
<td>- Provides high reliability and a very quick response to meet changes in demand. Outperforms coal in emissions performance</td>
</tr>
<tr>
<td></td>
<td>- A significantly higher generation cost in place</td>
</tr>
<tr>
<td></td>
<td>- World demand for gas is increasing given its environment benefits</td>
</tr>
<tr>
<td><strong>Nuclear</strong></td>
<td>- High reliability, enable large scale steady base-load electricity</td>
</tr>
<tr>
<td></td>
<td>- Very competitive generation cost</td>
</tr>
<tr>
<td></td>
<td>- Virtually zero CO₂ and other air emissions</td>
</tr>
<tr>
<td></td>
<td>- Requires sophisticated and careful operational safety and waste management</td>
</tr>
<tr>
<td></td>
<td>- Public concern over nuclear safety still remains after the Fukushima accident</td>
</tr>
<tr>
<td><strong>Renewable Energy (RE)</strong></td>
<td>- Natural resources availability is intermittent in nature, and support from conventional fossil fuel generation is required to ensure reliable electricity supply</td>
</tr>
<tr>
<td></td>
<td>- Large amount of land is often required for developing RE</td>
</tr>
<tr>
<td></td>
<td>- Higher generation cost</td>
</tr>
<tr>
<td></td>
<td>- It is practically emission-free and thus is gaining in popularity in countries where its relatively high cost can be supported</td>
</tr>
<tr>
<td></td>
<td>- RE has a role to play in the world’s fuel mix, and where there are abundant quantities of renewable energy available (e.g. Hydro in British Columbia, Canada; wind in Australia; solar in Arizona, United States.) However, abundant natural RE resources and favourable criteria for developing RE are not available everywhere</td>
</tr>
</tbody>
</table>
The chart below compares the fuel types in terms of emissions, price, reliability and public concerns.

Managing Fuel Costs

- Most of the fuels Hong Kong required for power generation are imported and they are subject to price volatility in the international fuel markets.

- In support of the Government’s environmental policy and the increasingly tightening emissions requirement, CLP Power will substantially increase the use of natural gas for power generation in order to meet Hong Kong’s fuel mix target in 2020. As the cost of gas-fired power generation is more than double that of coal-fired generation, CLP expects this will inevitably continue to put pressure on future tariffs. In fact, fuel cost increases has been the driver of CLP’s total tariff adjustment over the past few years.

- The following chart shows the volatility of fuel prices in the past decade while the price of nuclear power is relatively stable.
CLP’s diversified fuel mix strategy helps maintain the competitiveness of fuel costs in addition to fuel supply security.

CLP takes a prudent approach in managing our fuel cost. Measures taken include contracting with different suppliers, as well as using a range of commercial terms to help us capture value from changing market conditions over time, thus ensuring our supply costs are in line with the market.

Fuel Choices

The Hong Kong Government launched a public consultation in 2014 on the Future Fuel Mix for Electricity Generation, proposing two fuel mix options: importing more electricity through purchase from the Mainland power grid, or using more natural gas for local generation. Most of the respondents supported local generation by natural gas and expressed reservation about importing electricity from the Mainland. Following the consultation, the Government announced a new fuel mix target for power generation with around 50% natural gas by 2020 in order to meet the proposed environmental targets. These targets are to reduce the carbon intensity of Hong Kong by 50-60% by 2020 when compared to 2005; and to reduce emissions of sulphur dioxide (SO₂) by 35%-75%, nitrogen oxide (NOx) by 20%-30% and respiratory suspended particulates (RSP) by 15%-40% by 2020 when compared to 2010.

In 2017, the Government announced Hong Kong’s Climate Action Plan 2030+, which stated that in order to meet its new carbon intensity reduction target of 65% to 70% by 2030, Hong Kong will continue to phase down remaining coal plants in the next decade and replace them with natural gas and non-fossil fuel sources. Concerning about the future fuel mix, possible options of utilising more zero carbon energy will be explored by the Council for Sustainable Development in the first quarter of 2019 through the Public Engagement exercise on Long-term Decarbonisation Strategy.

CLP’s Fuel Mix for Electricity Generation

CLP has been adopting a diversity of fuel types supplied from multiple sources and optimising its fuel mix. The objectives of the diversified fuel mix are to ensure energy security and price stability while providing a reliable electricity supply and meeting environmental standards at reasonable costs.
CLP endeavours to source fuels with high quality and at competitive prices. A well-established mechanism for fuel procurement is in place to source the fuels that can satisfy our requirements such as emission standards and costs. Our procurement team also keeps exploring new sources of cleaner fuels. For instance, we have started procuring low-emission coal from the US, another fuel source in addition to Indonesia. For gas supplies, we are also exploring new sources for diversity.

The following table and chart illustrate CLP’s ongoing efforts in managing a diversified fuel mix to achieve these objectives.

### Evolution of CLP’s Fuel Mix

<table>
<thead>
<tr>
<th>Year</th>
<th>Event details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s – 1980s</td>
<td>Single fuel supply from oil</td>
</tr>
<tr>
<td>1982</td>
<td>Began fuel diversification with introduction of coal with multiple sources of supply</td>
</tr>
</tbody>
</table>
| 1994 | Further diversification by importing nuclear energy from Daya Bay Nuclear Power Station  
Began to phase out oil |
| 1996 | CLP pioneered the use of natural gas for power generation in the region in the early 1990s  
Secured natural gas supply from one of the four largest offshore gas fields in the Mainland near Hainan with a 20-year contract |
| 2000 | Began to use low emission coal to further improve emissions performance |
| 2013 | Started using natural gas supplied via the Second West-East Pipeline (WEPII) in the Mainland |
| 2015 | HKSAR’s Sludge Treatment waste-to-energy facility connected to the CLP grid |
| 2017 | CLP was granted an environmental permit to install power generation units at the West New Territories (WENT) Landfill to utilise landfill gas produced there as fuel. Commercial operation of the project is expected by 2019 |
| 2018 | Feed-in Tariff was introduced to promote development of local renewable energy |

As early as the 1990s, CLP spearheaded the introduction of nuclear energy and natural gas for power generation, achieving a diversified fuel mix that enables an abundant and reliable electricity supply, an improving environmental performance and a stable tariff for Hong Kong.
CLP fully supports the Government’s plan to improve Hong Kong’s air quality and to promote low-carbon living. We are committed to continuing to increase the proportion of cleaner fuels in our generation portfolio. The section below illustrates our key initiatives of using cleaner fuels: natural gas, nuclear energy and renewable energy.

**Natural Gas**

- **In 1996, CLP became the first electricity supplier to bring natural gas to Hong Kong** for power generation, for which natural gas emits much less sulphur dioxide, nitrogen oxide, particulates and carbon dioxide than most other fossil fuels. Over the years, the use of natural gas has helped CLP reduce emissions from its operations.

- CLP started importing gas from Yacheng Gas Field near Hainan Island in 1996 at a very attractive price, providing an abundant and reliable energy source to support Hong Kong’s economic development. It enabled significant environmental improvement accompanied with a stable tariff regime.

- Today, the Yacheng gas supply is nearly exhausted. There is a need to replace this gas source as well as to develop new sources to meet the tightening emissions caps and the fuel mix policy set by the Hong Kong Government. Accordingly, we expect the proportion of gas-fired local generation to increase significantly over the next few years.
Gas Supplies to Hong Kong

- A Memorandum of Understanding (MOU) on energy cooperation was signed between the Hong Kong SAR Government and the Central Government in 2008, paving the way for the use of new fuel sources from the Mainland. One of the primary sources is the WEPII.

- WEPII, operated by China National Petroleum Corporation (PetroChina) and its subsidiaries, is currently the world’s longest natural gas pipeline. It consists of one trunk line and eight branches that starts in Horgos, Xinjiang, where it connects to the Central Asia-China Gas Pipeline and crosses 14 provinces, autonomous regions and municipalities, and terminating at Hong Kong’s Black Point Power Station.

- In line with the MOU, a Gas Supply Agreement (GSA) with PetroChina was signed for supplying WEPII gas to Hong Kong for 20 years starting from 2013. Gas is delivered via a 20-km undersea pipeline connecting the gas launching station at Dachan Island in Shenzhen and Black Point Power Station.
Ensuring Gas Supply

- To support the Hong Kong Government’s policy of increasing local gas-fired generation by 2020, CLP is seeking new gas sources to ensure long-term gas supply stability. In view of the depleting Yacheng gas fields and the two-month temporary suspension of gas supplies from the existing WEP II due to a landslide in Shenzhen in December 2015, CLP sees the importance to diversify the gas sources for CLP, and Hong Kong as a whole.

- CLP has developed a plan to ensure future energy supply stability, security and diversity. This also helps enhance the city’s bargaining power for natural gas purchases and provide our customers a more cost-effective electricity supply.

- Since August 2018, gas from Wenchang Gas Field in the South China Sea has started supplying CLP via the existing Yacheng pipeline, supplementing our supply needs in the medium term.
- For longer term, CLP has also been exploring the feasibility of building an offshore Liquefied Natural Gas (LNG) terminal by applying the new natural gas related technology of Floating Storage Regasification Units (FSRU) to enable direct purchase of LNG from the international gas market.

- The project is in good progress with the environmental impact assessment report completed and the Environmental Permit obtained.

- In parallel, CLP continues to pursue the gas sources stipulated in the MOU on energy cooperation and strives to achieve an optimal balance between different fuel types.
Nuclear Energy

Nuclear Energy in Hong Kong

- In 1985, the Chinese Government and CLP joined hands to develop the nation’s first large-scale commercial nuclear power station at Daya Bay in Guangdong Province in the Mainland. It was CLP’s first large scale power project in the Mainland and our first step to low emission power generation. In the same year, CLP established a joint venture company with Guangdong Nuclear Investment Co., Ltd. (a subsidiary of China General Nuclear Power Corporation) and signed a 20-year contract for nuclear power supply to Hong Kong starting from 1994.

- In September 2009, the supply contract for Hong Kong was extended for another 20 years to 2034.

- As of today, nuclear energy accounts for about a third of CLP’s fuel mix in Hong Kong and has been safely meeting 25% of Hong Kong’s electricity needs for more than 20 years.

- Daya Bay produces around 14 billion kWh of electricity per year, of which 70% is exported to CLP’s Hong Kong system.

- To ensure that more clean and cost-competitive energy is provided to Hong Kong, an agreement was reached to provide an additional 10% of the electricity output of Daya Bay to Hong Kong from late 2014 to 2018.

- Importing nuclear energy to Hong Kong has helped to avoid carbon dioxide emissions in the city by over 7.5 million tonnes a year while ensuring a reliable power supply at a competitive price.

- In the longer term, CLP believes that nuclear power should continue to be a part of our fuel mix and we will continue to explore ways of importing it in a manner that is acceptable to the community. It will offer an important element of diversity as we seek to minimise generation costs and emissions.

- CLP has three distinct roles in the Daya Bay Nuclear Project. We:
  – act as an investor;
  – contribute our expertise; and
  – import nuclear electricity into Hong Kong.
**Facts and figures about Guangdong Daya Bay Nuclear Power Station**

<table>
<thead>
<tr>
<th><strong>CLP ownership</strong></th>
<th>25% (through Hong Kong Nuclear Investment Company Limited (HKNIC))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Joint venture partner</strong></td>
<td>China General Nuclear Power Corporation</td>
</tr>
<tr>
<td><strong>Reactor technology</strong></td>
<td>Pressurised Water Reactor</td>
</tr>
<tr>
<td><strong>Generation capacity</strong></td>
<td>• Gross capacity ⇒ 1,968MW (2 x 984MW)</td>
</tr>
<tr>
<td></td>
<td>• Capacity attributable to HK ⇒ 1,380MW</td>
</tr>
<tr>
<td><strong>Commencement date of construction</strong></td>
<td>7 August 1987</td>
</tr>
<tr>
<td><strong>Date of commissioning</strong></td>
<td>• Unit 1 ⇒ 1 February 1994</td>
</tr>
<tr>
<td></td>
<td>• Unit 2 ⇒ 6 May 1994</td>
</tr>
<tr>
<td><strong>Plant management &amp; operation</strong></td>
<td>Daya Bay Nuclear Power Operations &amp; Management Company, Limited (DNMC) (CLP has 12.5% stake)</td>
</tr>
</tbody>
</table>

Link to reference information: [Nuclear Energy-A Viable Choice for Powering the Future](#)

**Safety Excellence and Emergency Preparedness**

- **Safe operation** is always the top priority for all nuclear power operators. At Daya Bay, the defence-in-depth principle is used to ensure a robust and safe operation, covering a full spectrum of activities from the initial plant design to the installation of all equipment and the implementation of all operational procedures. They include:
  - Site Selection;
  - Plant Design and Operational Safety;
  - Staff Training and Qualification;
  - International Benchmarking;
  - Radiation Protection and Environmental Monitoring; and
  - Emergency Preparedness.

- Daya Bay is located in a seismically stable region. The site was selected with great care according to international guidelines and stringent safety assessment by the National Nuclear Safety Administration, after a comprehensive analysis and survey.

- The design of the nuclear power station allows for natural hazards such as tsunami or earthquake and is tailor made for the local situation around the site of the power station.

- In the event of an emergency due to equipment failure or human error, auxiliary equipment is ready to step in and maintain the safe operation of the plant, minimising the chances of any adverse impacts of Daya Bay on the environment.
Well established contingency plans are in place at Daya Bay. A communication mechanism is also in place to facilitate communication with the general public and between relevant government authorities in Guangdong and Hong Kong in the unlikely event of a nuclear accident.

For public understanding of nuclear operation and higher transparency, Daya Bay has adopted a public notification mechanism to release information of non-emergency Licensing Operational Events through the websites of DNMC and HKNIC, within two working days after such an event is identified. These events carry no nuclear safety consequences and have no impact on the external environment or public safety. Events of an emergency significance will be announced far more quickly and as appropriate by the government authority.

Daya Bay has maintained an excellent record of plant reliability, performance and safety since its commissioning in 1994.

Over the years, Daya Bay has ranked high in the World Association of Nuclear Operators (WANO) performance indices across various major aspects of generation capability, plant safety and efficiency, industrial safety and radiation protection. DNMC was also named champion in Capability Factor at the EDF Safety Challenge Competition for ten consecutive years by 2017.

Daya Bay has a comprehensive environmental monitoring programme to safeguard the health of its staff and the general public. Regular checks over the years have indicated that there has been no excessive or undue release of radioactivity and the effect of radioactive releases on the environment is very low if not negligible. No adverse public health impact from Daya Bay (and the nearby Ling Ao) is confirmed in a 25-year survey by the Shenzhen Municipal Health Bureau.

Renewable Energy (RE)

CLP supports the Government’s energy policy and strives to explore practical local RE opportunities despite limited renewable energy (RE) resources and land scarcity in Hong Kong. The following provides an overview about CLP’s support to facilitate the community in developing distributive RE systems and RE projects constructed by CLP.

Grid Connected Renewable Energy Projects

While large-scale land-based projects prove challenging, CLP provides technical support, a simple procedure and grid connection advice for local RE projects of different scales. In addition, we provide back-up electricity supply for these systems so that customers could enjoy clean electricity from renewable sources without sacrificing power supply reliability.
- Solar power is the most popular technology applied in distributive RE systems in Hong Kong. Project examples include the largest solar farm in Hong Kong located at the Siu Ho Wan Sewage Treatment Works of Drainage Services Department. The city’s largest solar farm, built by CLP Engineering and connected to CLP’s electricity grid, comprises over 4,200 solar panels covering an area of 11,000 square meter and is anticipated to generate as much as 1.1 million kilowatt hours of electricity annually.

- There are also larger scale RE facilities under construction, planning and operation, e.g. Government’s waste-to-energy facilities including the T- Park in Tuen Mun and the Integrated Waste Management Facilities planned to construct at Shek Kwu Chau as well as the Organic Resources Recovery Centers located in Lantau and other places would have larger capacity and may generate surplus electricity to CLP grid. We fully support the operation of these new facilities in order to provide help to meet Government’s environmental goals. In April 2015, the T- Park in Tuen Mun was connected and electricity generated from the incinerators is also sent to the grid.

- Other community RE projects also include the Construction Industry Council’s Zero Carbon Building which generates RE on site from photovoltaic (PV) panels and bio-diesel and Science Park’s building integrated photovoltaic (BIPV) and wind turbine systems on the facades.

**Feed-in Tariff (FiT) Scheme**

- With the current Scheme of Control Agreement (SCA) came into effect from 1 October 2018, CLP Power introduced a Feed-in Tariff (FiT) scheme and the Renewable Energy Certificates to further promote the development of local RE. The new initiatives also aim to encourage the community to embrace low-carbon lifestyles through their participation in the development of renewable energy.
The FiT scheme is applicable to electricity produced by solar and wind power systems with a generating capacity of up to 1MW. CLP Power will purchase the electricity produced by an approved RE system once it is successfully connected to the company’s power grid. A smart meter will be installed to record the amount of electricity generated by the RE system. The FiT rate will be the same for both solar and wind power systems.

For instance, if a customer has installed solar panels at his rooftops and the system is approved and connected to the CLP’s grid, CLP will offer him Feed-in Tariff rate, ranging from HK$3 to HK$5 depending on to the capacity of the RE system. The FiT rates are higher than the prevailing tariffs to incentivise RE investment which is expected to enjoy a shortened payback period of around 10 years. The FiT rate applies to the electricity generated during the entire project technical lifetime or until the end of the existing SCA on 31 December 2033, whichever is earlier.

The FiT rates are as follows:

<table>
<thead>
<tr>
<th>RE System capacity</th>
<th>FiT rate (per unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10kW</td>
<td>HK$5</td>
</tr>
<tr>
<td>&gt;10kW to ≤200kW</td>
<td>HK$4</td>
</tr>
<tr>
<td>&gt;200kW to ≤1MW</td>
<td>HK$3</td>
</tr>
</tbody>
</table>

The FiT scheme is open to all CLP Power’s customers other than government departments. FiT rates for new applications may change from time to time as agreed with the Government. The new rates will apply to new RE system applications after the effective date of change. CLP has received over 700 FiT scheme applications as of the end of October 2018.

RE promotions are launched through the CLP website, CLP app, and social media, etc. to help customers understand the system installation and FiT application procedures. CLP Power will work with the Government and industry organisations to offer technical workshops for contractors and to provide technical support to customers. This will support RE system design, installation, and grid connection. Customers can find more technical information on the Electrical and Mechanical Services Department website under the heading “Technical Guidelines on Grid Connection of Renewable Energy Power Systems”.

Renewable Energy Certificates (RECs)

For customers who want to support local development of RE but cannot afford an RE system on their own, they can subscribe the Renewable Energy Certificates (RECs) which represent units of electricity produced by local RE sources including solar power, wind power, and waste-to-energy projects, whether purchased (such as through the Feed-in Tariff scheme) or generated by CLP.

Launched on 1 January 2019, the price of each unit of electricity generated by renewable energy sources under the RECs scheme will be HK$0.5, with RECs available at a minimum purchase of 100 units. Any residential or commercial and industrial customer with a CLP Power electricity account is eligible to purchase RECs.

Revenue generated from the sale of RECs will contribute towards part of the price of purchasing renewable energy through the Feed-in Tariff scheme, helping minimise the costs of electricity as a whole.
• The units of electricity carried in the RECs available for sale will match the total amount of electricity from local renewable energy sources generated or purchased by CLP Power over a specific period of time.

![CLP Feed-in Tariff scheme Website](https://www.clp.com.hk/energy/clp-ren-fee-in-tars)


**RE projects developed by CLP**

**Town Island Renewable Energy (RE) Supply Project**

• CLP has developed Hong Kong’s first commercial-scale standalone renewable energy generation and storage system on Town Island, located off Sai Kung. The **Town Island RE Supply Project** powers a non-profit drug rehabilitation centre run by Operation Dawn.

• The entire project, comprises 672 solar panels, two wind turbines and 576 batteries, with a generating capacity of up to 192 kW which is capable of lighting up 9,600 compact fluorescent lamps.

• As the system is not connected to the grid, it features batteries capable of storing over 1,000 kWh of electricity to provide power supply for the rehabilitation centre’s use lasting for around 30 hours. By the second quarter in 2018, the system generated more than 480,000 kWh of electricity, equivalent to the monthly consumption of 1,333 households. It had achieved of over a significant reduction of over 192,000 kg in carbon dioxide (CO₂) emissions.

• Staff and residents at the centre, located off Sai Kung, used to rely on the intermittent running of small diesel generators for a few hours every day for their power supply. Since the commissioning of the first phase of the system in 2010, more reliable electricity has been available to meet their basic energy needs.

• In 2013 the Project was named one of the “Hong Kong People Engineering Wonders in the 21st Century” in a prestigious public vote organised by Hong Kong Institution of Engineers in recognition of CLP’s commitment to promoting sustainability, the use of clean energy and caring for the community.
Landfill Gas Project

- CLP plans to install power generation units at the West New Territories (WENT) Landfill. The units will make use of landfill gas produced locally at the landfill site for power generation and the electricity produced will be transmitted to the CLP Power’s existing power grid.

- Upon the completion of the first phase of the WENT landfill project with five generation units, power generated would be sufficient to supply 17,000 four-person households for one year. The project is expected to commission in the end of 2019.

Landfill gas generation process

Feasibility Test for Developing Offshore Wind Farm

- Given Hong Kong’s densely populated urban environment and the nature of our terrain, there is limited potential for Hong Kong to develop significant land-based RE projects. However, developing wind resources offshore is a possible alternative. CLP is keen to explore this new technology for Hong Kong on a wider scale, although such a move would involve economic and environmental trade-offs.

- CLP is studying the feasibility of developing an offshore wind farm in the south-eastern waters of Hong Kong.

- We are in the process of collecting wind, wave and other environmental data for completing the feasibility study and will engage with the community on the appropriate way forward.
Helping Customers with Energy Efficiency and Conservation (EE&C)

- **CLP is firmly committed to energy efficiency and conservation.** We encourage our residential and business customers and the Hong Kong community at large to use energy more efficiently and change their behaviour so that they save energy and help to create a better environment.

- We adopt a four-pronged approach in changing people’s habits and helping them to reduce their energy consumption. These steps are:
  - Educating the public;
  - Providing customers with information and energy-saving tips;
  - Equipping customers with tools and technical support; and
  - Helping with enablers to make greater energy efficiency possible.

- We are committed to doing all we can to help our customers and our city move towards a low-carbon lifestyle that will improve our environment for future generations. The following table summarises the scale and variety of CLP’s commitments to help our **residential** and **business customers** and our city move towards a greener and smarter future.

<table>
<thead>
<tr>
<th>Public Education</th>
<th>Energy-Saving Support for Home</th>
<th>Energy-Saving Support for Business</th>
</tr>
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<tbody>
<tr>
<td>• POWER YOU Kindergarten Education Kit</td>
<td>• CLP Smart Energy Award</td>
<td></td>
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<tr>
<td>• Green Elites Campus Accreditation Programme</td>
<td>• CLP Smart Energy Symposium</td>
<td></td>
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<tr>
<td>• Green Studio and Multi-purpose Vehicle</td>
<td>• EE&amp;C Workshops</td>
<td></td>
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<tr>
<td>• Energy Innovation for Smart City Competition</td>
<td>• Eco Tours</td>
<td></td>
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<tr>
<td>• Power Your Love Programme</td>
<td>• CLP Power Connect</td>
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<td>• CLP Power Connect</td>
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<table>
<thead>
<tr>
<th>Energy Saving Information</th>
<th>Energy-Saving Support for Home</th>
<th>Energy-Saving Support for Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Energy saving ideas on CLP Website and CLP Mobile App</td>
<td>• Meter Online</td>
<td></td>
</tr>
<tr>
<td>• Energy use information on electricity bill</td>
<td>• Energy saving applications on CLP Website</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• GREENPLUS eNewsletter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SME energy saving tips</td>
<td></td>
</tr>
</tbody>
</table>
New Energy Saving and Conservation Initiatives under SCA (2018-2033)

The current SCA commenced in October 2018 marks another milestone for CLP in its movement toward a greener, smarter and low-carbon environment. To support the Government’s long-term environmental policy and the climate strategy, CLP will introduce and enhance its energy saving and conservation initiatives under the new SCA.

Community Energy Saving Fund

- A new CLP Community Energy Saving Fund (CESF) has been set up with around HK$70 million in the first year to implement two programmes from January 2019. Of which, CLP Power Connect is a city wide energy efficient and conservation campaign which aims to encourage residential customers to earn rewards by saving energy throughout the year. Participants can choose the disadvantaged group they want to support to alleviate their electricity expenses. A total of HK$20 million will be allocated to subsidise around 40,000 households in need each year, including single elderly or elderly couple, low income families, the disabled and subdivided unit households, with each receiving HK$500 of electricity subsidy.

- Another programme under the CESF is CLP Electrical Equipment Upgrade Scheme. The programme aims to subsidise business customers, in particular small and medium enterprises, to replace or upgrade the lighting and air-conditioners to more energy-efficient models.
Eco Building Fund

- **Eco Building Fund** was first set up in 2014 to help residential building owners to carry out energy efficiency improvement works in the communal areas. Under the current SCA, its scope has been extended to cover commercial and industrial buildings as well, and its funding has been increased five-fold to HK$100 million a year to subsidise about 400 buildings. On top of lighting and air-conditioning systems replacement, the upgraded fund will also support retro-commissioning projects and the use of smart technology.

Energy Audit Services

- CLP has been conducting **energy audits** for business customers since the 1990s. It is a free service helping businesses to save energy and operating costs. CLP’s engineers carry out energy system performance analysis at customers’ premises to identify Energy Management Opportunities and proposing energy saving solutions. Since the 1990s, CLP has conducted over 2,300 energy audits for business customers. From 2009 to 2017, CLP helped business customers to save over 140 GWh of electricity.

- Under the current SCA, CLP quadruples the number of energy audits it offers to business customers from 150 to 600 a year, with total electricity saved expecting to reach 48GWh each year.

Helping Residential Customers in Energy Saving

Eco Power 360

- **Eco Power 360** is an online energy assessment tool, all 2.2 million CLP residential customers can make use of this platform to compare their electricity consumption against neighbouring households with similar consumption patterns. It also provides consumption projection and recommendations with an aim to support customers to better manage their energy usage and improve household energy efficiency.
Eco Rewards Scheme

- We empower our customers with consumption data that underpins their energy management approaches. To further motivate them to live a greener lifestyle, the Eco Rewards Scheme comes into place which engage customers in an interactive and creative way. Customers who participated in the scheme can earn Eco Points to redeem fabulous gifts while saving energy.

Helping Business Customers in Enhancing Energy Efficiency

GREENPLUS Programme

- CLP launched the GREENPLUS Programme since 2010 to raise awareness of environmental protection among business customers, and to promote affordable energy-efficient and renewable energy application to them. Initiatives under the programme include Smart Energy Symposium, GREENPLUS Workshops, Eco Tours, Energy Audit Services, Meter Online, GREENPLUS Energy Billboard and Smart Energy Award. It aims to enable customers not only to save energy costs, but also to protect the environment. Over 9,000 customers have joined the GREENPLUS programme and many of them have received energy saving solutions from CLP. Customers can typically achieve 10-20% savings in electricity consumption annually if they implement the recommended energy saving measures.

- Launched in 2018, the Smart Energy Award is designed to recognise organisations with outstanding performance in four areas: Energy Saving, Peak Demand Management, Renewable Energy and Smart Energy. Business customers are encouraged to implement energy efficiency measures, adopt renewable energy and integrate innovative technologies in their business operations, with an aim to shift towards a greener and smarter environment.

- Equipped with smart meters, large businesses are able to conveniently access the most up-to-date load profile data via the Meter Online platform. Customers can monitor specific high consumption electricity accounts, conduct consumption comparison and projection, and be informed of the anticipated occurring time of peak demand, for a better management on energy usage.
GREENPLUS Energy Billboard is an online benchmarking tool offering business customers the convenience to compare average monthly energy performance among individual outlets of chain stores or groupwide companies as well as against the industry norm. The tool helps them manage their electricity consumption and save operational cost.

To support SMEs, NGOs and schools enhancing their energy efficiency performance, CLP launched the Smart Enterprise in 2017. By installing Smart Enterprise app and IoT wireless devices, customers can monitor near to real-time energy consumption and operation efficiency as well as auto-control their lighting and air-conditioners. Despite tailor-made energy management solution, ongoing monitoring and data analysis will be conducted to continuously identify improvement areas. Customer can make reference to their consumption pattern and change the mode of operations to adapt to different situations.

Peak Demand Management

As part of our continuous efforts to drive towards a greener future, CLP is stepping up our Demand Side Management measures. Demand side management aims to reduce customers’ peak electricity demand to achieve energy efficiency through closer customer engagement. The greater the electricity demand can be lowered, through applying more efficient devices and increasing the customers’ awareness of energy consumption, the more the bill amount can be reduced and the longer the new investment in electricity infrastructure can be deferred by the power companies.

We have launched peak demand management programme for business and industrial customers since 2013 to encourage them to reduce electricity consumption during peak demand hours by offering incentives. This programme is suitable for Bulk or Large Power Tariff customers who have high energy demand. Customers can implement measures to reduce their electricity usage during Peak Demand Hours when CLP gives them advance notice about anticipated specific hours of extremely high electricity demand. Participating customers can earn rewards in return.
## 8 SAFETY FIRST

### Safety Always Comes First

- Safety is always the **Number One priority** in CLP. Stringent safety guidelines, including **Life Saving Rules** which serve to prevent serious incidents, are well in place and strictly enforced by CLP staff and contractors to ensure safety in all work processes and at all facilities.

- To ensure a safe working environment for CLP staff and contractors, we proactively conduct safety inspections and risk assessments to upkeep our safety performance. In 2017, CLP carried out over 148,000 safety observations and inspections at CLP offices and construction sites.

### Safety Commitment

- **Total Involvement** – At CLP, safety is everyone’s responsibility. All staff members of CLP are assigned with respective safety roles and accountabilities. We also apply the same safety standard to our contractors so as to upkeep safety performance across the board.

- **Safety Performance** – CLP has made every effort to achieve the goal of zero incidents and is working diligently towards the world’s best or world class safety standard. CLP was awarded the certificate on OHSAS 18001 Occupational Safety and Health Management System across all of its business units. CLP endeavoured in maintaining recordable incident rates well below average in the industry.

### Safety Advocacy

- A **well-established Safety Management System** is in place to uphold the safety performance across CLP. Leading by example, a steering committee championed by top management is formed to formulate the company’s safety policies, practices and programmes, in order to cultivate a safety culture among staff and contractors. Designated safety teams are set up in every operation and business unit to promote safety in every aspect of our operation.

- **Alignment Programmes for Contractors** are in place to ensure the same safety standard and practices are applied to CLP staff and contractors. Safety initiatives and enhancement programs such as safety observations (focusing on behaviour), serious injury prevention, safe systems of work and control of heavy lifting operations are communicated to all contractors for effective implementation at all CLP’s work sites.
CLP has conducted **Safety Climate Survey** every three years since 2004. The analysed survey results will be communicated to all staff. An action plan will then be developed to address comments and areas of improvement in the next three-year cycle.

**Safety Family** culture, which emphasises on treating our employees, contractors and the public as family members, has been promoted in CLP to foster mutual care to each other’s safety and health. Roles and responsibilities on safety have been clearly defined for implementation by different family members.

**Safety Incentive Scheme** is one of the signature programmes to connect colleagues’ safety effort with the community. The scheme encourages staff to share initiatives on safety practice which will turn into donations to local charities as the company will reward outstanding initiatives that help enhance our safety performance.

CLP proactively participates and organises **occupational safety and health seminars** to keep the industry workforce abreast of the up-to-date safety and health knowledge, as well as providing a platform for sharing good safety practices.

As early as in 2004, CLP has launched the **Safety Leader** programme to provide comprehensive trainings to all staff, ranging from frontline colleagues to the executives, with an aim to raise their safety awareness. Up to now, over 1,700 staff members have been appointed as Safety Leaders to be the role models and cultivate safety messages to all staff.

Since 2017, CLP has put focused efforts on reducing the exposure to serious injuries or fatalities (SIF) by identifying the high-risk situations, to achieve more effective control measures, and has formulated the plan for improvements in our safety management systems on SIF findings.
Safety Performance

- CLP achieves excellent safety performance, and our accident rates have been far below the average industrial accident rates of Hong Kong over the years.

Industrial Accident Rate of Hong Kong industries and CLP (2006 - 2017)

(1) The Hong Kong Industry Accident Rate is sourced from Labour Department Occupational Safety and Health Statistics Bulletin (August 2018)

(2) Occupational injuries (including industrial accidents) are injury cases arising from work accidents, resulting in death or incapacity for work of over three days, and reported under the Employees’ Compensation Ordinance.

(3) Total Recordable Injury is the sum of all injuries other than first aid case, which includes all Fatalities, Lost Time Injury Incidents, Restricted Work Injury Cases and Medical Treatment Cases.
9 CUSTOMER JOURNEY

Performance Pledges

- CLP is committed to providing our customers with the best quality service and value. We are continuously improving both our productivity and efficiency for the benefit of our customers.

- We assess our performance regularly and report our achievements to establish a performance pledge on a yearly basis. CLP’s efforts in meeting its performance pledge is recognised in the community. We have won a number of prestigious awards for excellence in customer service. For instance, we received two Gold Awards of the Mystery Caller Assessment Award (Customer Service Hotline for the ninth consecutive year and Emergency Hotline for the second consecutive year respectively) in the Hong Kong Call Centre Association Award 2018; and clinched five awards in the Customer Service Excellence Award 2017, including a Gold Award in Outstanding Customer Service Programme.

- CLP strives to achieve the service targets pledged to our customers. The table below shows our 2018 targets and 2017 performance.

<table>
<thead>
<tr>
<th>Performance Standards</th>
<th>2018 Targets</th>
<th>2017 Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability of electricity supply</td>
<td>&gt;99.99%</td>
<td>✓</td>
</tr>
<tr>
<td>Notify customers 3 working days in advance of planned outage</td>
<td>&gt;99%</td>
<td>✓</td>
</tr>
<tr>
<td>Average arrival time for loss of supply inspection</td>
<td>&lt;28 minutes</td>
<td>✓</td>
</tr>
<tr>
<td>Average supply restoration time after fault outage</td>
<td>&lt;2 hours</td>
<td>✓</td>
</tr>
<tr>
<td>Provide appointments for installation inspections within 3 working days</td>
<td>96.50%</td>
<td>✓</td>
</tr>
<tr>
<td>Carry out site investigations on consumption enquiries within 3 working days</td>
<td>98%</td>
<td>✓</td>
</tr>
<tr>
<td>Keep appointments to visit customers for supply applications within a 1.5-hour time slot</td>
<td>99%</td>
<td>✓</td>
</tr>
<tr>
<td>Connect and supply electricity within the same day after satisfactory installation inspection</td>
<td>99.98%</td>
<td>✓</td>
</tr>
<tr>
<td>Reconnect supply within the same day of payment of outstanding charges</td>
<td>95%</td>
<td>✓</td>
</tr>
<tr>
<td>Answer Emergency Service Hotline in less than 9 seconds</td>
<td>90% of answering time</td>
<td>✓</td>
</tr>
<tr>
<td>Answer Enquiries Hotline in less than 9 seconds</td>
<td>80% of answering time</td>
<td>✓</td>
</tr>
<tr>
<td>Average queueing time for customer service enquiries at Customer Service Centres</td>
<td>Within 3.5 minutes</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Excluding incidents occurred during severe weather conditions or in remote locations (e.g. islands without regular transportation).
Raising Online-to-Offline Customer Experience

- We strive to continuously enhance our service quality by offering greater convenience and benefits to our customers.

Digitalised Platforms

CLP Mobile App and CLP Website

- Digital channels are reshaping today's customer journey. To better connect with and engage our customers, a wide range of services are offered through the CLP Mobile App and website. All 2.2 million residential customers and 320,000 business customers can leverage on these one-stop online platforms to manage their electricity accounts, settle their bills and payment, and even shop online for smart products while they are on-the-go.

- The CLP Mobile App has simplified home move-in procedures. Residential customers may apply electricity supply within five minutes by locating their addresses on Google Maps with a click and uploading required data and documents through the App. Tracking service is also provided for customers to check their application status.

- CLP offers green bills to customers via e-mail and CLP App which not only reduces paper usage but also helps protect our environment. Customers can track their billing and payment history up to the past 14 months online. Registered customers will receive billing and payment alert and can settle their bills instantly using the Payment by Phone (PPS) function available on the CLP App. Customers can also settle their bills in cash at convenience stores by presenting the QR code generated by the App.

- Customers can also join the Eco Power 360 and Eco Rewards Scheme through the App and website for electricity consumption management and earn Eco Points which can be used to redeem rewards, or shop for smart gadgets and energy efficient appliances on the online and mobile shopping platform Smart Shopping (See also separate Fact Sheet on Energy Management).

- Besides green living and energy saving information, other useful information such as locations of CLP Customer Service Centres, hotlines, and information on nearby charging facilities for electric vehicles are also available online.
Instant Communication

- CLP utilises instant messaging to communicate with some designated customers:
  - **SMS Notification Service** proactively notifies Estate Management Office (EMO) and Incorporated Owners (IO) in the events of voltage dip or power incidents relating to their facilities.
  - “CLP – EMO Direct” WeChat Channel enables CLP and EMO to communicate instantly in case of any power outages or voltage dip incidents.

Offline Platforms

Customer service centres and business centres are conveniently located at Kowloon and New Territories to meet different types of customers’ needs. Customer service hotlines operate around the clock to attend to customers’ enquiries.

Smart Energy@Mong Kok

- [Smart Energy@Mong Kok](#) is a five-storey building located at Mongkok. As CLP’s flagship store, it showcases the latest green living concepts, smart technologies and products. It is CLP’s first retail establishment which has been set up since 2008 to encourage a wider adoption of energy efficient appliances and to promote green living concepts to our customers. The newly revamped store offers unique in-store customer experience by letting visitors experience a full range of smart home devices in person at a home setting and learn more about the smart home technologies and high-end smart appliances.

Smart Energy Experience Centre

- The Yuen Long customer service centre has undergone a major facelift and transformed into a [Smart Energy Experience Centre](#) in 2017. By partnering with the Hong Kong Science and Technology Parks Corporation and using innovative technology developed by local start-up companies, the centre aims to introduce smart home and business solutions and promote smarter and greener lifestyles to customers. It features smart home devices suitable for small flats in Hong Kong and offers smart solutions to help business customers optimise their operations and services.
Tai Po Eco Home

- Tai Po Eco Home, a one-stop green lifestyle centre, brings smart yet green living ideas to the residents in the New Territories. Customers can try out energy efficient appliances and participate in cooking classes. A list of innovative energy saving products fit for village homes and low-density housing, including electric vehicle charging demonstration and typical solar power system for Feed-in Tariff, are available at the centre.

GREENPLUS Experience Centre

- The centre aims to encourage small and medium enterprises (SMEs) to implement energy efficiency practices in doing business and saving energy and cost. Located in Sham Shui Po, it showcases mock-ups of different SME trades such as retail stores, catering outlets and offices to reflect the nature of small businesses, allowing visitors to experience applicable and affordable solutions to achieve energy saving in business operations.

Customer Service Centres

- Two other customer service centres conveniently located in CLP’s supply area, Sham Shui Po and Kwun Tong, provide assistances in account management and enquiries as well as advices on energy efficient products, energy saving tips and product safety for better quality living.

24-hour Hotlines

- A 24-hour Customer Service Hotline (2678 2678) attends to customers’ enquiries via phone calls in person. More than 1.1 million calls a year are taken by our hotline service.

- An Emergency Hotline (2728 8333) is dedicated to handle customer enquiries on supply interruptions, planned outages, voltage fluctuations, cable damages and dangerous wiring.

- Link to reference information: CLP Customer Hotlines
Customer Engagement

- CLP understands the importance of listening to our customers, who can be from all walks of life, because their opinions can help us to continuously improve our services. In 1992, CLP formed a CLP Customer Consultative Group (CCG) with the support from the Consumer Council by inviting members from a wide spectrum of customers. CLP is the first-ever public utility company in Hong Kong to form a CCG. With the extension of the customer base and service variety, the number of CCG members has increased from 5 to 14.

- CCG’s main purpose is to further enhance the relationship between CLP and its customers, improve services to customers, and to ensure that the ever increasing demand of customers is addressed.

- Following the success of CCG, CLP Local Customer Advisory Committees (LCACs) were formed in 1994 to strengthen customer communication. Members consist of representatives from different customer segments, such as management professionals, resident associations, business owners of small and medium-sized enterprises (SMEs), community leaders and members of rural committees. Currently, there are 14 LCACs in CLP’s supply area.

- Each LCAC meets quarterly to offer advice on quality and efficient customer service. They also collaborate with CLP in many community services. Over the years, this well established communication channel between CLP and local communities has constructively helped reflect timely feedback from customers.
10 COMMUNITY COMMITMENT

Care for Our Community

- The success of CLP as a business is closely aligned with the well-being of the community we serve. At CLP, we deliver reliable and safe electricity at reasonable tariff, operate in a responsible way, and give back energetically to the community of Hong Kong.

- Our community commitment initiatives focus on three areas: the environment, education and development, as well as community well-being. We work closely with local NGOs and community groups to identify evolving social needs and to devise programmes that will have the best long-lasting impact.

- Over the years, our community activities have improved people’s quality of life with the help from our skills, expertise and resources.

Our Flagship Programmes

CLP Hotmeal Canteens

- We are continuing our efforts in enhancing community well-being. In 2011, CLP launched Hotmeal Canteen programme, serving hot meals to the underprivileged at a nominal cost.

- CLP Power has partnered with Po Leung Kuk to provide CLP Hotmeal Canteen service in Sham Shui Po, Kwun Tong and Kwai Tsing, providing nutritious hot meals at discounted prices to low-income families, unemployed people, and elderly people. The service also provides meals for people with special dietary requirements and conditions such as diabetes.

- A total of more than 500,000 hot meals had been provided to the community as of August 2018.

- CLP Volunteers participate actively in the hotmeal canteens, serving the beneficiaries on a weekly basis.

- Through CLP’s own publicity channels, such as CLP website, bill insert and CLP Green Bill, the programme has attracted broad support, generating more than HK$4.2 million in donations from customers and members of the public as of August 2018.
Sharing the Festive Joy

- CLP launched the **Sharing the Festive Joy programme** in 2014, inviting single elderly people / elderly couples and people in need to spend the festivities such as the Chinese New Year, Tuen Ng Festival, Mid-Autumn Festival and Senior Citizen’s Day with CLP volunteers to show our care and spread message on energy efficiency and safety. Some **3,500 elders and people in need enjoyed** the festive meals as of September 2018.

Promoting Energy Efficiency and Conservation (EE&C) in the Community

- CLP is committed to promoting energy efficiency and conservation, through **public education, community programmes** and **a series of tools**, to assist the public, our residential and business customers on energy saving.

- Since 2015, CLP has organised the **Power Your Love** programme for four consecutive years. It is the first programme of its kind in the world, combining energy saving with a mission to help the less fortunate in society. It is also a unique campaign to encourage residential customers to save energy in summer and contribute to the well-being of society by transferring units of electricity to offset the electricity bills of households in need. In 2017, more than 400,000 residential customers participated in the campaign, an increase of 25% from 2016. Electricity saved by participating residential customers totalled 30 GWh from 2015 to 2017. Each year, around 20,000 eligible households in need, including single and couple elderly, the disabled, families living in subdivided flats and the families of boarders in special schools, were benefitted with each family receiving HK$300 donated by the shareholders’ fund.
In 2014, CLP allocated HK$10 million from our shareholders’ fund to launch the **CLP Subsidy Programme for Energy Efficient Electrical Appliances**. In joint effort with members of 14 District Councils in our supply areas, NGOs and green groups, the programme gave out sets of four energy saving electrical appliances to 4,000 households, including low-income families, residents of subdivided flats, single elderly and the multiple “have-nots” people, to improve their basic necessities and help them save energy expenditure. In 2016 and 2017, we continued to cooperate with the community leaders to provide energy saving electrical appliances to families with imminent needs, such as those who face financial burden after accidents or the chronic patients.

**Assistance to the Disadvantaged**

- Energy poverty has been a growing concern in the community and hence the low-income families are one of the key targets we offer assistance.

- Under the current Scheme of Control Agreement, a **CLP Community Energy Saving Fund** will begin operations in January 2019. The fund, which will be around HK$70 million in its first year, will introduce two initiatives namely **CLP Power Connect** and **CLP Electrical Equipment Upgrade Scheme**. Under the fund, a total of HK$20 million will be allocated to CLP Power Connect to subsidise around 40,000 households, including single elderly or elderly couple, low income families, the disabled and subdivided unit households, with each receiving HK$500 of electricity subsidy. In addition to financial assistance, CLP Power will work with NGOs to provide subsidies for the landlords of subdivided units for the rewiring work needed for the installation of individual electricity meters. Energy efficient electrical appliances will also be given to residents who live in the Hong Kong Council of Social Services community houses to lower their electricity consumption. (See also Chapter 7 on **Energy Management**)

Know more about CLP’s other community programmes launched in the past years
In the past few years, CLP initiated different community projects to alleviate the economic burden of needy households including tenants living in subdivided flats:

- In 2013, we provided the Community Care Subsidy of HK$300 to each eligible low-income person or household;
- In 2014, the “CLP Subsidy Programme for Energy Efficient Electrical Appliances” gave out sets of four energy saving electrical appliances to 4,000 underprivileged households;
- Since 2015, Power Your Love programme has been organised every year to help 20,000 households in need, with each family receiving HK$300 of subsidy that helps reducing their electricity expenses;
- We provide energy saving rebate to low-consumption customers. The Energy Saving Rebate Scheme has been launched since 2013, residential and small business customers consuming 400 units or less on a bi-monthly basis are eligible to enjoy the rebate;
- We also provide a Concessionary Tariff for the Elderly to eligible customers who live either alone or with other similarly qualified elderly. They can enjoy half-price for the first 400 units of electricity consumed in each two-month billing period plus an exemption of the minimum charge per bill.

CLP noted some concerns in the society about the electricity charge that tenants living in subdivided flats are facing. CLP is willing to consider and work towards a resolution that fits in every aspect to help these people install individual meters. However, prior approvals from landlords and Owners’ Corporations for such installations are necessary.

Since 2014, CLP has worked with Caritas Hong Kong, Yan Oi Tong, Society for Community Organization (SoCO), World Green Organisation and Hong Kong & Kowloon Electrical Engineering & Appliances Trade Workers Union in an attempt to identify subdivided flat tenants and help those who have obtained their landlord’s permission and fulfilled safety requirements to install individual meters for free. So far, a total of four flats, have been installed with 18 individual meters.

The Hong Kong Council of Social Service launched the Community Housing Movement in 2017, aims to provide transitional social housing to deprived households. As one of the supporting parties of the Movement, CLP donated energy efficient home appliances to the tenants, such as induction cookers, rice cookers, electric fans and LED light bulbs etc., to help alleviate their household expenditure, encourage energy saving and improve home safety.

We will continue to engage with the concern groups and tenants to understand their needs. As long as the landlords agree and it is under safe conditions, they are welcome to apply for individual meter installation.
CLP Volunteer Team

- Employee involvement is a very important part of the success of our community projects. CLP’s volunteer team is one of the largest corporate volunteer teams in Hong Kong. It was initiated in 1994 by a group of frontline staff who provided free re-wiring services to underprivileged elderly people. Today, it comprises more than 1,600 current and retired employees along with family members and friends. Senior CLP executives have lent their enthusiastic support to volunteers and actively participated in the volunteer effort. CLP also encourages staff to bring their children for volunteering work, encouraging more compassion in the community.

- CLP volunteers provide support to the community initiatives led by CLP and other organisations. These initiatives included:
  - Conducted re-wiring work for the elderly;
  - Trained young-old volunteers to be home electricity safety ambassadors;
  - Actively participated in and served at the CLP community programmes, including CLP Hotmeal Canteens, Sharing the Festive Joy Programme, Power Your Love Programme, and paying caring visits to the needy under the CLP Subsidy Programme for Energy Efficient Electrical Appliances;
  - Regular visits to the elderly with early symptoms of dementia;
  - Organised homework tutorial classes for new migrants and underprivileged children;
  - Beach cleaning activities;
  - Participated in fund-raising activities, such as night walk, charity run, and city orienteering race;
  - Organised eco-tours, workshops on electrical safety and energy efficiency, caring visits, and a range of other activities for people in need.

- We also actively provide training to our volunteer teams’ leaders. By inviting experienced social workers from NGOs to give talks, our leaders are able to learn more about the social trends and demands. It helps them in devising volunteer programmes that suit the social needs.

- Apart from programmes initiated by CLP, we also encourage our employees to take part in other volunteering work. Employees are entitled to enjoy one day of Community Service Leave at full pay each year to participate in projects run by recognised voluntary service organisations.
<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Key Social Performance Awards received by CLP</th>
<th>Organiser(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 – 2018</td>
<td>▪ 15 Years Plus Caring Company Logo</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
<tr>
<td>2017</td>
<td>▪ Friend of Social Enterprise Awards</td>
<td>Home Affairs Bureau and Social Enterprise Advisory Committee</td>
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<td></td>
<td>▪ Metro Awards for Corporate Social Responsibility 2017</td>
<td>Metro Daily and Metro Prosperity</td>
</tr>
<tr>
<td>2017 (Since 2007)</td>
<td>▪ Corporate Voluntary Team Award – Sing Tao Services Awards</td>
<td>Sing Tao Daily</td>
</tr>
<tr>
<td>2016 - 2017</td>
<td>▪ Gold Award for Volunteer Service (Organisation)</td>
<td>Social Welfare Department</td>
</tr>
<tr>
<td>2016</td>
<td>▪ Outstanding Contribution Award of the Partnership Fund for the Disadvantaged</td>
<td>Social Welfare Department</td>
</tr>
<tr>
<td>2015</td>
<td>▪ Grand Caring Award (Enterprise Group) – Corporate Social Responsibility (CSR) Recognition Scheme – Industry Cares</td>
<td>Federation of Hong Kong Industries</td>
</tr>
<tr>
<td></td>
<td>▪ The 6th Hong Kong Volunteer Award, Corporate Award</td>
<td>Agency for Volunteer Service</td>
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<tr>
<td>2013 - 2016</td>
<td>▪ 10 Years Plus Caring Company Logo</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
<tr>
<td>2013 - 2014</td>
<td>▪ Champion Award (General Corporate Group) of 2013-14 Best Corporate Volunteer Service Project Competition – Rewiring and Home Electricity Safety Service Programme</td>
<td>Social Welfare Department</td>
</tr>
<tr>
<td></td>
<td>▪ Outstanding Award (General Corporate Group) of 2013-14 Best Corporate Volunteer Service Project Competition – CLP Green Volunteers for Seniors Programme</td>
<td></td>
</tr>
<tr>
<td>2010 - 2011</td>
<td>▪ Outstanding Partnership – “Care for the Elderly – Active Mind”</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
<tr>
<td>2006 - 2007</td>
<td>▪ Total Caring Award</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
<tr>
<td>2005 - 2006</td>
<td>▪ Outstanding Partnership – The Rewiring and Home Electricity Safety Service for the Elderly Programme</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
<tr>
<td>2002 - 2012</td>
<td>▪ 10 Consecutive Years Caring Company Logo</td>
<td>The Hong Kong Council of Social Service</td>
</tr>
</tbody>
</table>
Public Education and Youth Engagement

- We firmly believe in the importance of public education and knowledge sharing for the continuous development of our businesses as well as a sustainable future. Over the years, CLP has launched a host of educational initiatives, covering the entire education pathway, from kindergarten to primary, secondary and tertiary education. In 2017, our visitation facilities received over 51,000 guests including shareholders, government officials, Legislative Council members, professional groups, business counterparts, community leaders as well as students.

For Kindergarten Education

POWER YOU Kindergarten Education Kit and Related Outreach Activities

- In 2016, CLP launched a **POWER YOU Kindergarten Education Kit**. The electricity-themed education kit is an innovative public education initiative for kindergarten students that aims to spark interest among them in the work of electricity, to give them a basic knowledge about energy and teach them good habits in energy efficiency. CLP is the first commercial company in Hong Kong providing a comprehensive tool kit for 180,000 pupils of 1,000 kindergartens for free.

- The education kit comprises storybook series, finger puppets to facilitate story telling, a board game, stickers, work sheets, an iconic cartoon character Power Kid to promote energy saving messages, Cartoon MV and a theme song titled “Please Come and Save the Earth” on energy saving. So far, 85% of the kindergartens used the Kit in 2016/17 academic year.

- As an extended activity, CLP young engineers and graduate trainees started to visit the kindergartens from January 2017 to introduce power generation journey, safe use of electricity and energy saving tips. More than 16,000 kids from over 200 schools were reached out as of September 2018.

- To further promote energy saving to the public, **Please Come and Save the Earth** Music Contest was organised in 2017. 170 teams and some 1,700 contestants from different nationalities, social backgrounds and ages were attracted to perform the theme song in very creative genres.
In 2018, CLP introduced a new team of energy saving cartoon characters called **POWER FOUR**. Teamed up with Power Kid, the new characters are brainy Professor K, mischievous Lululu, and cheeky yy Boy. They made their debut at the CLP booth in the Hong Kong Book Fair 2018 with the Power Kid Channel, a new 3D cartoon video featuring their daily lives to help young children explore the world of electricity and acquire energy saving knowledge in a fun and engaging way. For the first time CLP has participated in Hong Kong Book Fair, nearly 30,000 attendees visited the CLP booth to learn about energy saving through fun and interactive games.

For Primary School Education

**Green Studio and Multi-purpose Vehicle**

- CLP’s first mobile classroom **Green Studio** was joined by our new Multi-purpose Vehicle (MPV) in 2017 to arouse public attention on climate change and spread green messages to a wider audience in schools and local communities. To engage visitors and give them a unique experience, 4D movie and Augmented Reality interactive educational games are available on both vehicles, while the MPV can also be transformed into an open stage platform. Equipped with various digital technologies and interactive games, customers can get to know CLP’s latest products and services in a more fun and engaging way. Since 2009, Green Studio together with MPV have reached out to over 160,000 school children and visitors.
Green Elites Campus Accreditation Programme

- With the aim of nurturing primary students to develop green living behaviour at an early age, CLP launched the Green Elites Campus Accreditation Pilot Programme and Green Elites Portal cum Award Scheme in the 2014/15 academic year. The Programme was carried out in 51 primary schools under Tung Wah Group of Hospitals, Po Leung Kuk and Sheng Kung Hui.

- The programme continues to run in the 2018/19 academic year, in collaboration with Anglican (Hong Kong) Primary Schools Council Limited, Green Power, Friends of the Earth (HK) and Green Earth, to encourage around 15,000 students and teachers from 18 Sheng Kung Hui primary schools to apply green tips in their daily lives through checklist, student handbook, teaching materials, visitations, talks and energy audit. The green education portal continues to be the online platform for all students to learn green habits through games and interactive content. The portal has also been opened to the public starting September 2017.

Youth Engagement

- At CLP, we see engaging young people, from early teens who are in junior secondary education to undergraduates in tertiary institutions, as a key focus area of our community initiatives. Initiatives targeting at this group, as moving along the education pathway, are launched with the objectives to stimulate early interest in power engineering, offer alternative career paths and opportunities for academic, vocational and professional training, so as to facilitate them in the career development and upward mobility.
Engineer in School

- To enhance junior secondary school students’ understanding of power engineering profession and strengthen their career and life planning, CLP launched the Engineer in School programme in 2016. Through a series of activities including school talks, workshops, day camps and job shadowing, we encourage students to learn the importance of environmental protection and energy conservation. Students with outstanding performance would also have the opportunity to join a three-day engineer experience tour guided by CLP mentors. In the 2017/18 academic year, Engineer in School has toured 50 secondary schools reaching out to about 10,000 students.

LS-energy HK e-learning Portal

- Launched in 2011, the Portal is Hong Kong’s first and most comprehensive one-stop Liberal Studies e-learning kit for the “Energy Technology and the Environment” module in the senior secondary Liberal Studies programme. CLP invited experts from the education sector, academia and government to form the CLP Liberal Studies Advisory Committee to develop this free platform to better facilitate students’ learning process.

Initiatives to Stimulate Interest in Power Engineering

- To inspire young people’s interest in engineering and promote Science, Technology, Engineering and Mathematics (STEM) education, CLP organised workshops at the Maker Faire Hong Kong x Make Big in 2017 and 2018, enabling participants to learn about cable jointing and use virtual reality (VR) to climb a transmission tower. Energy saving and renewable energy knowledge were also shared with the young people, families and children. A total of around 5,800 people visited and took part in the workshops.
CLP set up a cable jointing workshop at St. James’ Settlement Career Sparkle Centre in 2018. Expecting to receive around 6,000 visiting senior secondary students per year by the centre, our workshop aims at giving them the first-hand experience on the craftsmanship of power industry and inspiring their interest in the power industry to help promote the engineering careers.

As the Energising Partner of the 2018 CLP Energy for Brighter Tomorrows Award organised by the Hong Kong Federation of Youth Groups, CLP awarded scholarships to 20 secondary students who have overcome adversity in life, remained positive and dedicated to drive a better future. The awardees also joined a year-long Brighter Future Buddy mentorship programme in which guidance by eight CLP mentors was provided for the awardees’ further growth and development.

Initiatives to Introduce Power Engineering as a career

CLP actively collaborated with industry, community partners and NGOs in various programmes to reach out to more than 80,000 students in 2018 to introduce to them the power engineering and possible careers and training opportunities in the industry. These programmes include:

- **2018 Hong Kong Trade Development Council Education and Careers Expo** – CLP joined hands with the other 18 members of the Hong Kong Electrical and Mechanical Trade Promotion Working Group (the Working Group) to showcase the electrical and mechanical (E&M) industry and highlight CLP’s training programmes and recruit craft apprentice for CLP.

- **2017 & 2018 E&M Go!** – CLP initiated and co-organised the E&M Go! function with the Working Group from 2017 onwards, to welcome new recruits of young entrants to the E&M industry, and at the same time reinforcing the opportunities as a professional and skilled workforce. The 2017 and 2018 E&M Go! were attended by more than 1,600 new entrants and guests.
– **2018 Project WeCan’s Career Exploration Day** –
CLP reached out to more than 4,000 senior secondary students. More than 300 of them tried out job tasters offered by Generation Academy and Power Academy.

**Opportunities for vocational and professional education and training**

- **CLP Power Academy** has become an important building block for CLP’s youth engagement framework since it was established in 2017. It expanded CLP’s well recognised and structured internal training programme to the E&M industry. It aims to become the leading vocational-based academy for power engineering, bridging the gap between career training and higher education, providing industry practitioners with the necessary professional and accredited qualifications, paving way for their career advancements. It also provides an alternative runway for youths in the power engineering industry the necessary vocational and professional education and training (VPET) path. In collaboration with various tertiary institutions, CLP Power Academy offers a complete articulation pathway from Diploma in Power Engineering, to Professional Diploma in Power Engineering and to Bachelor of Engineering (Honours) in Electrical Engineering programmes.

  - See also Chapter 11 on People Development.

**CLP Internship Programme and Scholarships for Tertiary Students**

- To identify and nurture new talents for the company, CLP Internship Programme offers full-time training for tertiary students studying different disciplines during the summer vacation or for a 12-month period. Moreover, CLP offers a number of scholarships every year to outstanding engineering students from local tertiary institutions, and provides opportunities for scholarship awardees to join the CLP Internship Programme and experience the work life of engineers.

  - See also Chapter 11 on People Development.
Our Key Visitation Facilities

- CLP offers a wide range of exhibition and education facilities to share knowledge with the public and provide value-added services to customers. Members of the public are welcome to visit these facilities and interactive platforms, which cover three key areas: energy business, fuels, and energy efficiency and conservation.

- For more information on visitation facilities: Visit to CLP

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### About Our Energy Business

<table>
<thead>
<tr>
<th>Facility</th>
<th>Description</th>
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<tbody>
<tr>
<td>ElectriCity</td>
<td>It aims to educate the public about the production of electricity and promote environmental protection and energy efficiency. The centre features interesting and informative displays that explain the fundamental principles of electricity, power generation, transmission and distribution. Visitors can also learn more about the fuel mix in Hong Kong.</td>
</tr>
<tr>
<td>Black Point Gallery</td>
<td>CLP’s first exhibition on the theme of natural gas-fired power generation. It introduces the operation of gas-fired power generation and its environmental benefits which contribute to air quality improvement and carbon reduction for Hong Kong.</td>
</tr>
<tr>
<td>CLP Power Low Carbon Energy Education Centre</td>
<td>CLP has sponsored City University of Hong Kong to set up a Low Carbon Energy Education Centre on campus. Visitors can learn about the importance of low carbon energy in addressing the challenge of climate change. Connecting various exhibition zones is an innovative array of multimedia and interactive elements to illustrate the complex scientific concepts and generation principles of different kinds of energy. In an interesting and vivid manner, the Centre offers visitors an inspiring and enlightening learning experience.</td>
</tr>
<tr>
<td>Power Quality Workshop</td>
<td>It provides a better understanding of the vital issue of power quality to the industry and corporate customers. Exhibits and interactive games that illustrate the causes of voltage dips and harmonic distortions, and the corresponding potential impacts on electrical equipment are featured.</td>
</tr>
</tbody>
</table>
# About Our Energy Efficiency and Conservation Efforts

| **Smart Energy@Mong Kok** | As CLP’s flagship store, the Smart Energy@Mong Kok is a five-storey building located at Mong Kok which introduces the brand-new retail experience. It was first set up in 2008 to encourage a wider adoption of energy efficient appliances and promote green living concept to our customers. The newly transformed retail and service centre provides smart electricity services and promotes smart home living to customers. It also offers customers an opportunity to experience and appreciate the benefits of a full range of smart home products and technologies. |
| **Smart Energy Experience Centre** | The Yuen Long customer service centre has undergone a major facelift and transformed into a Smart Energy Experience Centre in 2017. It aims to provide professional advice to residential and business customers on the use of smart products, to introduce smart home and business solutions and to promote smarter and greener lifestyles. |
| **Tai Po Eco Home** | It is a one-stop green lifestyle centre designed to serve residents living in the New Territories. Customers can try out energy efficient appliances and participate in cooking classes. A list of innovative energy saving products targeting at village homes and low-density housing are also available for demonstration. |
| **GREENPLUS Experience Centre** | The Centre aims to encourage small and medium enterprises (SMEs) to implement energy efficiency practices in doing business to save energy and cost. SMEs are welcome to visit the centre, which is located in Sham Shui Po, to experience applicable and affordable solutions to achieve energy saving in business operations. |
| **Green Studio and Multi-purpose Vehicle** | **Green Studio** mobile classroom and Multi-purpose Vehicle welcome primary schools and community organisations to experience the green adventure and learn more about environmental protection, climate change and energy conservation. |
11 PEOPLE DEVELOPMENT

Internal People Development and Caring for Employees

- CLP employs over 4,500 staff members in Hong Kong (CLP Holdings Limited and CLP Power Hong Kong Limited) and invests constantly in training and development to help our staff perform well in their current roles and prepare them for future challenges.

- CLP has a clearly-defined company policy towards people development and has introduced a variety of training and development programmes to enhance employees’ professional proficiency and leadership potential. CLP’s commitment to people development is well recognised in the 2018 Randstad Awards as the Most Attractive Employer in Hong Kong. CLP is continuously recognised by the Employees Retraining Board (ERB) as a “Manpower Developer” since 2010 and received the “Manpower Developer 1st (2010-2020)” in the 7th “ERB Manpower Developer Award Scheme”.

- Moreover, CLP values innovation and knowledge. CLP is devoted to sustaining the specialised professional expertise of the power industry. We encourage staff members to share their knowledge and experience. Our outstanding performance in this area is well recognised by the Asian Most Admired Knowledge Enterprise (MAKE) Award accomplished in 2015. CLP was one of the 25 organisations from South Korea, Japan, Singapore and other Asian countries and territories to win the regional award. The company was also named the best performer among the winners in the field of people development.

Academy for Internal Training

- Established in 1966, our world-class Power Academy (formerly known as Training School) trains operational experts and engineers for power transmission and distribution. It also provides skill and knowledge on non-technical training such as management and leadership.

- For our power stations, besides training teams under individual departments, our Generation Academy was set up for the training and development of our power generation staff and contractors.
Our well-structured **Trainees and Apprentices Programmes** transform talented young people into seasoned technical experts. These programmes include:

- Graduate Trainee programme
- Technician Trainee Programme
- Apprentice Training Programme
- Engineering Crew Programme
- CLP Internship Programme

CLP also organises the annual CLP Power Trainee and Apprentice Graduation Ceremony to strengthen its bonding with Graduate Trainees, Technician Trainees and Craft Apprentices upon their completion of training at CLP. The occasion aims at building a sense of belonging among the new joiners in working at CLP.

To enhance our customer service and cultivate Innovation culture, CLP established an **Energy Retailer Academy (ERA)** to coordinate the development of training strategy, plan and initiatives with an ultimate goal to uplift the customer services and capabilities of our staff in the energy retail industry. Employees are invited to join in the state-of-the-art training programmes identified and planned by the four ERA Faculties including Customer Experience, Digital, Sustainability and Technical.
Training Facilities

**Power Academy**

- Our well-equipped **Power Academy** is located in Shatin, which provides the all-round training of technical, non-technical, operational, safety, health and environmental quality management skills to our existing engineering staff and new joiners including trainees, apprentices and contractors for electricity transmission and distribution functions. The Academy has a dedicated team to promote knowledge management and learning culture.

- Training facilities include Web-based Learning Centre, Electrical Fitting Workshop, Cable Jointing Workshop, Electrical Installation Workshop, High-voltage Equipment Operations Training Centre, Fault Simulator, Simulated Primary Substation, Distribution Overhead Lines Training Poles, Transmission Training Towers, etc.

**Overhead Line Training School**

- The **Overhead Line Training School** is the largest outdoor training venue of its kind in Hong Kong. With over 27,200 square meters, the School provides world-class training facilities and courses to train and develop staff for working and practising on overhead electricity lines.

**Generation Academy**

- Our **Generation Academy**, located in our power station, provides an array of training in technical, operational, safety, commercial and project management, as well as management skills with focus on power generation. The Mechanical & Electrical Training Workshop houses comprehensive facilities to enable trainees to be well equipped with not only electrical and mechanical skills but also electronic instrumentation techniques that are essential for the operation, monitoring and maintenance of huge and complex generators.

Caring for our Employees

- CLP cares for our employees and has been implementing various family-friendly policies that help our staff to achieve a healthy balance between work and life.

  Starting from 2018, we have significantly enhanced various leave entitlements for our employees, including:

  - Maternity leave: increased from 14 weeks to 16 weeks (statutory 10 weeks)
  - Paternity leave: 10 days (statutory 3 days)
  - Marriage leave: increased from 3 to 5 days (not statutory)
  - Introduction of 10-day adoption leave (not statutory)
  - Introduction of 5-day auxiliary service training leave (not statutory)

- CLP also provides various facilities including staff canteen to encourage employees to bring their own lunches, recreational amenities such as fitness room and organise various social, recreational and sports activities. Lactation room equipped with partitions, washing basin and refrigerator is also set up to encourage breastfeeding.
Nurturing Power Talents

CLP Power Academy

- To support the sustainable development of Hong Kong and to meet the growing demand for power expertise, CLP Power Academy (CLPA) was established in 2017. Being a vocational-based academy for power engineering, CLPA bridges the gap between career training and higher education. It also serves as an important building block for CLP to engage the younger generation by providing them alternative pathways to join the power engineering industry. Various part-time accredited programmes are offered to facilitate industry practitioners in their career development and professional standing. This also helps ensure an adequate supply of competent engineering employees for the local power industry.

- CLPA has been working in partnership with tertiary institutions, such as the Vocational Training Council and The Hong Kong Polytechnic University’s School of Professional Education and Executive Development, to offer part-time accredited programmes. Currently, Diploma in Power Engineering, Professional Diploma in Power Engineering and Bachelor of Engineering (Honours) in Electrical Engineering (Honours) in Electrical Engineering programmes, equivalent to Level 3 to Level 5 in Hong Kong Qualification Framework (HKQF), are offered in 2017 and 2018 academic years. These programmes provide students and young people multiple entry points to gain practical skills and to advance their career with a clear articulation path through continuous learning.

- At CLPA, classroom lectures are supplemented by practical sessions. The world-class training facilities at CLPA give students the opportunity for hands-on and practical experience of the design, operation and maintenance of different types of power facilities. Keeping pace with the latest technology, CLPA uses Virtual Reality (VR) and Augmented Reality (AR) to provide zero-risk training in a virtual environment simulating the real one. Visits to power facilities and CLP Power work sites are arranged to provide students with valuable experience of working in the power industry. CLPA also organises short courses periodically on Continuing Professional Development on generation and power systems.
Stimulate Interest in Power Engineering

- To stimulate young people’s interest in power engineering, in 2018, CLP set up a cable jointing workshop at St. James’ Settlement Career Sparkle Centre in 2018. Located at the centre’s Engineering & Science Industries Experiential Area, the workshop enables senior secondary students to gain first-hand experience on the craftsmanship of power industry.

Embrace Diversity in Workplace

- CLP respects and embraces diversity in our workplace, we have taken steps to attract more female to join our industry, including our “Engineer in School” programme and the Girls Go Tech programme organised by The Woman’s Foundation. We send young engineers to secondary schools to deliver talks and organise other activities, with an aim to give these students a chance to learn more about the engineer industry and the life as an engineer. This helps provide talent pool for our sustainable growth, while help us remain flexible and innovative.

Academic Collaboration and Scholarships

- To nurture the development of human capital in the power industry, CLP has actively collaborated with local and overseas tertiary institutions.

- Locally, CLP has built long-term partnerships with tertiary institutions by offering the CLP Internship Programme to identify and nurture new talent, and to attract them to join CLP when they graduate. The internship programme offers full-time training for students studying different disciplines either during the summer vacation or for a 12-month period. CLP Engineering Studies Award provides sponsorship and mentorship to outstanding engineering students for their final year studies and to identify them early to join CLP as graduate trainees upon their graduation.

- A number of scholarships are offered every year to outstanding engineering students at The University of Hong Kong (HKU), The Hong Kong Polytechnic University, The Chinese University of Hong Kong, The Hong Kong University of Science and Technology (HKUST), and City University of Hong Kong, as well as students who are studying electrical and mechanical engineering at the Vocational Training Council (VTC). Scholarship awardees will join the CLP Internship Programme to experience the work life of engineers.

- Since 2015, CLP has supported the VTC to develop an Applied Learning Course for Electrical and Energy Engineering, enabling senior secondary students to understand fundamental theories and practical application of relevant subjects through diversified learning activities. We have also offered a scholarship scheme and internship opportunities for the students.
To motivate engineering students to become tomorrow’s innovative global leaders and play a key role in the sustainable future of the community, CLP and HKU’s Faculty of Engineering formed a ten-year alliance “Powering a Sustainable Generation Scholarship” in 2013. The scholarship scheme supports promising engineering undergraduates and helps them develop an international perspective through one semester of study in a prestigious overseas university. Selected scholars also get to join CLP’s internship programme.

To widen the exposure of Mechanical Engineering students through the real engineering working environment, CLP has started a Co-op Program with Department of Mechanical and Aerospace Engineering of the HKUST since 2016. From February to June 2016 and 2017, selected engineering students were offered a chance to work at CLP’s power stations. This also provides a way to identify potential Graduate Trainee talents.

CLP is collaborating with universities on the Mainland to arrange seminars, talks and company visits for engineering students. CLP also promotes Hong Kong’s power industry to young people studying overseas via participating in a career fair organised by the UK Joint University Hong Kong Career Society and other online recruitment platforms.

CLP signed an MOU with the University of Strathclyde, Scotland in February 2014. It marked an important milestone in a closer working relationship in respect of providing continuing professional development for our engineering talent, uplifting technical knowledge and exploring innovative technological applications.

In order to support employees developing the full potential of their children through full-time continuing education, a CLP Centenary Scholarship programme has been established since 2001 for children of employees who have demonstrated outstanding academic and personal achievements.

Link to reference information: CLP Training and Internship Programme
12 CLP IN MAINLAND CHINA

Background

- CLP entered Mainland China’s energy market in 1979 when it started providing electricity to Guangdong.

- As of 30 June 2018, CLP is one of the largest external independent power producers in Mainland China, focusing on clean energy generation. CLP also takes the role of a developer, investor, project manager and operator. Our generation portfolio includes coal, nuclear, and renewable energy such as hydro, wind and solar.

- Currently CLP has over 50 projects in Mainland China, covering 15 provinces, cities and autonomous regions in eastern China (Jiangsu and Shanghai), southern China (Guangdong and Guangxi), southwestern China (Guizhou, Yunnan and Sichuan), northern China (Beijing, Shandong, Hebei, Tianjin and Inner Mongolia), northeastern China (Jilin and Liaoning) and northwestern China (Gansu).

- Link to reference information: CLP in Mainland China

Our Operations

Coal-fired Power Plants

- CLP first invested in coal-fired power plants in Mainland China in 1998. As of 30 June 2018, we had operations in 13 projects in Guangxi, Hebei, Inner Mongolia, Liaoning, Shandong and Tianjin, with an equity capacity of 3,953 MW.

- CLP has invested in a range of measures to improve the environmental performance at these plants. For example, Guangxi Fangchenggang II Power Station is fitted with highly efficient ultra-supercritical coal units and other emission control facilities such as flue gas desulphurisation system.
Nuclear Power Stations

- CLP’s first major expansion beyond Hong Kong was our joint venture with China General Nuclear Power Corporation (then China Guangdong Nuclear Power Holding Co., Ltd.) to develop, build and operate the Guangdong Daya Bay Nuclear Power Station.

- Daya Bay is one of the earliest and largest projects launched under China’s Open Door Policy and remains one of the most successful.

- Operation began in 1994 and the two pressurised water reactor generating units now produce over 14 billion kWh of electricity per year, of which 70% is exported to Hong Kong.

- To ensure that more clean and cost-competitive energy is provided to Hong Kong, Daya Bay has increased its electricity supply to Hong Kong from 70% to approximately 80% of its total capacity from late 2014 to 2018.

- The acquisition of a 17% equity interest in Yangjiang Nuclear Power Co., Ltd. from CGN Power was completed in December 2017. Yangjiang Nuclear Power Station, upon full commissioning of all six units, will add over 1,100MW (on a 17% equity basis) of non-carbon emitting generation capacity to CLP’s portfolio. Yangjiang Nuclear Power Station is connected to the Guangdong power grid and supplies its full capacity to the electricity market in Guangdong.

- Yangjiang Nuclear Power Station comprises six pressurised water reactor (PWR) with 1,086MW each adopting advanced CPR1000 technology. Five of them are in commercial operation and the sixth unit is planned to commission in 2019.

- Link to reference information: Nuclear Energy

- See also Chapter 6 on Cleaner Fuel Mix for Electricity Generation.
Renewable Energy

- CLP has undertaken to support the Central Government’s goal of reducing the country’s carbon intensity through environmental improvements at power stations and continued development of renewable energy projects, including wind, hydro and solar.

- CLP Xicun Solar Power Station is the first large-scale demonstration project of solar-agriculture integration in Yunnan. By combining agricultural activities (plantation of honeysuckle in the solar farm) with solar generation, the project brings about multiple benefits including maximising land use, creating jobs for local farmers and fueling the community with clean energy.

- As of 30 June 2018, we had stakes in over 30 projects in various parts of the country, with equity capacity of 1,765MW.

Pumped Storage Power Station

- Guangzhou Pumped Storage Power Station has a total capacity of 2,400MW and was developed in two stages.

- CLP wholly owns the Hong Kong Pumped Storage Development Company Limited (PSDC), through which CLP has contractual rights to use the equivalent of half of the first stage of the project (600MW) until 2034.

- CLP uses this pumped storage capacity to support the operation and security of the Hong Kong electricity supply system.