CLP 中電

2019
Sustainability Report

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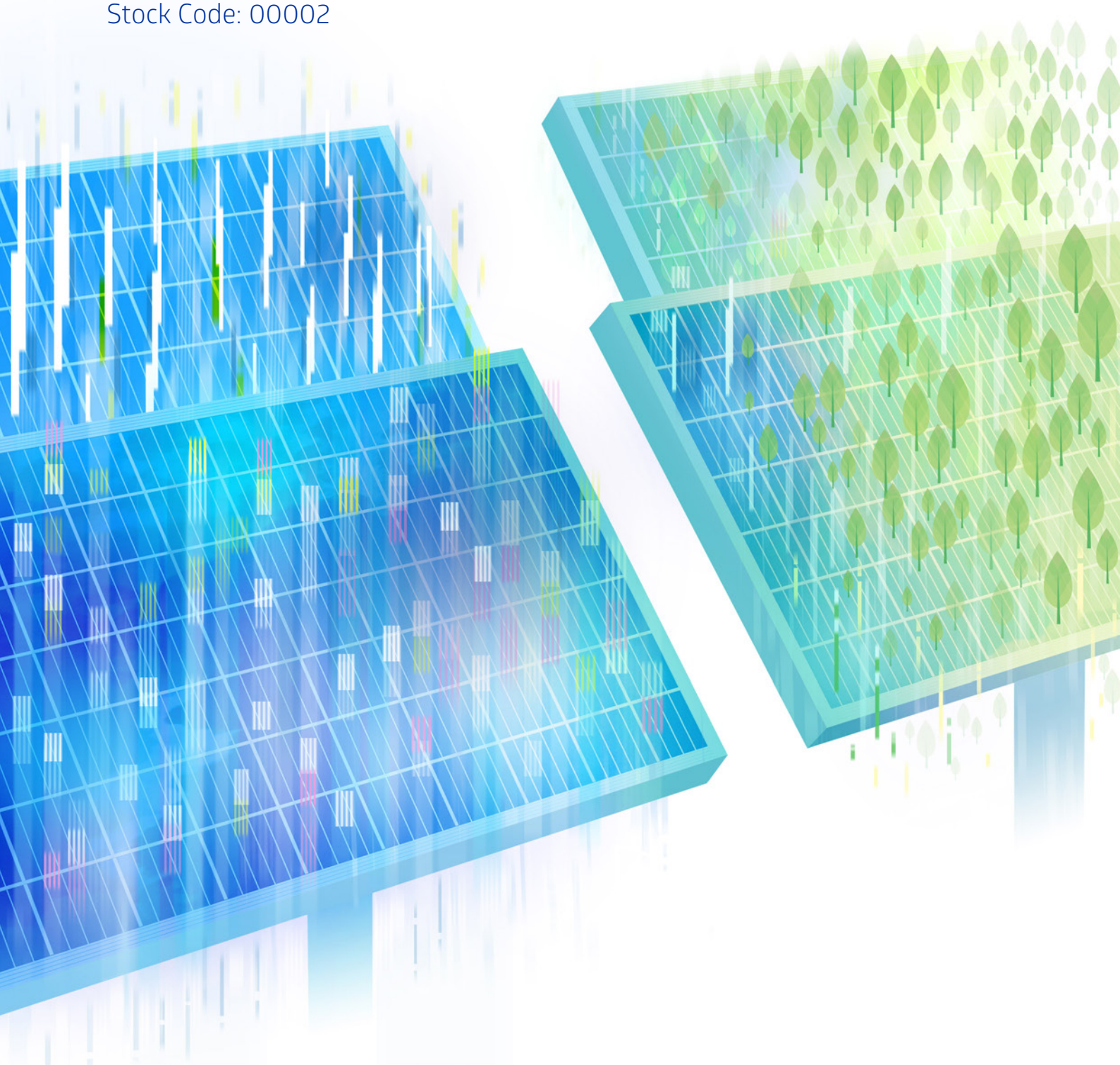

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Chairman and CEO message

"At CLP, we have for years taken a long-term view on our investments as well as our shared environment. To stay ahead of challenges, we will continue driving change within the Company to build a sustainable business fit for the future."

The Honourable Sir Michael Kadoorie, Chairman (right) and Richard Lancaster, CEO (left)

From significant movements in global environmental and trade issues, through to local circumstances experienced in the Hong Kong and Australian markets, the complexities we faced in 2019 certainly made it one of the most challenging years in our recent memory.

However, we recognise that the nature of our business subjects us to continuous changes and we must be prepared for adaptation. At CLP, we have for years taken a long-term view on our investments as well as our shared environment. To stay ahead of challenges, we will continue driving change within the Company to build a sustainable business fit for the future.

Our long-standing commitment to maintaining high corporate governance standards and sustainable practices underpins our approach to business. We are pleased to see increasing interest in environmental, social and governance issues in society, particularly among investors and regulators. Properly addressing these issues requires vision and a commitment to manage with a long-term view, two things which have always been a hallmark of CLP.

Following a thorough review of transformative global megatrends, we identified decarbonisation and digitalisation as our long-term drivers of change and have strategies in place to take on the resulting opportunities and challenges.

These megatrends, together with intensifying demographic and labour supply issues as well as social and political uncertainties, present significant opportunities and risks for our workforce. There is no single solution: it requires a coordinated and integrated range of strategic initiatives to build an agile, inclusive and sustainable workforce for the future.

Decarbonising our portfolio

Against the backdrop of accelerated climate change, decarbonisation continued to be a key priority of CLP in 2019 as we transition to a Utility of the Future. Late last year we released our updated Climate Vision 2050. At its heart are our pledges to phase out our existing coal-based assets by 2050, at the latest, and not to invest further in any additional coal-fired generation assets. This latest edition is a foundation stone of our business strategy, which provides a roadmap for the decarbonisation of our portfolio in alignment with, and being sensitive to, local policies in each of our markets.

We have also pledged to revisit and strengthen our decarbonisation targets at least every five years as technologies advance and cost structures change, while tracking our progress against the goals of the Paris Agreement.

Our pledges can also be seen in another context. We have been investing in renewable generation technologies since the mid-1990s and are well placed to help position renewable power at the heart of the energy transition. On an ongoing basis, we are actively pursuing further investment opportunities in low-carbon electricity generation, transmission and distribution, as well as in new energy services such as those emerging from the development of "smart cities".

Accelerating our digital transition

Our Group's electricity value chain is increasingly supported by smart energy services. To fully unlock the potential of the future energy system, we need to develop a robust digital transformation strategy with bespoke energy services solutions for each of the local markets in which we operate.

The launch of Smart Energy Connect is a prime example of our recent efforts. As the first online energy app store in Asia, it offers a range of innovative and practical applications to help businesses and organisations in the region manage energy use in a greener and smarter way.

As for our operations, we will continue replacing and enhancing our digital systems and processes to enable our business to deliver improved results, leveraging innovation to facilitate our people in making better decisions while placing importance on cyber resilience and data protection. Over the past year, we made good progress in building up internal expertise and enhancing the awareness of cyber security across our organisation. Going forward, we will continue being vigilant and keep strengthening our cyber resilience.

Addressing the utility workforce challenge

Industry, regional, demographic, social and political drivers are bringing unprecedented change to CLP and are redefining our people agenda. Attracting and retaining skilled resources to meet the needs of energy transition is a key priority. We continued developing leaders of the future, recruiting for new-to-CLP skills, and creating opportunities for our people to gain experience in low-carbon and innovation projects.

Digitalisation requires new skills and ways of working. We commenced providing accredited data analytics training while design thinking began to take hold at CLP for advancing our services and driving people-centric innovation.

We believe that supporting diversity and inclusion is critical to business performance as well as addressing future employment needs. Hence, we continued investing in increasing women's participation in engineering through mentoring and strengthening female engineering networks.

Safeguarding our people

Safety remains an absolute priority for the Group and our target is one of zero harm for everybody. Sadly, we do have to report the work-related death of a team member of one of our subcontractors in Hong Kong. The Board, on behalf of everyone at CLP, expresses its condolences to the individual's family. This regrettable event has further increased our resolve to improve the safeguarding of our people moving forward.

Outlook

In the past months, nowhere was the risk of a changing climate more vividly displayed than by the bushfires in Australia. We have taken steps to consider the resilience of our Climate Vision 2050 against possible climate-related scenarios and will continue refining our analysis to help integrate climate risks and opportunities into long-term business planning. To ensure our transparency, we have also advanced our disclosure in accordance with the recommendations by the Task Force on Climate-related Financial Disclosures and will continue disclosing reliable and consistent information to stakeholders.

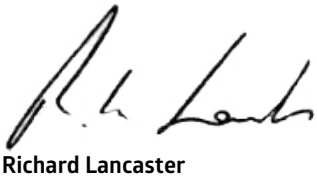
All markets go through transition periods and any country with a legacy of coal generation assets will require its private sector energy partners to be ready for the challenge of decarbonisation. We see ourselves as a ready, willing and highly capable partner in the transition to a low-carbon energy future.

Going through the transition in 2019 was challenging and our results are a stark reminder of the changes in our industry. Nevertheless, we are striving to decarbonise, digitalise our operations, deliver on our investments and keep innovation at the heart of our ongoing development, all while continuing our collaboration with different sectors of the community to run our business with purpose and with an underpinning commitment to sustainability.

The Honourable Sir Michael Kadoorie

Chairman

Hong Kong, 24 February 2020



Richard Lancaster

Chief Executive Officer

Hong Kong, 24 February 2020

About this report

Welcome to the CLP 2019 Sustainability Report

CLP Holdings Limited (the Group) has embarked on a journey to become a Utility of the Future, a transformation which demands a keen understanding of changes occurring in the energy sector, the global economy and society more broadly. CLP's ambition is to pursue best of breed policies, processes and technologies in all of its operations. The Group operates for the long term and seeks to create value for all stakeholders, internal and external, and the communities in which it operates.

Building on the materiality assessment results from last year, CLP engaged a broad range of stakeholders to seek their feedback on material topics. Based on this some adjustments were made to the strategic discussions on the most important environmental, social and governance (ESG) topics facing the Company. In recognition of the need for increased ambition by companies on climate change, CLP has advanced its disclosure in accordance with the recommendations by the Task Force on Climate-related Financial Disclosure (TCFD). The Group also continues to disclose its management approach and performance in relation to a set of secondary topics in the Standard ESG disclosure section.

Feedback on this report is welcomed, and can be sent through the online survey or via email (srfeedback@clp.com.hk). As a token of CLP's appreciation, each stakeholder who sends feedback on or before 30 June 2020 will receive four CLP Carbon Credits, which can be used to offset their carbon footprint.

Materiality assessment

CLP's materiality assessment was updated in 2018 to further consider the operating environment and the Group's strategy in the medium- to long-term. Building on that result, the engagement of external stakeholders was broadened in 2019 to validate the results and to gauge feedback on the level and quality of disclosure.

Assessment process

GRI reference: 102-44, 102-46

The materiality assessment process was guided by the *Applying enterprise risk management to environmental, social and governance-related risks* guidelines published by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) and the World Business Council for Sustainable Development (WBCSD) in October 2018.

The assessment process is summarised in the diagram below.

External stakeholder engagement in 2019

In November 2019, CLP conducted two focus group workshops and 15 individual interviews with subject matter experts in ESG reporting, finance and investment, industry, climate change, digital transformation, human rights, gender, and sustainability.

There were two objectives for this exercise:

- To gauge feedback and comment on CLP's material topics; and
- To identify improvement areas on reporting quality, presentation method, categorisation, target setting, and other reporting criteria.

The external stakeholders commended CLP's sustainability governance practices and level of ESG disclosure, and were in a consensus on the prioritisation of the key topics which were most material to CLP. In preparing the 2019 report, CLP has taken on many of their suggestions, including discussing business purpose as an overarching topic and enhancing specific disclosure in each of the material topics. Other recommendations related to improvements in CLP's future sustainability disclosure and operational performance were also shared with internal functions and business units.

Learn more about the materiality assessment results ›

1 Horizon scanning and megatrend analysis	2 Identifying material topics	3 Prioritising the material topics	4 Engaging external stakeholders
• Reviewed internal strategy papers and desktop research. • Horizon scanning identified 17 megatrends which may be potentially relevant to CLP. • Interviewed 38 internal subject matter experts to gauge their views and those of their stakeholders and narrowed down the focus to 12 megatrends.	• Identified relevant ESG topics for each of the 12 megatrends, and supplemented with additional information for prioritisation.	• The Sustainability Executive Committee engaged in a workshop to prioritise the material topics. • The Committee considered CLP's level of control over management of the topic; its likelihood to influence the decisions and actions of CLP's stakeholders; and its impact on people, the environment and/or the economy in CLP's markets.	• External stakeholder engagement exercise to gauge feedback on CLP's material topics, content coverage and overall disclosure quality.

Key drivers and megatrends

Megatrends are "large, transformative global forces that define the future by having a far-reaching impact on business, economies, industries, societies and individuals". A megatrend is distinguished from other trends in that it cannot be stopped or significantly altered, even by powerful actors such as governments.

CLP's materiality assessment process started with a megatrend analysis to deepen the understanding of how broad changes in the environment, society, technology and governance were affecting CLP's operating environment.

Starting with the big picture provided the necessary context to review risks and opportunities, thereby making the organisation more agile in responding to changes. This makes it easier to identify and prioritise the ESG topics that CLP should be managing and reporting.

The table below summarises the 12 most important megatrends that were considered. They could be categorised into three big drivers: Decarbonisation, Digitalisation, and Social and Demographic Change. Each of them shapes one or more of the prioritised ESG topics and how CLP responds.

Climate change mitigation and adaptation

The adverse impacts of climate change are growing in frequency and severity, taxing the resilience of built and natural environments. Stakeholders are increasingly focused on how a business identifies, responds and discloses its mitigation and adaptation efforts.

See Climate change

Demand for renewables

Technological innovation, regulatory incentives, cost efficiencies and growing consumer and industrial demand are increasing the commercial viability of clean energy. Renewable power capacity is expected to expand by 50% in the next five years.

See Climate change, Technology

Changing energy mix

Governments, cities, institutional investors and energy companies are leading players in the slow but inevitable transition to a lower-carbon global economy. Clean air initiatives, tighter environmental regulations, support for clean energy technologies, carbon pricing initiatives and green finance mechanisms are prompting a range of energy transition pathways.

See Climate change, Technology

Evolving energy business models

Decentralisation is increasing consumer options for sourcing and managing energy. As a result, traditional utilities may need to change their business models to respond to the competitive pressures associated with distributed solar PV systems, new storage technologies and microgrids.

See Technology, Cyber resilience , Workforce

Technology as enabler and disrupter

New technologies such as the Internet of Things, robotics, and autonomous vehicles are changing the world faster than ever and blurring the lines between industries. But new business opportunities – even whole industries – are also presenting.

See Climate change, Technology,Cyber resilience, Workforce

Smart systems

The world is entering the fourth industrial revolution; a computing revolution which has Artificial Intelligence (AI) and machine learning as its cornerstones. Traditional business models are being challenged by new market entrants that have embraced these technologies.

See Technology

Data privacy and security

An exponential rise in the use of data has increased the scale and severity of successful cyberattacks. With customers increasingly concerned about how their personal information is protected and used, the financial and reputational cost of a major breach can be significant.

See Technology, Cyber resilience

Electrifying transport and energy

Electric vehicles, smart factories and cities, more efficient heating and cooling systems, and rapidly rising energy demand in the developing world are spurring the electrification of energy systems.

See Climate change, Technology

Changing society

Many developing societies are young and growing, with expanding labour forces and increased consumer spending by millennials. Others, especially in the developed world, are ageing, with negative implications for productivity and government budgets. Social inequality is creating significant uncertainty for business.

See Workforce

Digitally adept and diverse workforce

Given the pace of changes resulting from the energy transition and digitalisation of the energy sector, the workforce must be agile. In addition, social and demographic changes, combined with increasing competition for STEM skills, are driving the need for an inclusive and sustainable workforce.

See Technology, Workforce

Changing role of business

The role of business is changing. Stakeholders increasingly expect organisations to demonstrate how they are creating value for communities and the environment, but not for shareholders alone, and to act ethically in their interactions with governments, suppliers and consumers.

See Climate change, Workforce

Geopolitical uncertainty

Strategic competition between global powers, an increase in protectionism and the continuing re-invigoration of Asian economies are increasing global uncertainty, opportunities and threats. The state of global climate change negotiations creates further uncertainty.

See Climate change, Technology, Workforce

Reporting frameworks and content indices

This document references different reporting guidelines and frameworks to ensure reporting is comprehensive and aligns with international best practices. CLP recognises a diversity of methodologies are used around the world to measure the sustainability performance of organisations. The Group welcomes the opportunity to benchmark itself against these well-developed frameworks.

Global Reporting Initiative (GRI)

- The GRI is an international independent organisation which provides widely used standards for sustainability reporting.
- This report has been prepared in accordance with the GRI Standards: Core option. It also reports on the GRI G4 Electric Utilities Sector Disclosures. These are disclosures that cover key aspects of sustainability performance which are meaningful and relevant to the Electric Utility sector. CLP has been reporting with reference to the GRI reporting framework since 2007 and has adopted the GRI Standards for the fourth year since it was launched in 2016.

Download the GRI content index

International Integrated Reporting Council (IIRC)

- The IIRC is a global coalition behind the International <IR> Framework, which has become a widely used guideline for integrated reporting.
- This report applies its guiding principles to illustrate how integrated thinking has been embedded in CLP. In particular, it adopts a forward-looking view and considers the material trends that affect the ability to create value over time.
- CLP's Annual Report has been prepared with reference to this guideline since 2011, and includes a focused discussion of how the Company creates value for stakeholders under different capital structures.

Task Force on Climate-related Financial Disclosures (TCFD)

The TCFD develops voluntary, consistent climate-related financial risk disclosure recommendations for use by companies in providing information to investors, lenders, insurers, and other stakeholders. The recommendations consider the physical, liability and transition risks associated with climate change and what constitutes effective financial disclosures across industries. TCFD covers four main areas of disclosure: governance, strategy, risk management, and metrics and targets. Referencing recommendations by the WBCSD TCFD Electric Utilities Preparer Forum, CLP's climate-related disclosure in these areas has been enhanced in the Annual and Sustainability reports, as well as via CDP – Climate Change.

Read CLP's disclosure in accordance to TCFD

Hong Kong Stock Exchange Environmental, Social and Governance (ESG) Reporting Guide

- In 2019, the Exchange conducted a consultation on Review of the ESG Reporting Guide. The Company has submitted a response in support of the new initiatives for upgrading the disclosure obligations of the existing requirements as proposed in the Consultation Paper. Read the response here.
- Companies listed on the Stock Exchange of Hong Kong (HKEx) are required to meet the ESG Reporting Guide disclosure obligations from financial years commencing on or after 1 July 2020. In this 2019 Sustainability Report and in the Annual Report, CLP has adopted the revised HKEx ESG Reporting Guide published in December 2019. In particular, the materiality assessment process as outlined under the mandatory disclosure requirements has been applied to prioritise CLP's response to the "comply or explain" provisions of the Environmental and Social Aspects.

Download the HKEx content index

Greenhouse gas emissions

- CLP's greenhouse gas (GHG) emissions inventory covers the six greenhouse gases initially specified in the Kyoto Protocol. The Company has also considered the seventh mandatory gas added under the second Kyoto Protocol compliance period, namely nitrogen trifluoride (NF_3), but has deemed it immaterial to operations. In 2019, CLP enhanced its GHG disclosure to also include Scope 3 emissions. Key scope 3 categories are independently assured, and the Group is working towards assuring the total Scope 3 emissions in the future.
- CLP's GHG emissions are reported with reference to: The World Resources Institute (WRI) / World Business Council for Sustainable Development (WBCSD) GHG Protocol, the Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (2006), the International Standard for GHG Emissions ISO 14064, and relevant local statutory guidelines where applicable.
- To facilitate implementation, in 2007 CLP developed the first version of the Group-wide GHG reporting guideline which referenced the guidelines above. This reporting guideline is reviewed in accordance with CLP practice at least every three years.

Financial data

All financial data in this report is consistent with the figures published in the audited financial statements of the 2019 Annual Report. These financial statements were prepared in accordance with the Hong Kong Financial Reporting Standards (HKFRS) issued by the Hong Kong Institute of Certified Public Accountants (HKICPA) and the requirements of the Hong Kong Companies Ordinance (Cap.622).

Reporting scope and data verification

GRI reference: 102-50, 102-51, 102-52

This report covers the CLP Group's sustainability performance for the calendar year ending 31 December 2019. It is published at the same time as the Integrated Annual Report. The previous report was published in March 2019.

GRI reference 102-45, 102-48, 102-49

CLP reviews its reporting scope regularly to ensure the material impact of the Group's overall portfolio is covered. In 2019, the reporting scopes of the following data points have been adjusted:

- **Employees:** part-time employees are covered in employee metrics reflecting the expectation of increasingly flexible working arrangements in the future.
- **Health and Safety, Environmental (HSE):** any assets that have been operating during the year are included in the reporting scope. In 2019, additions to the reporting scope include the Laizhou II wind farm and Meizhou solar farm in China; Newport and Jeeralang power stations in Australia; Indian wind farms (Andhra Lake, Bhakrani, Chandgarh, Harapanahalli, Jath, Khandke, Mahidad, Samana I & II, Saundatti, Sipla, Tejuva and Theni I & II) and solar farms (Gale, Tornado and Veltoor).

  The HSE data of Satpura Transco Private Limited (STPL) transmission network, acquired by CLP India in November 2019, were not included in the 2019 data points, but will be included in the 2020 reporting cycle. Environmental data of Paguthan power station, the power purchase agreements (PPA) of which expired in December 2018, were not included.
- **Climate Vision 2050:** while CLP continues to report on carbon intensity based on equity, the Company tracks its performance based on equity plus long-term capacity and energy purchase to reflect more holistically on the developments of generation capacity from other sources.

See CLP's portfolio changes for the year 2019 >

Limited assurance is provided by PricewaterhouseCoopers (PwC) on a selected set of environmental, social and governance-related Key Performance Metrics for this report in accordance with International Standard on Assurance Engagements 3000 (Revised), ***Assurance Engagements other than Audits or Reviews of Historical Financial Information***, and, in respect of greenhouse gas emissions, International Standard on Assurance Engagements 3410, ***Assurance Engagements on Greenhouse Gas Statements***.

Below is the definition of the Company boundary for each of the main categories of data included in this report. Please refer to the CLP 2019 Annual Report for more details on the entities included in the consolidated financial statements.

Governance	Includes people employed by CLP entities and their subsidiaries. It does not include non-CLP employees of joint ventures, joint operations or associates.
Finance	Selected financial figures are extracted from the Annual Report and the consolidated financial statements of CLP Holdings Limited and its subsidiaries (the Group) which is in accordance with Hong Kong Financial Reporting Standards (HKFRS) issued by the Hong Kong Institute of Certified Public Accountants (HKICPA). For a detailed description of the financial reporting scope, please refer to the Significant Accounting Policies – Consolidation and Equity Accounting on pages 229-230 of the 2019 Annual Report.
People	Includes people employed by CLP entities and their subsidiaries. It does not include non-CLP employees of joint ventures, joint operations or associates.
Safety	Includes power generation assets, transmission and distribution infrastructure, coal mines, fuel storage facilities and offices: · That are majority owned by CLP or under CLP's operational control, defined as full authority to implement CLP's operating policies; and · That are under construction or in operation during the reporting year. 100% of the performance data for in-scope assets is reported without adjustment based on CLP's equity share, unless otherwise stated.

Environment – Resource use, air emissions, fuel use and environmental compliance

Includes power generation assets, transmission and distribution infrastructure, coal mines and fuel storage facilities:

- That are majority owned by CLP or under CLP's operational control, defined as full authority to implement CLP's operating policies; and
- That are in operation during the reporting year; and
- That pose material impact to the environment.

100% of the performance data for in-scope assets is reported without adjustment based on CLP's equity share, unless otherwise stated.

GHG emissions (on an equity basis)

1. **Scope 1 CO_2e**

   Includes power generation assets, transmission and distribution infrastructure, coal mines and fuel storage facilities:

   – That are owned by CLP, where assets are included on an equity basis (i.e. accounts for the data according to CLP's equity share in the asset); and

   – That are in operation during the reporting year.

2. **Scope 2 CO_2e**

   Includes power generation assets, transmission and distribution infrastructure, coal mines, fuel storage facilities and offices:

   – That are owned or rented by CLP, where assets and offices are included on an equity basis (i.e. accounts for the data according to CLP's equity share in the asset); and

   – That are in operation during the reporting year.

3. **Scope 3 CO_2e - Category 1a: Purchased goods and services (products)**

   Includes the upstream emissions of EnergyAustralia's natural gas retail business, covering the emissions from upstream gas production and transmission, and distribution leakage in the state pipeline systems.

4. **Scope 3 CO_2e - Category 3: Fuel- and energy-related activities**

   Includes the upstream emissions of purchased fuels and electricity for CLP's power generation. In addition, it includes the direct emissions and upstream emissions from generation of purchased electricity that is sold to CLP's customers.

   The upstream emissions of purchased fuels and electricity for CLP's power generation include assets:

   – That are owned by CLP, where assets are included on an equity basis (i.e. accounts for the data according to CLP's equity share in the asset).

   The direct emissions and upstream emissions from generation of purchased electricity that is sold to CLP's customers include:

   – Generation assets whose capacity and energy are purchased by CLP to meet customer demand, where the purchase agreement duration is at least 5 years and where the capacity or energy purchased is no less than 10MW; and

   – The net electricity purchased by EnergyAustralia from the Australian Energy Market Operator (AEMO) in Australia.

5. **Scope 3 CO_2e - Category 11: Use of sold products**

   Includes the downstream emissions of EnergyAustralia's natural gas retail business, covering the emissions from combustion of natural gas supplied to the customers.

GHG emissions (on an operational control basis)

Includes power generation assets, coal mines or fuel storage facilities:

- That are majority owned by CLP or under CLP's operational control, defined as full authority to implement CLP's operating policies; and
- That are in operation during the reporting year; and
- That pose material impact to the environment.

100% of the performance data for in-scope assets is reported without adjustment based on CLP's equity share, unless otherwise stated.

Climate Vision 2050

Operations – Generation capacity, energy sent out

Data are consolidated on an equity basis with two variations:

1. **Equity basis**

   Includes power generation assets:

   - That are owned by CLP, where assets are included on an equity basis (i.e. accounts for the data according to CLP's equity share in the asset); and
   - That are under construction (for generation capacity only) or in operation during the reporting year.

2. **Equity plus long-term capacity and energy purchase basis**

   In addition to (1) above, this scope includes the power generation assets whose capacity and energy are purchased by CLP to meet customer demand where:

   - Purchase agreement duration is at least 5 years; and
   - Capacity or energy purchased is no less than 10MW.

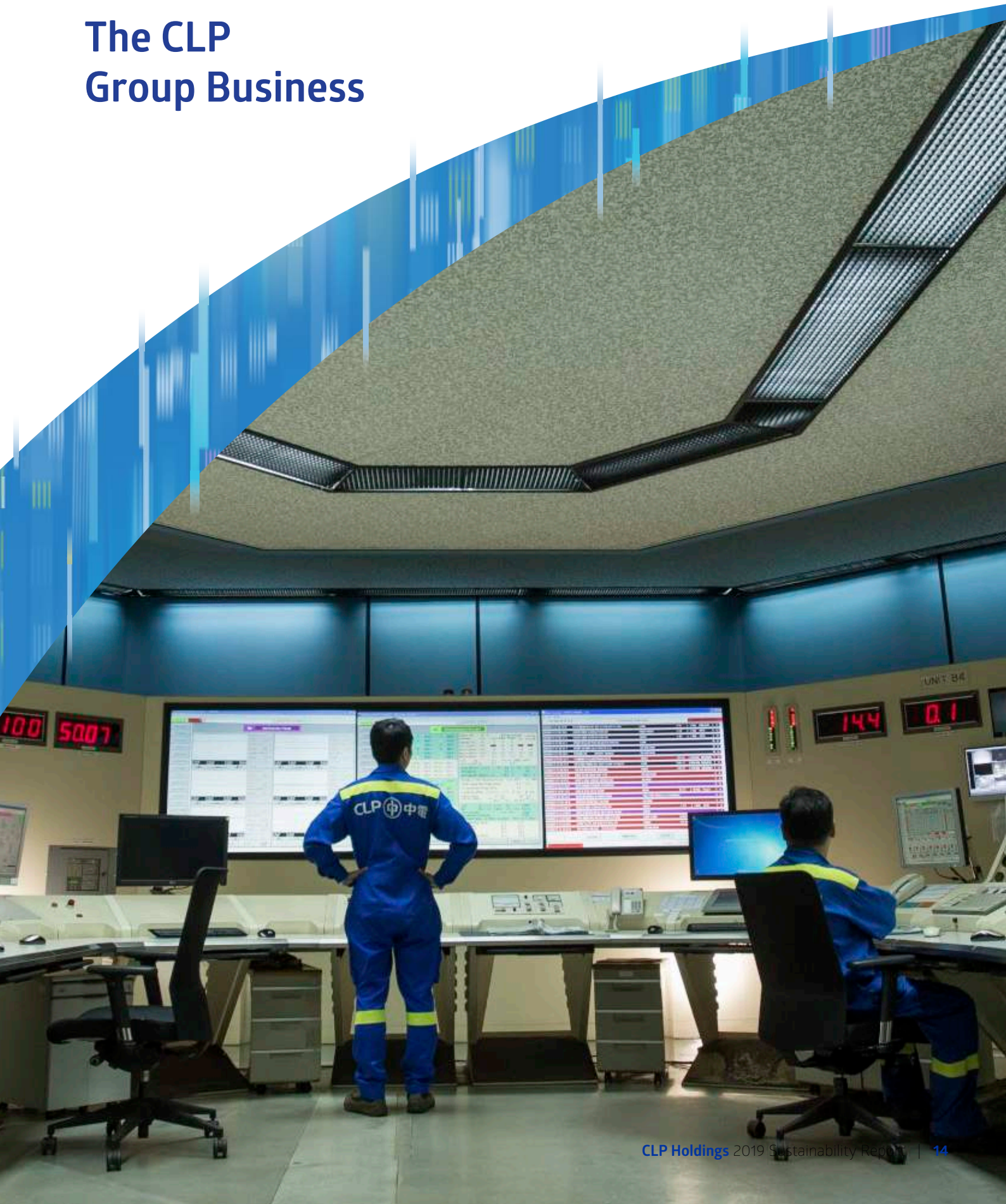
CLP Power Hong Kong carbon emissions intensity of electricity sold

Includes power generation assets involved with the delivery of electricity to CLP Power Hong Kong customers, and:

- The CO_2 and CO_2e emissions are from generation assets in Hong Kong only (as power generation from the nuclear assets does not result in significant carbon emissions); and
- The kWh is from the total electricity sales for CLP Power Hong Kong.

Independent assurance statement

The CLP Group Business



The CLP Group business

Building a Utility of the Future

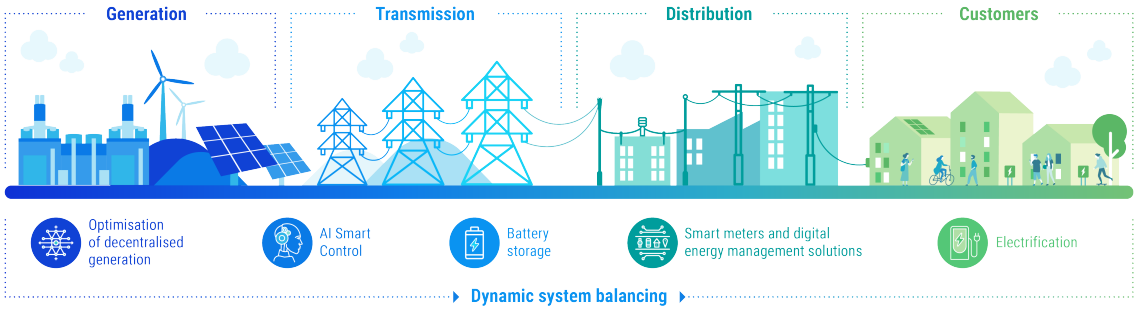
CLP Purpose

To power the sustainable development of communities in which CLP operates by providing reliable and affordable electricity to customers with minimal impact to the environment.

CLP Strategy

To leverage new and emerging technologies to aid the progressive decarbonisation of the CLP portfolio, empower customers in making better energy choices, enhance performance of operations, and to evolve and grow CLP's business along with the transition.

CLP Business model



Where CLP operates

Hong Kong | Mainland China | India | Southeast Asia and Taiwan | Australia

Purpose

The history of CLP mirrors the economic development of Hong Kong and the growth of the Asia-Pacific region. CLP cares not only about shareholders, but also about the communities where it operates.

As an operator and investor in the energy sector in Asia-Pacific for over a century, CLP has been at the forefront of major transformations in the industry and how it serves the markets of the region. In the company's home market of Hong Kong, where CLP was incorporated in 1901, the city has been transformed from a bustling port to a dynamic metropolis on the world stage.

Although the circumstances and CLP's role in each of its markets differ, the Group has an unwavering commitment to its communities:

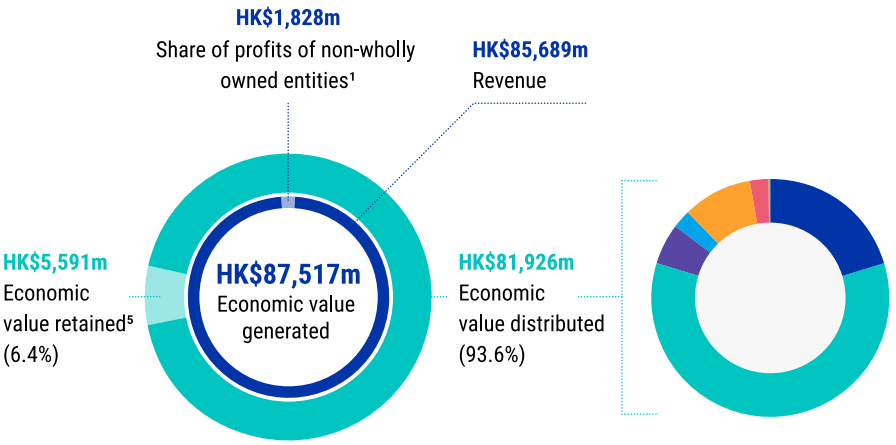
"CLP aims to power the sustainable development of communities in which we operate by providing reliable and affordable electricity to our customers with minimal impact to the environment."

In delivering service, CLP values guide the company's behaviour:

"CLP cares for people, the community and the environment. We care about performance, respect laws and standards and value innovation and knowledge."

The pivotal role of electricity for economic growth and human development cannot be over-emphasised. It is essential for modern infrastructures such as water supply, healthcare, transport and digital technology. Worldwide, 9 out of 10 people now have access to electricity. As CLP operates primarily in developed or emerging economies where access to electricity is almost universal, stakeholders expect more than simply the delivery of safe and reliable energy services.The Company strives to ensure that its electricity is affordable and that it minimises the impact on the environment, in particular greenhouse gas emissions.

CLP emphasises value creation over the long term rather than the short term. The Group's purpose is to do business in a way that also helps serve the communities in which it operates. The value created by the Group is shared amongst different stakeholders in society: in 2019, 93.6% of the economic value CLP generated was distributed to stakeholders, including employees, suppliers and contractors, lenders, shareholders, government and the community at large.



HK$16,712m
Fuel Costs
(Suppliers and contractors)

HK$48,654m
Other operating costs
(Suppliers and contractors)

HK$4,535m
Staff expenses[2] (Employees)

HK$2,033m
Finance costs[3] (Lenders)

HK$7,782m
Dividends (Shareholders)

HK$2,189m
Taxes[4] (Governments)

HK$21m
Donations (Community)

1 Includes share of results (net of income tax) from joint ventures and associates netted with earnings attributable to other non-controlling interests, which represented CLP's share of economic value created together with its business partners.

2 Another HK$1,365 million (2018: HK$1,338 million) of staff costs incurred were capitalised.

3 Finance costs are netted with finance income and include payments made to perpetual capital securities holders. In addition, finance costs of HK$323 million (2018:HK$278 million) were capitalised.

4 Represents current income tax but excluding deferred tax for the year.

5 Represents earnings attributable to shareholders (before depreciation, amortisation and deferred tax) for the year retained.

Strategy

Decarbonisation and digitalisation are at the core of CLP's business strategy, and sustainability is fully integrated into this strategy.

GRI reference: 102-47

The pace of change in the energy industry will continue to accelerate, and disruption will increasingly become the new normal. The linear, traditional electricity sector value chain which stood for decades has morphed into an interconnected, multidirectional mesh of opportunities. Incorporating digital solutions into the core of the energy business will be necessary to master this increasing complexity.

"Against the backdrop of climate change, progressively decarbonising our asset portfolios, empowering our customers in making better energy choices, enhancing performance of our operations, and evolving and growing our business along with the energy transition are fundamental for CLP's strategy."

The Group is committed to a gradual retirement of its coal assets by 2050, and will no longer invest in new coal generation assets. This evolution creates the need to replace the revenue from coal-based generation over time. To this end, CLP is actively pursuing opportunities in clean energy, transmission and distribution, as well as in new energy services.

As part of the transition to a Utility of the Future, CLP has placed sustainability at the centre of its operations, ranging from decarbonisation, adoption of digital technology to talent attraction. As such, CLP does not have a stand-alone sustainability strategy but rather a business strategy to which sustainability is intrinsic.

The table below summarises the topics that are most material to CLP and the reasons why.

Read about other megatrends that are changing CLP's operating environment >

It is clear from generations of experience that it takes time and effort to build and maintain the trusting relationships corporates have with their communities. Across CLP's entire business, the Company seeks to make a contribution to society by leveraging the trust that has been built, and support and collaborate with like-minded organisations to find solutions to mutual challenges together.

Material Topic	Why this is material	How CLP responds
Responding to climate change	Climate change is unarguably the biggest threat CLP is facing. The electric utility industry offers great opportunity to slow down climate change by coupling electrification and decarbonisation: a 2018 report from the Energy Transition Commission projects that increasing the share of electricity to 60% of the total energy mix (up from the current 20%), would help achieve net zero emissions by around 2060.	Read more
Harnessing the power of technology	Digital technologies including artificial intelligence, IoT and big data offer energy companies new ways to enhance performance and serve customer needs. As more renewable energy is introduced into the system, its intermittent nature could pose challenges to system stability and reliability. Digital platforms offer a solution by balancing dynamic customer demand against different generation profiles to optimise cost efficiency, reliability and environmental performance.	Read more
Reinforcing cyber resilience and data protection	CLP's operations are becoming more digital and more information is stored in cyber space. This makes the organisation more vulnerable to cyberattacks. Effective cyber defence becomes fundamental to protect the business. The Group is expected to detect and respond to any incident promptly, and resume normal operations and minimise inconvenience to its customers.	Read more
Building an agile, inclusive and sustainable workforce	Digitalisation and decarbonisation of the energy sector, together with intensifying demographic and labour supply issues and social and political uncertainties, present significant workforce opportunities and challenges. CLP must ensure business continuity through managing generational knowledge transfer; attract and retain the new skills, talents and mindsets of a more diverse workforce; build greater organisational agility; and meet increasing social expectations as a responsible employer.	Read more

Business Model

As a Group, CLP's main focus is on electricity services and its products span the entire value chain from power generation to transmission and local distribution, to gas and electricity retail services supported by smart energy services.

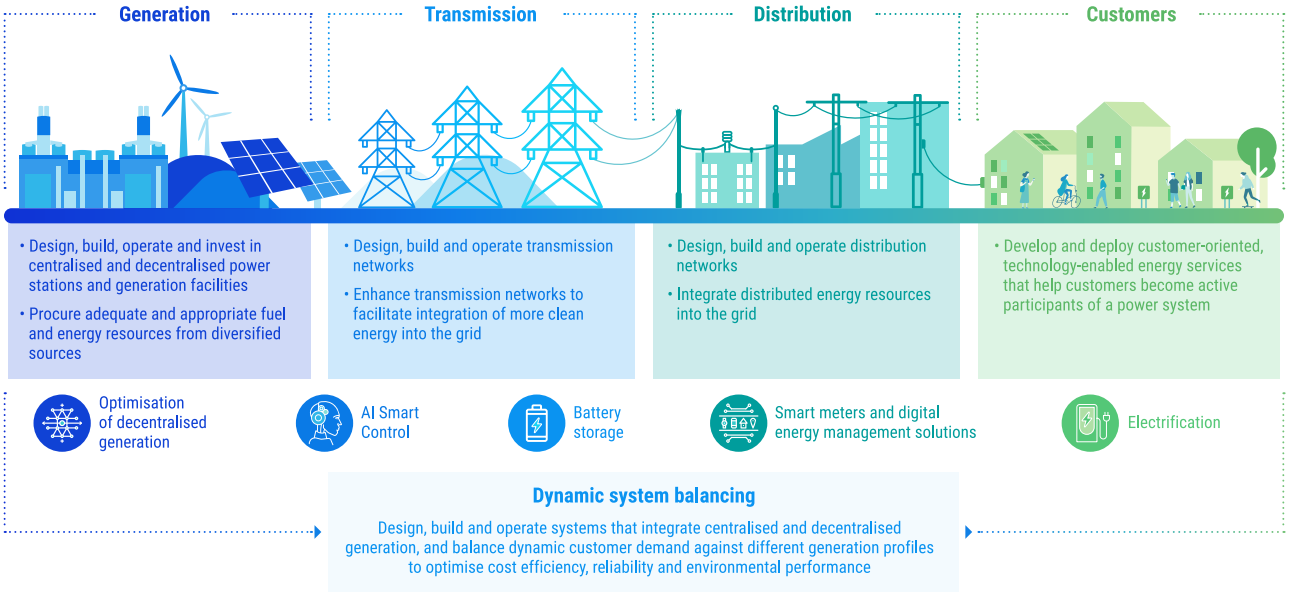
CLP Holdings Limited is headquartered in Hong Kong, where it is listed on the Hong Kong Stock Exchange. Hong Kong is where the largest business operates under the brand of "CLP Power Hong Kong". There are additional business units in Mainland China, India (under the brand of "CLP India"), Southeast Asia, Taiwan and Australia (under the brand of "EnergyAustralia").

In these diverse markets Group companies play different roles across the electricity value chain, depending on local circumstances and market characteristics. Much of the business outside Hong Kong lies in the production of electricity, and all of the business units own sizable generation assets. CLP's generation fleet has a balanced portfolio consisting of coal, gas, nuclear, wind, hydro and solar power facilities. The Group also operates flexible generation assets to manage intermittent and peak demand as well as storage solutions.

In 2019, CLP India entered into the power transmission sector. Through acquisition, 240 km of transmission line has been handed over to CLP India's portfolio in 2019 and the remaining 575 km will be handed over in 2020..

Through the retail businesses in Hong Kong and Australia, CLP serves both commercial and residential customers. Wholesale customers include grid companies in Mainland China and electricity distribution companies and intermediaries in India, which purchase power directly from generating assets.

Electrification and digitisation are changing the electric utilities industry. To capture the opportunities they present, the Group is also deploying various energy services such as battery storage, smart meters and other digital energy management solutions that enable system balancing and the deployment of additional renewable resources.



Portfolio

As of 31 December 2019, the CLP Group companies had 7,960 full-time and part-time employees and a market capitalisation of HK $207 billion. The revenue in 2019 amounted to HK $85,689 million.

CLP's business comprises over 16,000 kilometres of transmission and distribution lines, energy retail activities that serve about 5.15 million electricity and gas customer accounts, and a diversified portfolio of generation assets across five Asia-Pacific markets, using coal, gas, nuclear, wind, hydro and solar. In addition to generation facilities where CLP holds equity interests, the portfolio includes long-term capacity and energy purchase arrangements.

The equity generation capacity in operation and under construction across the Asia-Pacific region stood at 19,238MW as at the end of 2019, which was supplemented by an additional 4,777MW of long-term purchases.

The Group's total electricity sent-out on an equity plus long-term capacity and energy purchase basis decreased to 88,573GWh in 2019 (from 92,333GWh in 2018). The total generation capacity increased from 19,108 MW in 2018 to 19,238 MW in 2019 on an equity basis – and 23,705MW to 24,015MW on an equity plus long-term capacity and energy purchase basis.

Portfolio changes

Under the Climate Vision 2050, CLP is committed to growing its investment in non-carbon emitting energy projects across the Group. In 2019, the Group continued to make significant progress: Generation from non-carbon energy sources contributed 24% of operating earnings (before unallocated expenses), amounting to HK$2,948 million, while capital investments (on accrual basis)[1] in non-carbon energy sources was 8% of total capital investment or HK$967 million.

In addition, non-generation related activity from transmission, distribution, retail and Others delivered 44% of operating earnings, or $5,482 million, while capital investment in these asset types amounted to HK$5,498, representing 46% of total capital investment.

Below are the main changes in the portfolio this year:

- upgrade of gas turbines in Hong Kong Black Point Power Station (25MW addition)
- upgrade of gas turbine in Hallett Power Station, Australia (30MW addition)
- Coleambally Solar Farm (105MW) and Bodangora Wind Farm (67.8MW) in Australia commenced operations in January and April respectively
- acquisition of remaining equity of Veltoor and Gale wind farms (45.9 equity MW) and commissioning of a new solar farm in China (36.13 equity MW)
- acqusition of 815 km of transmission assets in Inda, of which 240km of trasmission line has been handed over to CLP India's portfolio in 2019, and the remaining 575 km will be handed over in 2020; CLP India has also successfully bid for a 250MW wind project at Sidhpur

[1] Capital investments include additions to fixed assets, right-of-use assets and intangible assets, investments in and advances to joint ventures and associates, and acquisition of business.

Generation

Coal | Gas | Nuclear | Wind | Hydro | Solar | Other

Other Energy-related Business

Transmission & Distribution Network | Customer Service | Other

Renewable Energy and Energy Storage Long-term Purchase

Wind | Solar | Storage

Assets wholly or majority-owned and/or where CLP has majority long-term purchase agreements

Assets in which CLP has no majority shareholding and/or majority long-term purchase agreements

This map is for graphical illustration only. Please refer to the 2019 Annual Report for details of CLP's equity share and long-term purchase arrangements.

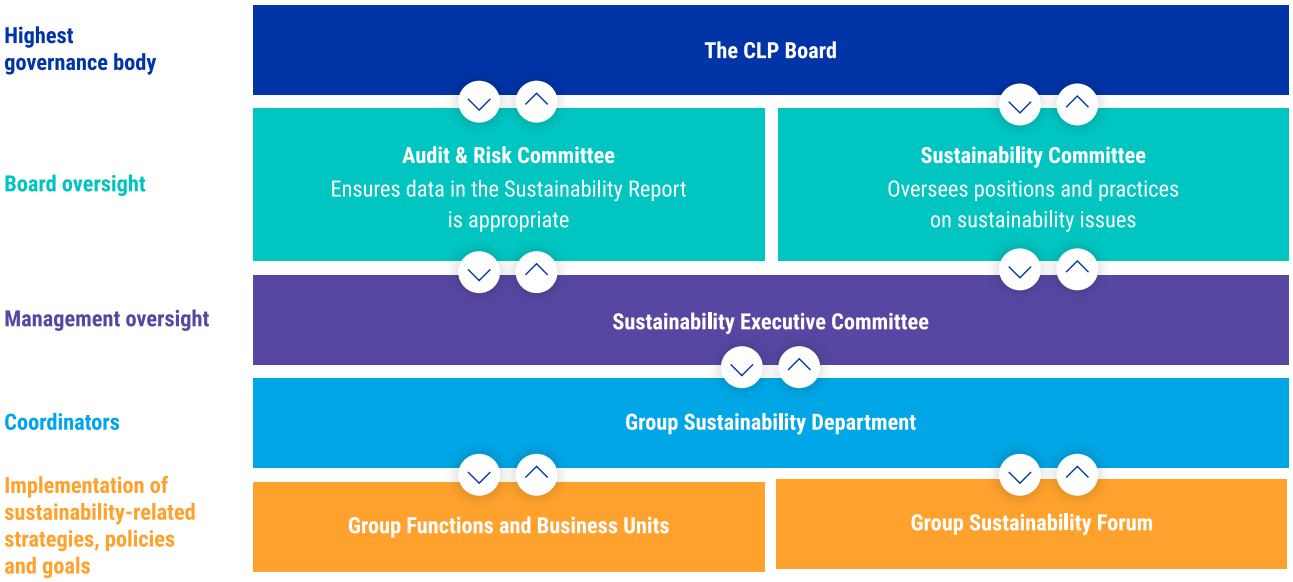
Find out more about CLP's assets and services

View the list of CLP's assets in the Annual Report

Sustainability governance

Overview

A strong governance framework is key to ensuring that the sustainability issues CLP faces are incorporated into the corporate agenda.



Board oversight

The CLP Board has overall responsibility for CLP's ESG strategy and reporting. The governance of sustainability is integrated into the corporate governance structure throughout the Group – from Board-level committees to management-level Group functions and business units.

As one of the Board Committees, the Sustainability Committee has a primary role in overseeing the management of the Group's sustainability issues and is supported by the Sustainability Executive Committee. The Audit & Risk Committee retains oversight and responsibility for short-term business risks and for the assurance of sustainability data.

Read more on Corporate Governance

In 2019, the two committees as well as the Board spent significant time in consideration of the impact of climate change on CLP:

- **Climate Vision 2050** – This included the consideration of how CLP should be managing its portfolio and projects in light of the risks and opportunities brought by climate change. In reviewing the revised Climate Vision 2050 publication, the Sustainability Committee and the Board not only considered the drafting of the documentation itself, but also the implications, both short term and long term, for the Group's underlying portfolio and projects.
- **Task Force on Climate-related Financial Disclosure (TCFD)** – Another important climate-related work stream was the TCFD disclosures and scenario analysis, where the Sustainability Committee studied and examined the ongoing work in this area. The Committee recognised that this remained a developing area and supported management's work with other electricity utilities and consultants to formulate accurate and meaningful climate-related financial disclosures. The Audit & Risk Committee was briefed on the preparatory work that CLP was doing in the area of the TCFD and the proposed engagement of a consultant to assist CLP in developing the relevant scenarios which would form the basis of the disclosures.

Sustainability Committee

The Sustainability Committee oversees positions and practices on sustainability issues, principally in relation to social, environmental and ethical matters that affect shareholders and other key stakeholders.

The Committee's objective is to oversee management and advise the Board on matters required to enable:

- the CLP Group to operate on a sustainable basis for the benefit of current and future generations;
- sustainable growth by maintaining and enhancing CLP Group's economic, environmental, human, technological and social capital in the long term; and
- the effective management of CLP Group's sustainability risks.

In particular, the Committee reviews and evaluates the adequacy and effectiveness of CLP Group-level frameworks including the Sustainability Framework, Climate Vision 2050, HSSE Framework, and the Responsible Procurement aspects of CLP's Procurement Framework.

Terms of Reference of the Sustainability Committee

Between 1 January 2019 and the date of this report, the Committee met four times (including three times in 2019 and once in 2020). Below is a summary of how the Committee spent its time during the periods.

Read the full report on the Sustainability Committee's activities for 2019

Looking ahead, the Committee will strengthen its role and place a stronger emphasis on overseeing the impact on the Group's strategy of longer-term emerging sustainability issues. This will ultimately support the CLP Group's objective to operate on a sustainable basis for the benefit of current and future generations.

Overview of work conducted by the Sustainability Committee in 2019

	2019			2020
	February	September	November	February
Sustainability matters – risks, opportunities and emerging issues	✓	✓	✓	✓
Sustainability reporting / ESG indices performance	✓	✓	✓	✓
Health, Safety, Security and Environment		✓		
Community investment activities	✓			✓

Audit & Risk Committee

A key responsibility of the Audit & Risk Committee (ARC) is to maintain oversight of CLP's financial control, risk management and internal control processes, by ensuring that adequate systems are in place and followed.

Risks are managed at both the strategic and operational levels to support the long-term sustainability of growth objectives, while at the same time supporting the operational needs of the current business.

In relation to sustainability issues, the ARC is responsible for ensuring the data in the Sustainability Report is appropriate, including assurance of the accuracy of metrics and reporting. CLP's independent auditor is also responsible for assuring key ESG data, and their findings and observations are presented to senior management and the Board through the ARC.

Terms of Reference of the Audit and Risk Committee

Read the full report on the ARC's activities for 2019

Management roles

Sustainability Executive Committee

The Sustainability Executive Committee (SEC) has the strategic responsibility to assess and manage sustainability issues.

The SEC is chaired by the CEO as part of the role's executive-level responsibility for economic, environmental and social matters. Set up in 2016, it comprises the corporate senior management team of:

- Mr Richard Lancaster (Chief Executive Offer), Chairman, also Chairman of the Sustainability Committee;
- Ms Quince Chong (Chief Corporate Development Officer), also a member of the Sustainability Committee;
- Mr Geert Peeters (Chief Financial Officer);
- Mr David Smales (Chief Operating Officer), who was appointed in October 2019 following the retirement of Mr Derek Parkin in September 2019;
- Mr David Simmonds (Group General Counsel & Chief Administrative Officer); and
- Ms Eileen Burnett-Kant (Chief Human Resources Officer), who was appointed in September 2019 following the retirement of Mr Roy Massey in June 2019.

Full biographies of the members are set out on the Group's website

The SEC steers the sustainability strategy of the Group and approves relevant deliverables. In 2019, the Committee convened six times, including before each Sustainability Committee meeting. These meetings provide a platform for the executive team to initiate or develop strategic sustainability projects, shape and receive progress updates on current projects and to engage in strategic discussions on emerging issues. Four of the meetings in 2019 reviewed and advised on strategic sustainability projects, and the other two meetings were designed as special topic workshops to deep dive into emerging issues. Meetings are facilitated by CLP's Director – Group Sustainability.

Key themes discussed in 2019 included:

- climate change-related risks and opportunities, and CLP's response to the TCFD recommendations, including the development of climate scenarios for further analysis;
- Climate Vision 2050 and CLP Group's strategy in decarbonisation, including the strategic decision not to add additional coal-fired power generation assets to the CLP portfolio and the commitment to convert CLP's vehicle fleet to electric under EV100;
- enhancement of labour practices amongst the workforce and supply chain;
- response to ESG-related public consultation;
- performance on key sustainability indices and how benchmarking results can drive improvements in operational performance;
- preparation and development of the Sustainability Report, including reporting standards and the assurance of key metrics.

The CEO and CFO also hold management responsibilities for the assurance of ESG data, and jointly sign off the General Representation Letter connected with the assurance process.

Group Sustainability Department

The Group Sustainability Department (GSD) is led by Director – Group Sustainability and delivers regular reports to and seeks guidance from the SEC and Sustainability Committee.

GSD aims to embed sustainability into existing processes and systems by informing the development of the business strategy and planning processes. The department monitors sustainability issues and informs the SEC and Sustainability Committee of emerging risks and opportunities. It leads corporate reporting on sustainability and facilitates identifying improvement areas for operational performance. GSD also manages the Group's climate change strategy, including reporting the progress on Climate Vision 2050 and TCFD implementation.

GSD is also tasked with developing capacity within the organisation to better manage emerging sustainability risks and opportunities material to the business. It communicates and works closely with other Group functions and business units via the Group Sustainability Forum; a quarterly meeting to share experiences in operationalising sustainability across the Group and to communicate CLP's sustainability vision internally. Awareness raising activities and events are also being held regularly.

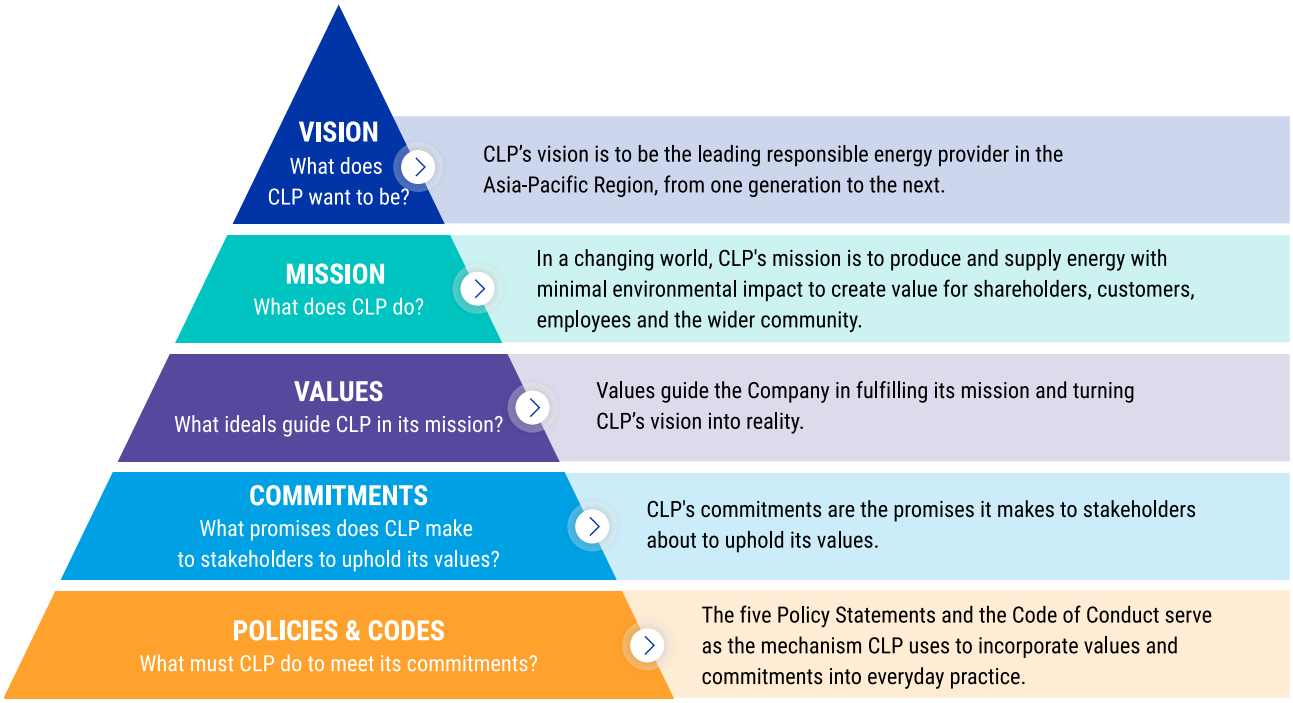
Guiding principles

Value Framework

CLP's Value Framework reflects the moral compass of the Company, articulating the Group's values, as well as its vision, mission and commitments to stakeholders.

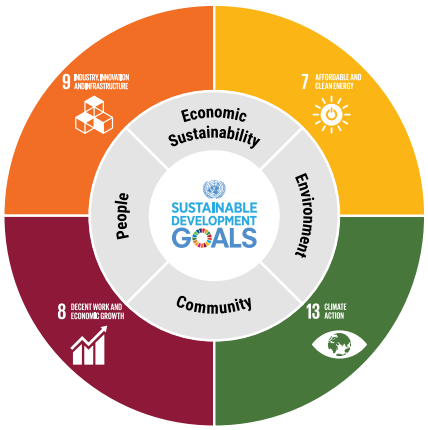
Holding true to a set of deep-rooted and enduring values is particularly important in a fast-changing environment. It helps navigate an ethical way forward in both good and turbulent times. When making any business decision, CLP is guided by the simple idea of 'doing the right thing'. It has helped establish mutually beneficial relationships with stakeholders, avoided the unnecessary risks that arise from short-termism, and has been proven to support CLP's success from one generation to the next.

See CLP's Value Framework and Code of Conduct



SDG Alignment

CLP has prioritised four of the 17 SDGs considered most relevant, and where the Group can make a significant impact.



In 2015, inspired by the announcement of the United Nations Sustainable Development Goals (SDGs), CLP developed its set of Sustainability Principles to guide the Group's activities and better align business objectives with value creation. These Principles cover four focus areas: community, people, environment and economic sustainability, and the prioritised SDGs are aligned with these areas.

Read the CLP Sustainability Principles

In 2019, CLP joined the WBCSD SDG Sector Roadmap working group for electric utilities. This project aims to identify key areas under the SDGs that are of the highest relevance and outlines how the utility sector can best achieve the SDGs. CLP aims to integrate key findings from this work into its operational performance and report accordingly in future cycles.

SDG 13 – Climate Action and SDG 7 – Affordable & Clean Energy

Climate Vision 2050, is the CLP Group's commitment to responding to climate change. CLP's decarbonisation and clean energy targets are in support of SDG 13 and SDG 7 respectively.

- **Decarbonisation targets:** a set of decadal carbon intensity reduction targets spanning out to 2050;
- **Clean energy targets:** renewable and non-carbon emitting capacity targets for 2020 and 2030.

Find out more about Climate Vision 2050

Read more on Responding to climate change

SDG 8 – Decent Work & Economic Growth

SDG 8 makes specific reference to equal pay for work of equal value, which is a target CLP has set to support internal gender diversity initiatives.

CLP has also developed a set of targets to help widen the pipeline of female employees to support the Group's future business strategy:

- **Women in Leadership (WIL) target:** Achieve gender balance in leadership positions by 2030 against a 2016 baseline of 22%;
- **Women in Engineering (WIE) target:** 30% of engineers to be female by 2030 compared to a 2016 baseline of 9%;
- **Ensuring equal pay for work of equal value** is maintained in all CLP Group businesses, that any gender pay equity gap is eliminated, and that CLP meets all relevant local compliance and disclosure standards.

Read more on Building an agile, inclusive and sustainable workforce

SDG 9 – Industry, Innovation & Infrastructure

Digitalisation is core to the CLP business strategy, underscoring commitment to Innovation under SDG 9.

As CLP's digitalisation journey evolves and the Group Innovation function begins to capitalise on the investments made into the changing global energy industry, the Group continues to review relevant metrics and targets which measure progress in support of SDG 9.

Read more on Harnessing the power of technology

Key sustainability ratings and awards

Key sustainability ratings

CLP has maintained its standing in key sustainability ratings. The performance scores received in 2019 were based on 2018 calendar year performance data.

Dow Jones Sustainability Asia Pacific Index

The DJSI is a globally recognised index which includes companies from a wide spectrum of industries. Inclusion in DJSI is based on a company's score in the RobecoSAM's Sustainability Assessment Methodology. CLP has been a constituent of the Dow Jones Sustainability Asia Pacific Index (DJSI Asia Pacific) and Dow Jones Sustainability Asia Pacific 40 Index (DJSI Asia Pacific 40) since the launch of both indices in 2009.

	2019	2018[1]	2017
Company score	73	69	70
Electric utilities industry average score	45	46	50
Asia-Pacific average score	64	60	67

1 The introduction of a revised scoring methodology means the result cannot be compared directly with that of the previous year.

Hang Seng Corporate Sustainability Index

The Hang Seng Corporate Sustainability Index helps the market better understand CLP's sustainability performance relative to other Hong Kong and Mainland Chinese companies listed on the Stock Exchange of Hong Kong. CLP has been listed on the Hang Seng Corporate Sustainability Index and Hang Seng (Mainland China and Hong Kong) Corporate Sustainability Index since their inception in 2010. HKQAA conducts the assessment and provides a rating for assessed companies.

	2019	2018	2017
HKQAA Rating	AA-	AA-	A+

FTSE4Good

The FTSE4Good Index Series is designed to measure the performance of companies demonstrating strong Environmental, Social and Governance (ESG) practices. CLP was included in the FTSE4Good Index in June 2018.

	2019	2018	2017
Overall Scores	3.7	4.0	3.3

2019 Constituent MSCI ESG Leaders Indexes

MSCI ESG Leaders Indexes

CLP has been included in the MSCI ESG Leaders Indexes (previously MSCI Global Sustainability Indexes) since 2015.

	2019	2018	2017
Overall Scores	AA	AA	A

CDP

CDP, formerly Carbon Disclosure Project, runs a global disclosure system for companies, cities, states and regions to measure and manage their environmental impacts. CLP has provided data for CDP – Climate Change since its launch in 2002, and currently discloses through the Climate Change and Water initiatives.

	2019	2018	2017
CDP Climate Change Score	B	B	B
CDP Water Score	B-	B	A

Key ESG awards

In addition to being benchmarked by global sustainability indices, CLP has also received awards and recognition over 2019 for its sustainability reporting and performance. These are the key awards which recognised CLP.

Best Corporate Governance Awards – Sustainability and Social Responsibility Reporting Award

Hong Kong Institute of Certified Public Accountants

For the ninth successive year, CLP received a Sustainability and Social Responsibility Reporting Award in the Best Corporate Governance Awards presented by the Hong Kong Institute of Certified Public Accountants.

Hong Kong Sustainability Award and the Sustainability Reporting Award

The Hong Kong Management Association

CLP was bestowed with The Hong Kong Management Association's Sustainability Reporting Award in the general category for the eighth successive year since the award was introduced in 2012. CLP also won a Sustainability Award which recognises organisations that demonstrated due consideration to the economic, social and environmental aspects of sustainability, while achieving good business and organisational performance.

Sustainability Reporting Award – Private Sector and Gold Award

Australasian Reporting Awards

The 2018 CLP Sustainability Report won the Sustainability Reporting Award – Private Sector, along with a Gold Award. Besides, the 2017 Sustainability Report was named the winner of the Joint ARA-Hong Kong Management Association Award for Sustainability Reporting.

BDO ESG Awards

BDO Hong Kong

CLP won the ESG Report of the Year, Best in ESG and Best in Reporting awards in the Large Market Capitalisation category.

Best ESG Materiality Reporting (Large Cap) Award

IR Magazine

CLP won the Best ESG Materiality Reporting (Large cap) Award of IR Magazine Awards, Greater China 2019. This award recognises the achievement of companies that produce clear investor-facing communications about ESG issues that are material to their business.

Sustainability Leaders Award – Mega Large Business, Process Sector

Frost & Sullivan and The Energy and Resources Institute (TERI)

The Award recognises companies that are well equipped to respond to the emerging opportunities and risks resulting from sustainability trends, based on a comprehensive assessment process, involving interviews with senior management and front line staff over a three-day period. CLP India was named the Sustainability Leaders in the Mega Large Business category.

Material Topics

Building a Utility of the Future

Decarbonisation at CLP is fundamental to the Company's business strategy. CLP's governance process enables the Company to manage the increasing impacts of physical climate change and the associated transition risks. Alongside this, digitalisation allows CLP to deploy innovative technical solutions that improve energy efficiency and help to safeguard the company's assets. And underpinning these two trends, CLP is transforming into an organisation that relies on an agile, inclusive and sustainable workforce.

GRI reference: 102-44, 102-47

The following sections contain a discussion of how these material topics relate to the company's value proposition, and how CLP is seeking to address these challenges. For a discussion of how CLP makes use of different capitals to address the challenges and opportunities outlined here, please refer to the Capitals section in the Annual Report.

MATERIAL TOPICS

Responding to climate change

Responding to climate change

Investment in transition enablers

1m+ Smart meters

500+ Electric vehicle charging points

118MW in contributions to demand response programmes

8.7GWh generated through Feed-in Tariff scheme in Hong Kong

Renewable and non-carbon emitting energy capacity

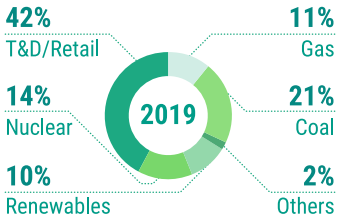
24.9% non-carbon

2020 target: **30% non-carbon**

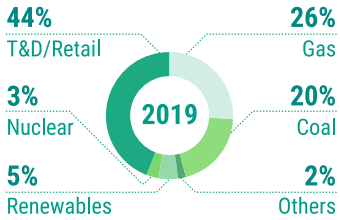
13.7% renewable

2020 target: **20% renewable**

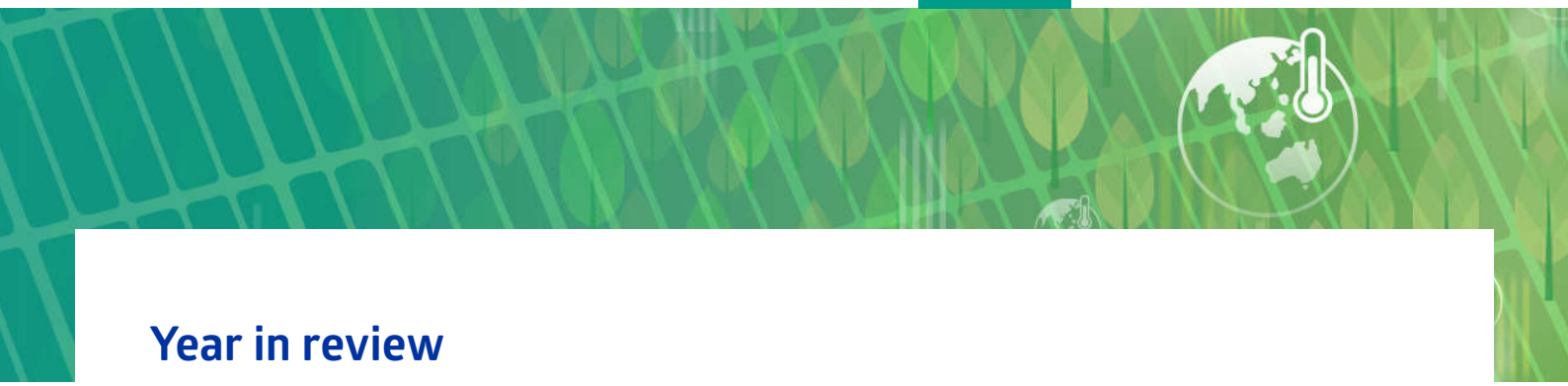
Operating earnings (before unallocated expenses) by asset type



Capital investments (on accrual basis) by asset type



Trajectory of CLP Group's carbon intensity



Year in review

The last year has seen unprecedented pressure on government and business for more ambitious climate action.

The "school strikes for climate" initiated by Greta Thunberg, a determined Swedish teenager, now have a global following of climate activists. Others resorted to different tactics such as the non-violent civil disobedience movement started by Extinction Rebellion. Investors and asset managers have also realised the gravity of the "climate emergency" and are increasingly focused on the materiality of climate-related financial risks to businesses. Pressure on companies to enhance their disclosure in accordance to the recommendations of the Task Force for Climate-related Financial Disclosure (TCFD) has gained significant momentum.

At CLP, mitigating the Group's impacts on climate change is firmly embedded within the business strategy. Board and Senior Management oversight on climate issues is integrated into the organisation's governance and enterprise risk management system. Set in 2007, the Climate Vision 2050 provides the entire CLP Group with a clear trajectory to guide its transition towards a sustainable, low-carbon future, and CLP is firmly committed to SDG 7 and 13 as part of this strategy.

The Group has enhanced its disclosure on climate issues this year and structured the discussion based on the four pillars of the TCFD's recommendations. This will help stakeholders better understand how the Group manages climate-related risks and opportunities, their impact on the business as well as the progress in managing these risks. CLP's Climate Vision 2050 was used as the basis for conducting preliminary scenario analysis to assess the ongoing impact of climate change to the business.

The CLP Group has also enhanced how it measures its climate impact and actions through new quantitative metrics. The Group is now detailing how it will be meeting its 2050 targets going forward, including how much is being invested in different fuel types as well as different energy transition enablers. In 2019, the Group's carbon intensity has decreased to 0.62kgCO_2/kWh, and the proportions of renewable and non-carbon emitting energy of the generation portfolio have increased to 13.7% and 24.9%, respectively. In addition to direct emissions, a comprehensive review of the Group's GHG profile was conducted to measure and manage the carbon footprint along the value chain. For the first time, CLP is disclosing its scope 1, 2 and 3 emissions on an equity basis to provide a more comprehensive overview of its carbon footprint.

The lack of concrete actions from COP25 in Madrid does not impede CLP's ambition to make decarbonisation a reality. To the contrary, CLP will continue to enhance its engagement and partnerships with stakeholders in the transition towards a low-carbon future.

Key metrics

0.62 kgCO_2/kWh

CLP Group's carbon intensity in 2019

Non-carbon emitting energy capacity

Renewable energy capacity

Outlook

The year 2020 will be an opportunity for an interim review of CLP's Climate Vision 2050 and its decarbonisation and clean energy targets.

The lack of significant progress for climate action at COP25 in Madrid may take more time to resolve. Regulatory certainty that supports long-term investment for a low carbon transition is not yet fully in place in many markets. Nevertheless, addressing climate change by decarbonising the Group portfolio will remain a principal focus for CLP's future business development.

CLP is on track to achieve its emission intensity targets, while there remain some challenges in meeting the clean energy targets. Progress has been made in diversifying the Group's portfolio of generation assets by fuel type and geography, but the 2018 strategic partnership with CDPQ in India along with the slower uptake of renewable energy in other key markets has slowed growth in the renewables portfolio in the short term.

The updated Climate Vision 2050 commits the Group not to invest in any additional coal-fired generation assets, and phase out coal from all operations by 2050. There is also a strong commitment to revisit the commitments and targets made under the Vision, and to progressively strengthen them. As a way to track the progress of the targets, CLP will benchmark its ambitions against the globally recognised Science Based Targets initiative backed by the United Nations and accepted internationally.

The decarbonisation of the generation portfolio is only one component in the Group's vision. CLP sees significant growth opportunities in emerging low carbon technologies in transmission and distribution, electric vehicles and smart services.

CLP will also be taking additional steps to further refine its climate scenario analysis, as part of an effort to update the enterprise risk management register on a longer-time horizon. This will enable the enhancement of not only the TCFD-related financial disclosure but also the further integration of climate risks and opportunities into long-term business planning and investment decisions.

Climate Vision 2050

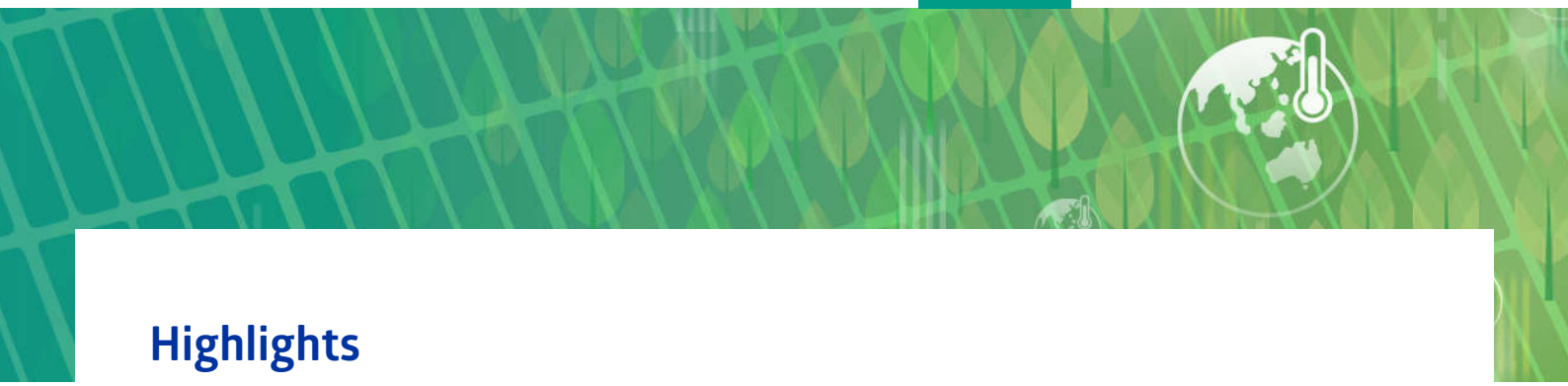
The new publication chronicles how CLP's Climate Vision 2050 has evolved over the years. It is integrated into CLP's strategies on asset portfolio management, guiding the Group in managing climate-related opportunities and risks.

Read more

Response to TCFD

As part of CLP's participation in the WBCSD TCFD Preparer Forum for Electric Utilities, the Company has undergone a comprehensive review of how the recommendations are met and has adjusted its disclosure accordingly.

Read more below



Highlights

CLP's disclosure following TCFD recommendations, the Company's progress against Climate Vision 2050, and their investments that facilitate the transition to a low carbon economy.

Climate-related financial disclosure

By following the recommendations from the TCFD, CLP seeks to disclose transparent, reliable and consistent climate-related information to stakeholders, including capital providers.

In July 2019, the World Business Council for Sustainable Development (WBCSD) published the implementation guide of the TCFD Electric Utilities Preparer Forum. CLP took part in this Forum along with five of its peers to review disclosures and share best practices for the electric utility sector in aligning with TCFD recommendations.

In this year's report, CLP has enhanced further its disclosures in line with what constitutes effective disclosure across the four TCFD areas as recommended by the Forum. Climate change is considered in a holistic way in the business strategy, and is therefore embedded in the governance and management processes and discussed in the relevant sections.

The index table outlines where to find the key elements of how CLP responds to the TCFD recommendations in this report:

Governance	· Sustainability Governance
Strategy	· Climate Vision 2050 (see new publication) · Climate-related scenarios (see below)
Risk management	· Risk Management
Metrics and targets	· Progress towards Climate Vision 2050 targets · How CLP creates value in the low-carbon transition · Investing in climate enablers

Find out more on other climate change-related disclosures

CASE STUDY

Governance highlights

The Sustainability Executive Committee (SEC) has the strategic responsibility to assess and manage sustainability issues.

It is chaired by the Group Chief Executive Officer and leads and oversees all matters related to sustainability in the CLP Group. David Simmonds, Chief Administrative Officer is responsible for CLP's climate change strategy on the SEC.

Focusing on CLP's implementation of the TCFD recommendations, a cross-functional working group covering key markets identifies, analyses and manages the climate risks and opportunities. This is coordinated by Group Sustainability with participation from fleet management, renewable energy, finance, risk management and investors relations. A broad range of other business functions are also engaged in the process, including business development and planning, legal and policy, innovation, health and safety, environment, human resources, as well as representatives from each business unit.

The SEC reviewed the material risks and opportunities across all key markets and selected scenarios. The SEC will also consider the steps to be taken next to further evaluate the impacts of scenarios on Climate Vision 2050.

Read more on CLP's sustainability governance >

CASE STUDY

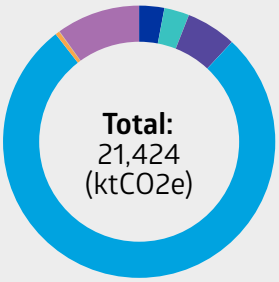
Understanding carbon emissions along CLP's value chain

Most of CLP's carbon footprint arises from electricity generation.

As a result, the greenhouse gas profile and disclosure has been focused on the Scope 1 and 2 emissions. To create transparency and to better manage the carbon footprint of the supply chain, CLP has conducted a comprehensive review of the Scope 3 emissions on an equity basis and will start reporting on this going forward.

Seven out of the 15 Scope 3 categories are considered relevant to CLP. Fuel- and energy-related activities, use of sold products and capital goods are the three that contribute the biggest carbon footprint under Scope 3. Find out more here.

Scope 3 GHG emissions by category



- 1a - Purchased goods and services (products) (3%)
- 1b - Purchased goods and services (non-products) (3%)
- 2 - Capital goods (6%)
- 3 - Fuel- and energy-related activities (78%)
- 5 - Waste generated in operations (0.5%)
- 6 - Air travel (0.04%)
- 7 - Employee commuting (0.02%)
- 11 - Use of sold products (10%)

Climate scenario analysis

The TCFD recommendations call for businesses to consider the resilience of their strategies against climate-related scenarios.

CLP has taken steps to consider the resilience of Climate Vision 2050 against the climate-related scenarios outlined below. These scenarios describe alternative outcomes to enable the Group to carry out deeper analysis of potential physical and transition changes. CLP will continue to monitor the operational landscape to better understand the uncertainty that is embedded within these scenarios.

Scenario	Example trends[1]
Warming of 3-4°C by 2100 (based on IPCC Representative Concentration Pathway 8.5 and IEA Stated Policies Scenario (STEPS))	· Emissions continue to rise, peaking after 2040 and resulting in warming reaching 3-4°C by 2100 · In Australia, the highest monthly rainfall over a 10-year period decreases by 0.7mm by 2050 compared to historic averages[2] · In India, the number of extreme hot days with temperatures above 40°C increases by 23 days per year by 2050 compared to historic averages · Renewables have a 44% share of global electricity generation by 2040 · Carbon pricing reaches USD $36 per tCO2 by 2040[3]
Warming of 1.5-2°C by 2100 (based on IPCC Representative Concentration Pathway 4.5 and IEA Sustainable Development Scenario (SDS))	· Emissions decline from 33 gigatonnes (Gt) in 2020 to less than 10 Gt by 2050, in line with the Paris Agreement to limit warming to 1.5-2°C by 2100 · In Australia, the highest monthly rainfall over a 10-year period increases by 10mm by 2050 compared to historic averages · In India, the number of extreme hot days with temperatures above 40°C increases by 16 days per year by 2050 compared to historic averages · Renewables have a 67% share of global electricity generation by 2040 · Carbon pricing reaches USD $125-140 per tCO2 by 2040

1 Physical climate event figures averaged across CLP Markets of Hong Kong, Mainland China, Australia and India.
2 Historic average references years 1986 to 2005.
3 Mainland China only.

When developing these scenarios, CLP has identified a set of tailored climate-related risks and opportunities relevant to its assets and services across key markets. This exercise referenced third party energy and climate models to understand the scenarios under which these risks and opportunities may be most significant. Scenarios with the most complete qualitative and quantitative coverage of the risks and opportunities identified as material to CLP have been selected for further consideration. These risks and opportunities and how CLP responds are discussed throughout the report, and the summary table below provides easy reference to the relevant sections:

	Risks	Opportunities
Short term (0-1 year)	· Physical risks from extreme weather events · Securing the skills and capability required to implement the climate strategy	· New products and services to help communities decarbonise · Technologies to enhance the performance of the renewable assets
Medium term (1-5 years)	· New regulatory requirements in relation to climate change	· Transitioning to low-carbon energy in Hong Kong to meet the Government's decarbonisation targets · Opportunities arising from transition enablers · Energy management solutions to enhance efficiency at a systemic level, for instance in building smart cities
Medium to long term (5+ years)	· Potential stranded fossil fuel assets	· Growing the non-carbon portfolio to reach the Climate Vision 2050 targets

CASE STUDY

Risk management highlights

Climate-related risks are embedded in CLP's risk management process and risk register. They are identified, assessed and managed alongside all other types of risk as part of the Risk Management Framework.

CLP has established risk profiling criteria to help assess and prioritise each identified risk according to its consequence and its likelihood. Currently, CLP categorises its risk profile into shorter-term regulatory, financial, market, commercial, and industrial & operational risks. To further align with the TCFD, CLP tracks these top-tier risks with the two main climate change-related risk drivers: physical and transition. Examples of physical risks include extreme climate events such as cyclones, bushfires, floods and shifts in climate patterns. Transition risks include policy and legal, innovative technologies, market and reputation shifts. Going forward, the Group is developing an additional risk register that tracks risks and opportunities on the basis of longer-term physical and transition changes.

Read more from the Risk Management Report

Scenario analysis supplements CLP's current risk management processes for climate-related risks and opportunities by providing a longer-term, forward-looking perspective to assessing climate resilience. The scenarios were selected for the purpose of evaluating the impact that climate-related risks and opportunities would have on the business and future financial performance.

The most material risks and opportunities were identified based on their potential impact to the business and the anticipated level of market disruption they may cause.

- The potential impact to the business was analysed based on a longer-term view of what the business would look like aligned with the Climate Vision 2050. Considering the megatrends affecting CLP, the expected changes in the utility sector in the coming decades and progress in the decarbonisation journey, this was deemed more appropriate than comparing it against what the business looks like today.
- The basis for anticipated market disruption was formed from a review of 10 providers of energy, climate and technology scenarios, enabling in-depth discussions amongst a wide range of stakeholders. Material risks and opportunities from CLP's key markets including Hong Kong, Mainland China, Australia and India were consolidated at the Group level.

Moving forward, CLP will continue efforts in refining methodologies and tools for climate risk analysis to maintain a comprehensive and up-to-date understanding of the Group's exposure to material climate-related risks and opportunities and the resilience of current strategy.

Progress towards Climate Vision 2050 targets

CLP continues to make progress towards its decarbonisation targets. In 2019, Group carbon intensity was 0.62kgCO_2/kWh, but meeting the 2020 clean energy targets continues to be challenging.

Climate Vision 2050, first launched back in 2007, is integrated into CLP's strategies on asset portfolio management, including acquisitions and divestments, guiding the Group in managing climate-related opportunities and risks. The last target review was announced in 2018, and CLP recently published the updated Climate Vision 2050, pledging not to invest in any additional coal-fired generation capacity and to progressively phase out all remaining coal assets by 2050. Furthermore, the Group committed to reviewing its targets no less than every five years. These commitments underscore CLP's continued determination to play a part in combating climate change challenges.

Download the updated Climate Vision 2050

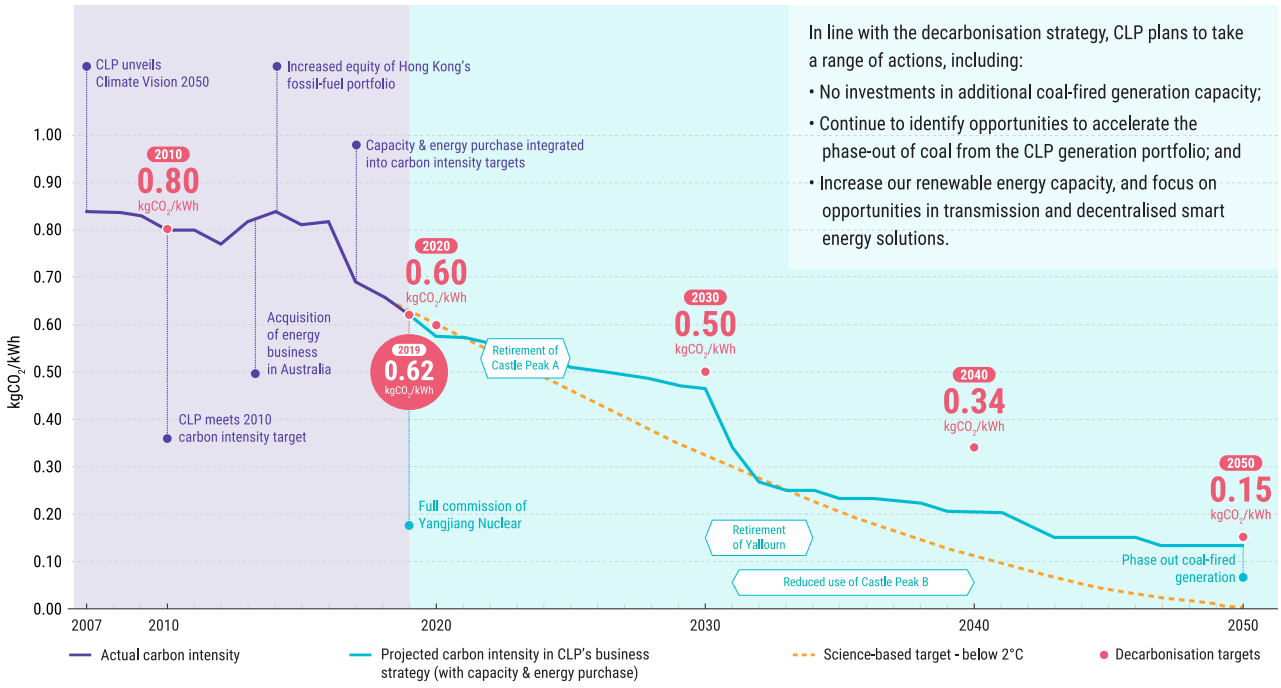
	Carbon intensity ($kgCO_2$/kWh)	Renewable energy capacity (% of total capacity)	Non-carbon emitting energy (% of total capacity)
2020 Targets	0.6	20%	30%
2019 Performance	0.62	13.7%	24.9%

CLP is on track to meet the 2020 carbon intensity target. The Group's carbon intensity decreased to 0.62kgCO_2/kWh in 2019 as compared to the 2018 level of 0.66kgCO_2/kWh. This was mainly contributed by a decrease of total carbon emissions from coal-fired plants, further commissioning of Yangjiang Nuclear Power Station's sixth and final unit since July 2019, an increase of output from renewable assets, as well as additional long-term purchase arrangements in Australia.

There were several major capital investments in 2019 that contributed to the growth of non-carbon portfolio, thereby helping to reduce carbon intensity. Find out more about CLP's portfolio here.

The trajectory of CLP Group's carbon intensity has been updated, in line with the current business plan and long-term decarbonisation strategy. This is presented alongside the Sectoral Decarbonisation Approach (SDA) trajectory of the Science Based Targets initiative (SBTi). This transparent comparison will help CLP stay on course to accelerate the transition to a science-based target.

CLP Group's carbon intensity



Note: The plant retirement timeframes are indicative only.

CASE STUDY

Reducing emissions in Hong Kong

The new CCGT unit at Black Point power station is expected to be in operation in 2020.

CLP's carbon intensity will steadily decrease in the coming years.

The main reduction would come from projects in Hong Kong:

- A new 550MW gas-fired generation unit at Black Point power station featuring combined cycle gas turbine (CCGT) technology is expected to be in operation in 2020. The new unit will assist Hong Kong in achieving the Government's target of increasing the share of gas to around 50% of the fuel mix by 2020. Another gas-fired unit of similar capacity is also planned for commissioning by 2023. The two units will contribute to the gradual phase-out of the oldest coal-fired units at Castle Peak Power Station which are expected to reach the end of their operating life in the mid-2020s.
- Construction of the largest landfill gas power generation system in Hong Kong at the West New Territories Landfill began in 2018. It would be in full operation in 2020 with generation capacity at 10MW. Subject to the availability of additional un-utilised landfill gas, expansion will be further assessed.

Crucial to enhancing the diversity and security of natural gas supply, CLP is now preparing for the construction of an offshore liquefied natural gas (LNG) terminal that will provide a long-term alternative source of gas to meet increased demand. The Government of Hong Kong has approved the Environmental Impact Assessment of the project and granted an environmental permit in October 2018. Progress has also been made in finalising the contractual arrangements for the supply of LNG and the chartering of the Floating Storage and Regasification Unit (FSRU) vessel for the project, which is expected to complete construction before the end of 2021.

The Clean Energy Transmission System connecting the CLP grid to Guangdong is planned to be strengthened by 2025, enhancing the accessibility to clean energy resources to help reduce fossil fuels use in Hong Kong.

Carbon intensity data for CLP Power Hong Kong is available here

Hong Kong offshore LNG terminal

WATCH VIDEO ▶

CASE STUDY

Challenges along EnergyAustralia's decarbonisation journey

For over 100 years, Australia's economic growth has been powered by an abundance of thermal coal.

Regions have developed around coal basins and transmission infrastructure has connected this power source to metropolitan centres and manufacturing facilities. While Australia is similarly endowed with excellent solar and wind resources, there are many technical, social and economic challenges in transitioning away from fossil fuels.

The evolution of Australia's energy system has begun, and an ageing coal fleet ensures it will continue. Increasingly, new technologies and community and government ambitions to reduce emissions are changing the mix of energy sources.

EnergyAustralia is committed to reducing GHG emissions in Australia by progressively phasing out coal-fired power, while integrating new, cleaner supplies of electricity. The phase-out of coal fired power should be done over a timeframe that provides for a carefully managed transition.

Blackouts in southern parts of Australia through extreme summer heat in early 2019 illustrate how finely balanced the system is and how little reserve electricity is available. The retirement of several major coal-fired power stations in Australia over recent years, without replacement dispatchable generation, has undeniably reduced the electricity system's ability to provide reliable power. Collaboration between businesses, communities, government and unions will be required to transition at least cost with minimal disruption to people and the economy.

EnergyAustralia has committed to provide at least five years' notice before closing Yallourn power station.

EnergyAustralia plans to run Yallourn Power Station to the end of its technical life in 2032, or as long as policy and regulation permit, and so long as there is not a substantial change in the market. The Company has committed to provide at least five years' notice before closing Yallourn, where circumstances remain in its control. EnergyAustralia is also planning to schedule the retirement of the Mount Piper station at the end of its technical life at around 2043. The Company continues to invest in comprehensive maintenance programs to secure the reliability of these assets.

EnergyAustralia will closely monitor the energy policy landscape in Australia, and the overall development of the wholesale electricity market. While any move to accelerate the retirement of coal-based assets would help bring CLP closer to our science-based targets, the impacts on workers and regions would be important considerations and EnergyAustralia would have to secure the necessary replacement generation to balance the company's commitment to reliability and affordability.

Find out more about EnergyAustralia's GHG emission data in 2019

Download EnergyAustralia's carbon commitments

Creating value in the low-carbon transition

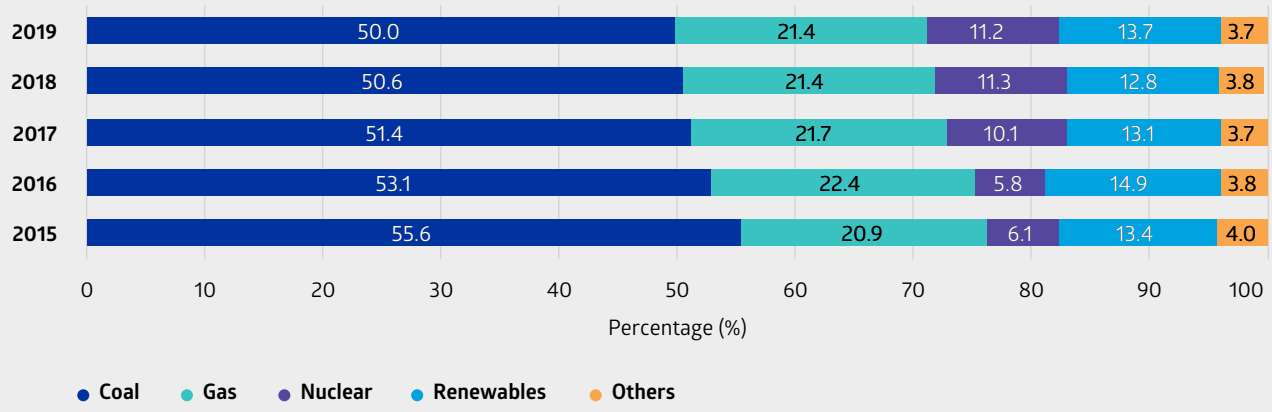
Diversifying CLP's asset portfolio with non-carbon sources of energy helps lower the GHG emissions, as well as reduce the reliance on revenue from fossil fuel-based generation.

The following charts demonstrate how CLP has diversified its investment, portfolio and operating earnings to include a broad range of fuel type and non-generation business activities.

Generation capacity (on an equity plus long-term capacity and energy purchase basis) by asset type

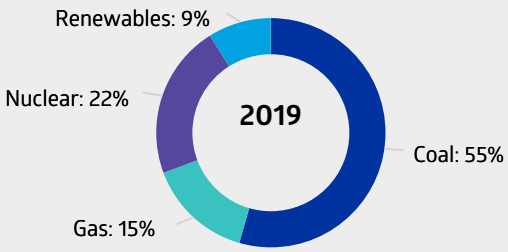
The renewable and non-carbon generation capacity in operation and under construction has increased:

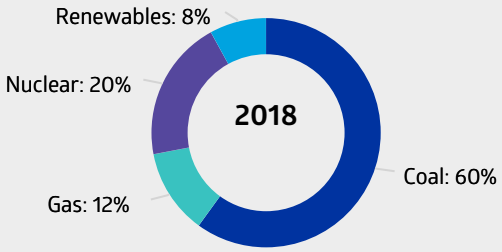
- Renewable generating capacity stands at 2,469 MW, supplemented by an additional 825 MW of long-term capacity and energy purchase; together they account for 13.7% of the portfolio.
- Non-carbon generating capacity stands at 4,069 MW, supplemented by an additional 1,910 MW of long-term capacity and energy purchase; together they account for 24.9% of the portfolio.



Energy sent out (on an equity plus long-term capacity and energy purchase basis) by asset type[1]

CLP's coal-based generation continues to decrease. Energy sent out from renewable and non-carbon sources accounted for 8.7% and 30.6% of the total, respectively.

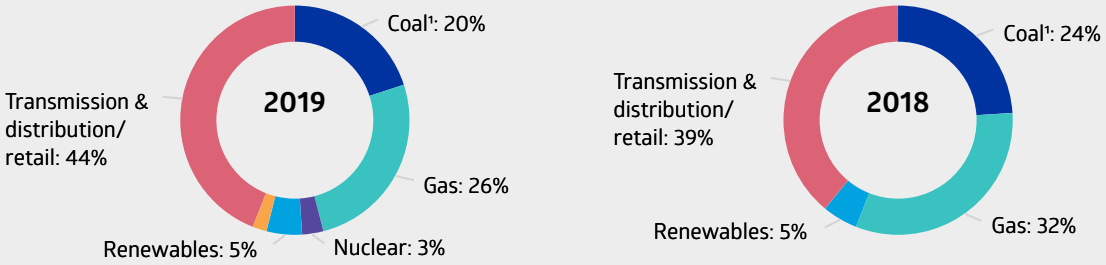




1 Percentage figures haven been subject to rounding. Only the major asset types are shown here. For details, pleasae refer to operations data table.

Capital investments (on accrual basis) incurred by asset type

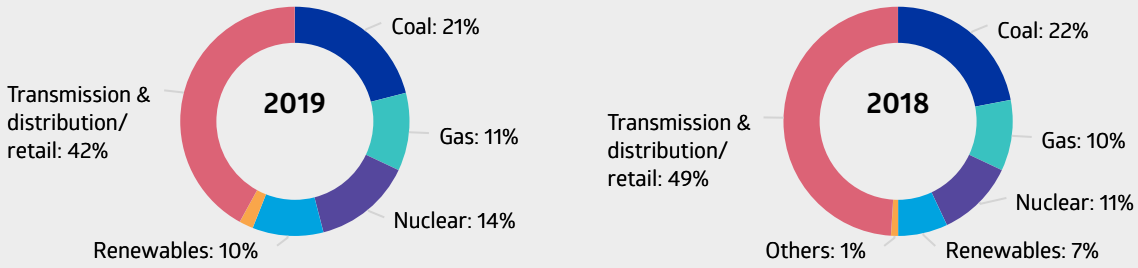
Capital investments into non-carbon generation assets represented 8% of Group capital investments in 2019, supplemented by 44% from transmission & distribution and retail related activity.



1 Capital investments in coal assets include upgrades and efficiency improvements only.

Operating earnings (before unallocated expenses) by asset type

Operating earnings from non-carbon generation assets represented 24% of Group operating earnings in 2019, supplemented by 42% of operating earnings from transmission & distribution and retail related activity.



Investing in transition enablers

CLP is going beyond low-carbon generation to include broader investments in innovative projects and propagating new technologies within the energy economy.

Decarbonisation of the generation portfolio cannot be achieved by simply replacing generation plants that use fossil fuel with those that use non-carbon energy sources. Investment in a broad range of transition enablers is required to transform the energy system. These enablers include decentralised generation and smart energy services, transmission and distribution systems, battery or other energy storage solution, or electric vehicle charging facilities, making full use of advanced technologies and innovation.

Group investment in transition enablers is focused on the Hong Kong and Australia markets, where CLP is engaged in retail business. Below are a few examples of these enablers:

Smart meters

- In Hong Kong, under the 7-year roll-out plan approved by the Government in 2018, up to end-2019, over 420,000 smart meters have been connected, equivalent to a 16% coverage of the service area.
- In Australia, the number of installed smart meters is even higher, at 594,000 with a coverage of over 27%.

Electric vehicle charging facilities

- Over 200 charging points have been installed for customers across Hong Kong; in addition, there are over 300 charging points in CLP premises to support greater EV adoption in Group operations.
- SmartCharge, a joint venture between CLP and HKT, has been actively offering and deploying EV charging solutions in private and public car parks in Hong Kong. There are a number of projects in the construction pipeline and these will be installed in the coming year.
- By the end of 2020, all EnergyAustralia sites will have EV charging facilities.

Demand response programmes

- In Hong Kong, around 1,500 commercial and industrial customers signed up for the demand response programme, and together around 62MW of demand reduction was achieved in 2019.
- EnergyAustralia's demand response contracted capacity now stands at 56MW. Over 20,000 household customers have opted in to the PowerResponse programme.

Customer solution sales

- The Feed-in Tariff scheme in Hong Kong had an encouraging start, with 8.7GWh of electricity generated from renewable sources through the scheme in 2019.
- EnergyAustralia has over 194,000 business and residential solar customers.

As more renewable energy is being introduced to the grid, the challenges posed by its intermittent nature, which does not necessarily follow the local load profile, requires enhanced grid connectivity and system balancing solution on a larger scale.

Transmission and distribution infrastructure

- In 2019, CLP India entered into the power transmission sector. Through acquisition, 240 km of transmission line has been handed over to CLP India's portfolio in 2019 and an additional 575 km will be handed over in 2020.
- The Clean Energy Transmission System connecting the CLP grid to Guangdong is planned to be enhanced by 2025, improving accessibility to clean energy resources and further reducing fossil fuel use in Hong Kong.

Large scale battery storage

EnergyAustralia's Ballarat energy storage system has been responding to demand and supply imbalances since December 2018, and the Gannawarra energy storage system since March 2019, with a total installed capacity of 55MW/80MWh.

- These systems recharge from the grid at night when excess generation capacity is available and prices are low, and provide dispatchable energy during times of peak demand when prices are high, while improving grid stability and reliability at the same time.
- Today, battery storage solutions require a government subsidy. Battery costs will continue to decline over time, allowing the further deployment of storage solutions which help build a flexible energy supply market.

Large scale battery storage at Gannawarra, Australia.

CASE STUDY

EV100 – Greening road transport

Experience in many countries suggests that although good progress is being made with decarbonisation in the power sector, the transportation sector is proving harder to decarbonise, despite it representing a significant proportion of total GHG emissions. With numerous non-carbon sources increasingly available for electricity generation, electrification can make a significant contribution in the global effort to decarbonise transportation.

One of the two EVs recently added to EnergyAustralia's vehicle fleet.

Looking at road transportation, technology is advancing fast in the development of electric vehicles (EV), with many more models becoming available. There are still challenges though, with potential users needing some reassurance over vehicle range as well as the availability of charging points. Total cost of ownership is still sensitive to vehicle purchase price differences and the relative running costs of fossil fuels and electricity. Although constantly improving, EV performance in terms of power and range still falls behind internal combustion engine (ICE) vehicles in some industry specific applications, such as Heavy Goods Vehicles.

Having said that, there is significant potential for reductions in both carbon and roadside air emissions by using EV technologies that are readily available. One example is the suggestion from the public engagement exercise on Hong Kong's Long Term Decarbonisation Strategy to promote adoption of electric vehicles (EVs) in the city. A pilot study showed that commercial EVs have about 30% less emissions on average than their internal combustion engines (ICE) counterparts on the same mileage travelled.

According to the Global EV Outlook published by the International Energy Agency (IEA) in 2019, GHG emissions for a mid-size car on a fuel and vehicle life-cycle basis is about one-third lower for EVs, based on a global average carbon intensity of electricity at 0.518kgCO_2/kWh, which is roughly equivalent to Hong Kong's current fuel mix. The actual carbon intensity of electricity will continue to decline in Hong Kong as the fuel mix shifts to natural gas in the coming years. With this in mind, CLP is actively developing EV infrastructure in Hong Kong by providing free charging facilities to the public and helping individual and commercial organisations to install relevant facilities.

To further demonstrate CLP's commitment to EV development, in 2019, the Company joined the global EV100 initiative run by the international non-profit organisation The Climate Group, a first amongst Hong Kong companies.

CLP has committed to transitioning its fleet of more than 1,000 cars to EVs by 2030 and encouraging more employees to switch to EVs. Specifically, CLP's target is to convert all company vehicles weighing below 3.5 tonnes and half of those weighing between 3.5 and 7.5 tonnes to EVs by 2030, where realistically feasible. The scope includes vehicles in Hong Kong, Mainland China, India and Australia. The shift has the dual benefits of reducing GHG emissions and reducing roadside air pollution. This is particularly important for many of the densely populated Asian cities in which the Group operates.

Helping communities decarbonise

There are different options for customers who want to support the use of clean energy, including the Feed-in Tariff Scheme and Renewable Energy Certificates in Hong Kong, and PureEnergy and GoNeutral Programme in Australia.

Many customers would like to contribute more to combating climate change. In Hong Kong, CLP Power launched the Feed-in Tariff (FiT) Scheme in October 2018 and the Renewable Energy Certificates (RECs) in January 2019 to encourage participation from the community to support local RE development.

The FiT Scheme, where CLP Power will pay for electricity generated by small-scale RE projects connected to its electricity grid, has received a strong positive response from the public since its launch. Read more in the case study below.

Meanwhile, customers who want to support the local development of RE but are unable to accommodate an RE system of their own now have the option of subscribing for RECs which represent the environmental attributes of electricity produced by local RE sources and purchased by CLP. As of end-December 2019, environmental attributes of over 3GWh units were sold through RECs.

Read more on CLP demand-side management efforts in Hong Kong

EnergyAustralia customers can subscribe to PureEnergy, where they can purchase accredited green energy which feeds into the grid on their behalf. The GoNeutral Programme allows residential customers to opt in to fully offset the carbon emissions associated with their home electricity usage, at no added cost to them. Over 220,000 customers have opted in to Go Neutral, making it one of the largest Climate Active certified offset programmes in Australia.

CLP Renewable Energy Schemes

WATCH VIDEO ▶

CASE STUDY

Supporting the growth of renewables in Hong Kong

Cathay Pacific Catering Services (HK) Limited has installed solar panels with a combined size of 3,000 square metres on the rooftop of its facilities.

With the introduction of CLP's Renewable Energy Feed-in Tariff (FiT) scheme in May 2018, CLP Power Hong Kong received overwhelming support from the public with 6,900 applications by the end of December 2019.

More than 80% of these applications have been approved. Upon completion, these projects will represent a total of 90GWh of green electricity a year – equivalent to the annual energy consumption of about 22,000 households and a reduction in carbon emissions of around 45,000 tonnes a year.

Participating customers came from a variety of segments with 80% of applications from village houses, and the remainder from commercial and industrial buildings. Cathay Pacific Catering Services (HK) Limited has installed 828 solar panels with a generation capacity of 299kW and a combined size of 3,000 square metres on the rooftops of its two facilities. It is expected to generate 320,000kWh of electricity a year, which will make their installations the largest system under one customer in the community of the Hong Kong International Airport.

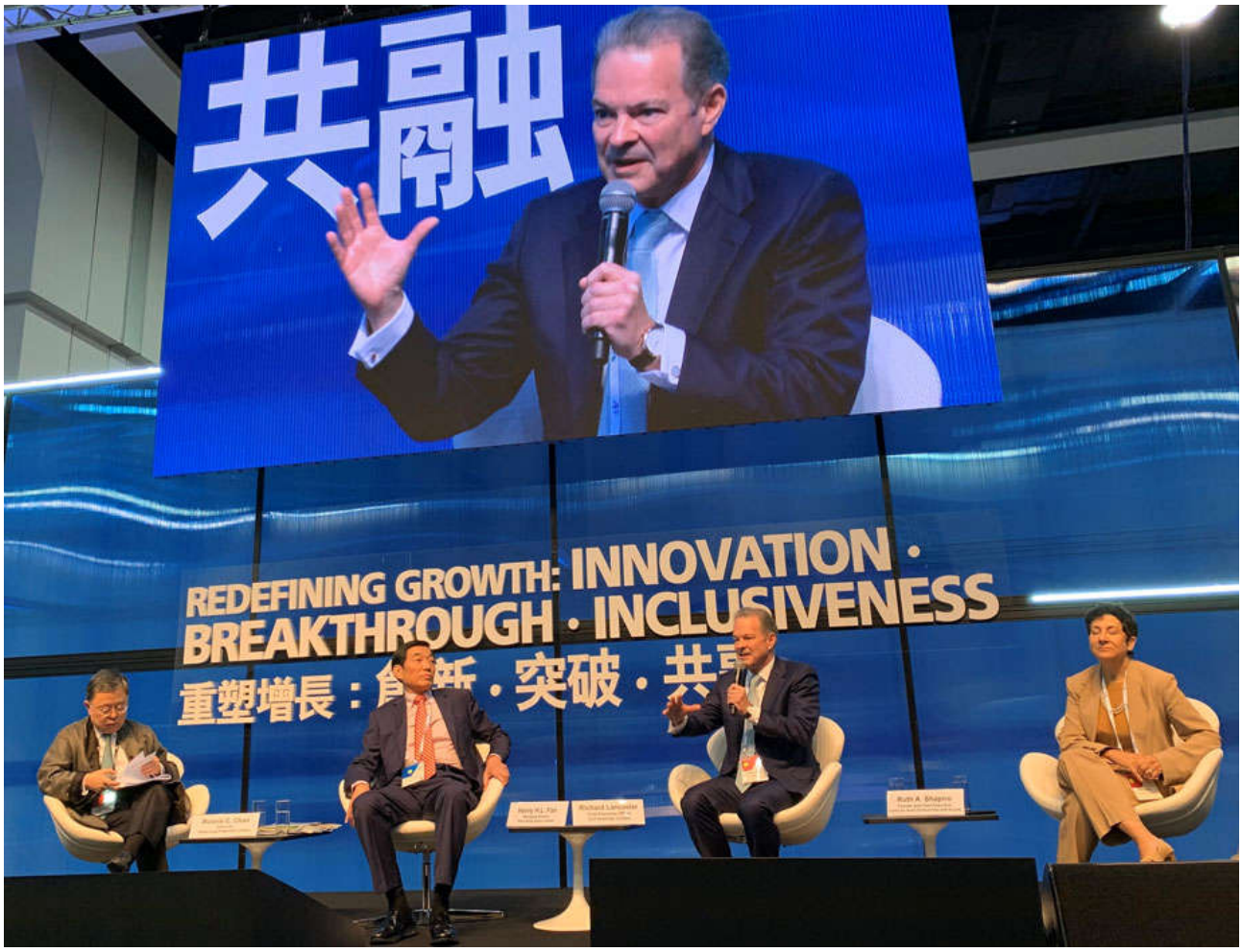
Similarly, another leading educational institution, Li Po Chun United World College of Hong Kong (LPCUWC), has also signed up to the FiT scheme and innovatively developed a solar-scholarship for its students using 100% FiT revenue contribution as funding for students coming from grassroots families. CLP conducted solar assessment to support their installation of 1,168 solar panels, with generation capacity of 403kW and annual generation of 480,000kWh approximately.

CLP has been promoting the awareness of FiT and REC initiatives through a variety of channels. Overall in 2019, CLP organised more than 50 seminars promoting these initiatives to more than 3,000 participants.

LPCUWC's solar scholarship is funded by the FiT revenue from the 1,168 solar panels on the school's rooftop.

Promoting systematic changes for climate actions

No single business or even country can mitigate climate change alone. CLP continues to join other like-minded organisations to promote the systematic changes required and to promote operational business interests.



Richard Lancaster, CEO, speaks at a panel themed "Profit with Purpose" alongside Mr Ronnie Chan (left), Chairman of Hang Lung Properties Limited, Mr Henry Fan (second from left), Chairman of Hong Kong Hospital Authority, and Dr Ruth Shapiro (right), Founder and Chief Executive of Centre for Asian Philanthropy and Society.

Sound public policies are required to balance the social, economic and environmental needs and support the long-term development of communities. CLP participates in a range of industry and professional bodies to discuss the major issues deemed important to ongoing viability and success, in particular climate change and energy.

When joining any organisation, respective Public Affairs teams act as a control point and will consider the appropriateness of the membership request. The Group CEO or respective MD approves the participation, to ensure the position of the organisation supports CLP's mission, in particular its ambition towards decarbonisation.

Following is a list of organisations which are active in climate change and broader energy market policies, and to which CLP devotes significant resources through membership, sponsorship, and other contributions including active participation by senior management. CLP has contributed annually over HKD 250,000 (or equivalent, in cash) on average over the last 3 years to the organisations listed below (by alphabetical order).

Organisation	Description of position	CLP contributions and engagement
Australian Energy Council	The AEC represents 21 major electricity and downstream natural gas businesses operating in competitive wholesale and retail energy markets in Australia.	EnergyAustralia is represented on the Board of the AEC and is an active participant in its various working groups which cover a range of competitive energy market issues. These include reviews of wholesale market operation, competitive retail markets and emissions reduction policies.
Business Council of Australia	The Business Council of Australia is a CEO-led industry association, representing over 100 of Australia's largest businesses. They support transitioning to a more carbon efficient economy with a goal of net-zero emissions by 2050.	The Managing Director of EnergyAustralia is a Director of the BCA. The BCA advocates for a national, bipartisan energy and climate change framework that can deliver against reliability, affordability and sustainability objectives, consistent with EnergyAustralia's position.
Business Environment Council	An independent, charitable organisation established by the business sector in Hong Kong. BEC promotes environmental excellence by advocating for the uptake of clean technologies and practices.	The CEO of CLP has been a Director since 2012 and is currently Chairman of the Board of Directors. The Company actively participates in or sponsors events, public consultations and working groups organised by BEC.
Energy Transition Commission	Supports energy system transition by informing what it will take to create credible, accelerating transitions towards universal, clean energy systems across the world. Current focus is on helping harder-to-abate sectors reach net-zero carbon emissions.	Having joined in August 2018, the CEO of CLP is one of a diverse group of leaders from the public, private and NGO sectors in the Commission.
Free Electrons	An accelerator programme for the electric utilities, where startups work closely with utilities to develop digital solutions to overcome challenges arising from the increase of renewable energy and decentralised energy systems, and facilitate the transition to low carbon energy.	CLP first participated in FreeElectrons during 2018, and has identified collaboration opportunities through the programme. In 2019, CLP hosted FreeElectrons in Hong Kong for a week-long module. Read more here.
International Solar Alliance	The treaty-based, inter-governmental organisation was established in December 2015 at COP-21. In June 2016, the Alliance entered into an agreement with the World Bank to raise US$1 trillion by 2030 to meet the Paris Agreement objectives.	CLP is supporting the Indian Government's plan to deploy solar technology across the country.
World Business Council for Sustainable Development	A global, CEO-led organisation of over 200 businesses, WBCSD is working to accelerate the transition to a sustainable world. It targets the realisation of the SDGs through six work programmes including Circular Economy, Cities and Mobility, Climate & Energy, Food & Nature, Redefining Value and People.	CLP is participating in various initiatives, such as the Climate Policy Working Group, TCFD Electric Utilities Preparer Forum, the Energy Solutions project, and the Redefining Value program.

MATERIAL TOPICS

Harnessing the power of technology

CLP's investment

80
employees across the Group in innovation functions

Innovation investments in 2019 amounted to
HK$127 million

Smart Energy Connect has identified more than
900,000kWh
of potential energy savings from its deployments

Technology solutions

Aerial drones used for renewable energy plant inspections

Centralised Analytics Platform used to optimise performance of the renewable energy portfolio

Building an innovation ecosystem

CLP Power continued its collaboration with **Hong Kong Startup Council** of the Federation of Hong Kong Industries (FHKI)

CLP participated in **Free Electrons,** an accelerator programme partnership with global energy utilities

Partnership with **Startupbootcamp** and **COSBOA** in Australia

Year in review

CLP recognises the potential for digital technology to transform not only the energy industry, but the world.

Embracing innovation helps optimise CLP's existing operations and is also the foundation for developing new products and services for customers. Together, this momentum combines to enable the transition toward a low-carbon economy.

CLP's technology innovation journey reached important milestones in 2019. Big data and artificial intelligence (AI) continue to help improve Group performance. More reliable predictive maintenance solutions and early fault detection through machine-learning models improve safety performance; more accurate load forecasting advances smart grid developments, and robotics process automation solutions automates manual business processes and improves productivity. The launch of Smart Energy Connect (SEC) in Q1 showcases capability to develop new lines of business, and importantly offers a suite of digital products to help customers save energy, cost and time, and advance their own sustainability agenda. Going forward, the range of new capabilities coupled with deep industrial knowledge and geographical footprint will help CLP pursue new opportunities in the low carbon economy. In particular, there is strong potential in the areas of data centres and smart grid developments.

As the Group business evolves, CLP is looking outward to tap into the best minds in the startup community. For the second year, CLP is involved in Free Electrons, an accelerator programme in partnership with global energy utilities, through which potential startup partners were identified. CLP will continue to invest in, and bring in the best technology, entrepreneurs and new business opportunities to build a sustainable, resilient and growing business.

Key metrics

Smart Energy Connect has identified more than **900,000kWh** of potential energy savings from its deployments

80 employees across the Group in innovation functions

Innovation investments in 2019 amounted to **HK$127 million**

Outlook

The digital and utility worlds have been progressing at vastly different speeds. As CLP transforms into a Utility of the Future, a major energy company such as CLP needs to synergise the strengths of each of these worlds to create new value propositions.

CLP's Group presence in diverse geographies, each with a unique set of regulations, infrastructure and market needs, helps to identify project opportunities to cater for these varying energy service areas and emerging markets. CLP is connecting customers across its markets with technology companies to help define key partnership and strategic collaborations to create new services offerings. With the infrastructure needs of cities continuing to expand, there are exciting new opportunities to support urban growth in greener and smarter ways.

The momentum in this innovation journey will only continue. With a focus on the opportunity in energy management of buildings, CLP intends to expand its digital product offering under SEC to provide end-to-end solutions to the customer base. Solution areas include office spaces, schools and university campuses and commercial buildings such as large office buildings, hotels, shopping malls, to name a few. The key areas for future energy saving are mainly through data-driven services such as chiller optimisations and building health monitoring through Internet of Things (IoT)-based solutions.

CLP's investments and venture portfolio champion cutting edge technologies and start-ups that help strengthen the Group's core business, nurture emerging businesses, and support the Group's contribution towards a low carbon economy. CLP's technology-based investments to support the growth of its capabilities and new businesses opportunities will continue in a prudent manner, but driven by strong goals.

CLP's transformation will inevitably change how the Group operates. Underlying the success is the ability to have the right talent to deliver to the Group vision. CLP will continue to develop in-house data science capabilities to develop AI assets to meet the digital transformation strategy, and attract the right external talent.

SmartHub@CLP showcases a smart city future for Hong Kong.

Highlights

Examples of how technology helps CLP improve its performance and develop new business opportunities to advance the sustainability agenda.

Enhancing performance

New technologies provide novel ways to manage CLP assets, transmission grids and customers. They help strengthen and enhance the core business.

Big data and artificial intelligence (AI) technologies enable CLP to collect and analyse large volumes of real time information, as well as automate and optimise the response, thereby improving operational efficiency across the value chain. On the other hand, increasing application of robotics helps reduces the need for manual and high risk work processes, allowing the Company to digitalise its operations.

Drawing on the experience and capabilities from the use of aerial drones for plant inspection in Hong Kong, CLP rolled out the technology in renewable energy plants in Mainland China and India to improve their operational performance and efficiency, and to strengthen workplace safety. In Mainland China, drones with thermal cameras were deployed for the inspection of photovoltaic panels at Sihong Solar Power Station in Jiangsu and Meizhou Solar Power Station in Guangdong. The technology enables faster and more accurate identification of damaged and underperforming solar panels. Further trials have been conducted to automate the drones' flight paths, further reducing the time required to carry out plant inspections. Aerial drones with high resolution binoculars have also been trialled for wind turbine blade inspections in India to achieve savings in time and labour requirements.

CLP has built a set of machine learning algorithms to enhance the efficiency of generation assets. As more renewable sources are integrated into the system, technology solutions that reduce uncertainty to the demand and supply of electricity are required to maintain system stability. For renewable assets CLP is using data analytics and artificial intelligence to optimise the performance of the Group's renewable generation portfolio. In 2019, CLP began the roll-out of a Centralised Analytics Platform (CAP) across all its wholly owned renewable assets, totalling 1,916MW installed capacity. CLP has set-up big-data clouds in India and China to capture all the operational data from the renewable portfolio. The CAP can then access this data and perform real-time monitoring, data analytics, equipment performance optimisation and automated reporting. Currently there are seven wind farms and solar parks in India feeding data into the CAP and the remaining assets will be included in 2020.

For the Castle Peak B Power Station, a trial of data science and machine learning helps to predict SO_2 and NO_x emissions based on the physical properties of the coal used and the loading demand of the power station. The model delivers reference data for the coal supply which will help reduce emissions and improve air quality for the community.

Smart grids integrate information and communication systems into the traditional power grid, creating new opportunities to engage customers in energy saving and demand side management. In one example, weather prediction at high resolution coupled with automated smart meter monitoring helps predict customer energy demand and forecast power generation, allowing energy supply to be optimised ahead of demand changes. The model can be fine-tuned for special events, allowing for better plant operation and maintenance scheduling. In addition, algorithms for cable monitoring allow early fault detection and make predictive maintenance possible, further enhancing supply reliability. In 2019, four faults were identified before they disrupted supply and this resulted in around 10,000 Customer Minutes Lost (CML) being saved and 2,000 customers retaining continuous power supply.

Supporting the sustainability agenda

CLP's deep knowledge in the energy sector enables it to expand the service offerings by supporting our customers to manage their energy use and save costs. CLP Smart Energy Connect is one of these key offerings.

The SEC platform provides a comprehensive portfolio of integrated, high-end and low-cost solutions for customers.

Increasingly, customers want more control over their energy consumption to maximise efficiency and minimise costs. Energy management solutions (EMS) is one of the opportunities that has arisen from such demand. It allows customers and facility managers to visualise the status of energy use, and offer greater control over how energy is stored, distributed and used. This reduces energy waste without adversely affecting operations.

CLP Smart Energy Connect (SEC) commenced operations in early 2019 and is one of the newest offerings to customers. It combines a set of energy management solutions, a data platform, and a commercial channel that accelerates the adoption of EMS, and provides a one-stop shop for digital energy innovations.

The SEC platform provides a comprehensive portfolio of integrated, high-end and low-cost solutions for customers. CLP adopted a customer-centric approach during the product development process, and paid special attention to the needs of different customers, be it reducing their carbon footprint, enhancing productivity or brand-building. It is encouraging to see the number of customers steadily growing since the platform's launch.

With buildings in Hong Kong consuming 90% of the electricity, it is quite important to focus on the building space. There are many types of solutions including smart office, lighting and HVAC optimisation, which all help building owners, tenants, and sustainability managers take a data driven approach to achieve energy savings.

By the end of February 2020, SEC introduced more than 25 products through in-house developed solutions and partnerships. Leveraging on CLP's deep energy domain expertise, the Company assists with the design, build, deployment and ongoing support of the featured technology solutions on the platform. In addition, SEC has developed a cloud-based digital energy platform to manage IoT solutions.

CLP's products in this area received initial traction in 2019 with Building Scope winning the Hanson I&T Outstanding Award from the Electrical and Mechanical Services Department (EMSD), Government of Hong Kong. This was an important award as this was through the deployment of the smart building solutions in one of CLP's own properties where an energy savings of 7% were realised along with a reduction of 86 t of CO_2 emissions. Building Scope, an AI software to identify inefficiencies within a building, was established through a

partnership with R&B Technology Holding Co. Ltd. CLP Innovation Ventures Limited, a wholly-owned subsidiary of CLP Holdings Limited, completed a US$2 million investment in R&B Technology Holding Co. Ltd. in January 2020 to deepen the collaboration between the two companies.

Another important milestone was the partnership with the Hong Kong Science and Technology Parks Corporation (HKSTP) to establish CLP's Innovation Hub at Hong Kong Science Park. As a living laboratory, HKSTP supported and piloted the energy management application from CLP. SEC enabled HKSTP to visualise their sustainability impact through SEC's in-house product, Solar Canvas, which helps to communicate to the Park community with over ten thousands of I&T workforce and visitors about Science Park's green energy generation. Solar Canvas connects the data from solar panels installed on six buildings in the Park and displays the energy produced in terms of carbon dioxide emissions avoided.

The impact of the success of SEC goes beyond the platform, as it also provides vital insight on how to manoeuvre the digital energy service landscape. CLP has developed a scalable organisation to support future growth by codifying product sourcing and trial processes, and completed a tailored technology stack to enable greater speed-to-market. There are plans to expand the service area to CLP supply areas outside of Hong Kong in the near future.

CLP Smart Energy Connect helps you save energy, money and time

WATCH VIDEO ▶

Visit CLP Smart Energy Connect

Visit Smart Energy Connect's LinkedIn page for latest news

Read more on CLP's low-carbon transition enablers >

Pursuing new business opportunities

The Group looks beyond CLP and invests in startups or forms partnership with other market players to create strategic value and new business opportunities.

Start-up companies showcase their innovations in smart energy technologies.

Microgrids present one of the focus areas for new business opportunities. A microgrid connects distributed energy resources (DERs) – which can be a power source, load and/or storage facility – and monitors, controls and optimises the DERs to reduce cost, GHG emissions, or maintain reliability. In 2019, working with numerous partner solutions, CLP established a microgrid pilot project at the Hong Kong Science and Technology Park. Outside Hong Kong, CLP is working with Business Units to develop smart microgrid solutions for industrial estates, developments; and commercial and industrial customers. While still at an early stage, with increasing adoption of renewables and decentralised technology, the expectation is that the microgrid market will have strong growth going forward.

The data centre market is also growing throughout the Asia-Pacific region, including in India and Hong Kong. Data centres are intensive energy users and reliant upon reliable power. This sector ties in with provision of sustainable solutions such as green power and energy efficiency, areas in which CLP has a strong edge and is actively pursuing.

As CLP leverages its history as a utility going back a century and moves towards a data-driven organisation, the Company understands the need to connect with emerging technologies and capabilities being developed at a rapid pace in the global marketplace. CLP is systematically scouting for and assessing new technologies for investment and co-development opportunities that are strategically important to the Group, as well as selectively investing in venture capital funds that provide key market insights and deal flow relevant to the energy sector.

CLP's investments and venture portfolio consists of venture capital funds in innovation hubs such as Silicon Valley, a joint venture with Other Sources Energy Group, which has a proven investment track record in clean energy technologies in Israel, and direct equity investments in companies that bolster CLP capabilities for a digital energy future. Another example in the start-up space is an additional investment of approximately HK$100 million (US$12.7 million) in California-based energy management software developer AutoGrid Systems, Inc.

In 2019 CLP strengthened its global ecosystem of strategic partners with more activities in Hong Kong, China, Israel and Australia. As a Group, CLP is now covering the major innovation hubs (USA, China, Israel and Europe) and has established a strong network to engage with startups, strategic partners and strategic customers to source new opportunities.

CLP chooses to invest in promising entrepreneurs and start-ups not only to harness their cutting-edge technology, agility and digital capabilities, but also to co-develop new products and services that can be scaled through the company's presence in various geographies. Through collaborations with startups CLP can act faster and get access to new skills, while in return piloting new products in real situations.

In November 2019, EnergyAustralia launched a new customer innovation platform called On by EnergyAustralia. The purpose of On is to give the Company the capability to trial new solutions with customers, starting with those in New South Wales. EnergyAustralia will use expert insight from customers to learn and iterate its products and services based on their feedback before they become widely available. As part of its commitment through the Energy Charter to use customer needs and preferences to drive innovation, and to make energy simpler and fairer, the first products to be trialled on the new platform are subscription-style energy plans.

Building an innovation ecosystem

At the Group level, CLP continues to play an active role in Free Electrons. In Hong Kong and Australia, the businesses are also keenly engaging with local accelerator programmes.

For the second year CLP has participated in Free Electrons – the global accelerator that is run by ten world class global utilities – and in June the Company hosted the programme in Hong Kong. This unique opportunity offered the chance to have ecosystem partners engage together.

Free Electrons provides a platform for utility companies to go into partnership with start-up companies and fast-track the development of new energy technologies and solutions. Through the programme, CLP has partnered with four startups including a Portuguese company which developed solutions for asset condition monitoring. Two of those projects are currently in the pilot stage.

In 2019 CLP also entered into an extended pilot with one startup from the 2018 cohort, a company which helps to predict the impact of solar integration on grid reliability. As part of the development of adjacent smart home services CLP also continued a trial in the area of health monitoring. The work with these startups was presented during the Connected Cities Conference co-organised by CLP. Together with a workshop on the "future use of buildings", this was a good opportunity to showcase CLP's innovation work to customers.

In Hong Kong, CLP Power continued its collaboration with the Hong Kong Startup Council of the Federation of Hong Kong Industries (FHKI). CLP helps up-and-coming start-ups develop operational skills and practical experience to support business growth, and build connections with traditional enterprises and investors. In 2019, CLP invited startups with high potential to join Free Electrons, and has partnered with one of them to run a customer pilot in the Hong Kong residential market to manage energy demand of air conditioners in the summer of 2019. CLP has successfully tested the operation and collected insightful customer responses for future planning.

Collaboration between CLP Holdings and EnergyAustralia led the Company to support the Australian Technologies Competition, which opened a new network for both companies.

EnergyAustralia continued the partnership with Startupbootcamp, an international accelerator programme for start ups working on innovative energy solutions. The 2019 focus areas were grid transformation, customer empowerment, data monetisation and electric mobility and robotics. The Company continued to work with three startups from this programme.

In support of the business community, EnergyAustralia was the sponsor and host of three 2019 COSBOA Innovation Games events. The Council of Small Business Organisations Australia (COSBOA) teamed up with Paddl Co on a series of events that allowed EnergyAustralia team members to work with small businesses to find innovative solutions to their energy problems.

In 2019 EnergyAustralia also participated in a Kidpreneur competition run by KPMG and Entropolis. Mentors from the Company benefited from a new perspective on the future generation's thoughts on issues facing the energy industry.

Officiating guests and representatives from member utilities unveil the CLP and Free Electrons Ecosystem Immersion Day.

MATERIAL TOPICS

Reinforcing cyber resilience and data protection

Cyber Security Strategy and related improvement programmes approved by the Board

Appointed Senior Director, Group Information Security, implementing a unified cross-CLP cyber security organisation

Reviews of operational effectiveness for cyber controls lead to enhancements in operational technology and other areas

Data Breach Response Plan implemented in Australia

CLP's Information and Operational Technology Cyber Security policies are based on the following principles:

Regulatory Compliance
Controls implemented must meet the relevant statutory requirements

Availability
Ensuring the information is available to authorised users when required

Confidentiality
The protection of the information from unauthorised disclosure

Integrity
Ensuring the completeness and accuracy of information

Year in review

Along the value chain in the electric utility sector, connected technologies such as cloud computing are increasingly being deployed to enhance the visibility of asset performance and improve efficiency.

Facilities such as smart meters and microgrids are collecting ever more information from pro/consumers. Unfortunately, this distributed energy landscape is also introducing new targets for malicious attacks. These attacks can occur in both CLP IT or OT systems:

- **Information technology (IT)**: the technology used to support normal business activities and processes (e.g. email, customer databases, finance systems).
- **Operational technology (OT)**: the technology used to control, monitor, support or manage systems and assets used to generate, transmit, distribute, deliver and manage electric power.

In a 2019 survey of more than 1,700 utilities professionals worldwide, 56% said they experienced at least one shutdown or operation data loss in the last 12 months. The focus has also shifted from attacks on IT to OT: respondents to the same survey agreed that attacks on their OT system have become a greater threat than those on their IT system. It was estimated 30% of attacks on OT systems remain undetected, and on average 72 days is required to respond to a malware attack.

CLP has had no instances of lost production or any operational shutdown due to cyberattack. However, in common with all companies in the Energy Sector CLP faces attacks on a daily basis, from criminals and other threat actors. In 2019, CLP stepped up its governance on cyber security. Cyber security is not a separate issue that is the sole responsibility of a dedicated department, but a business risk that needs to be managed holistically and integrated into daily operations . CLP's enhanced Group Cyber Security team acts as an in-house advisor and reviewer to help raise awareness amongst staff, and establish the system and tools required to protect information and other systems against cyber risks.

In 2019, there were no customer privacy or data loss cases reported in relation to the retail business of CLP Power Hong Kong. In Australia, four complaints were received, three of which have been formally closed by the Office of the Australian Information Commissioner with no further action required by EnergyAustralia.

Key metrics

Cyber Security Strategy and related improvement programmes approved by the Board

Appointed Senior Director, Group Information Security, implementing a unified cross-CLP cyber security organisation

Reviews of operational effectiveness for cyber controls lead to enhancements in operational technology and other areas

Outlook

Cyber resilience is especially important for companies like CLP which provide critical infrastructure. A cyber breach could have a significant impact not only on the Company, but also on the environment and the economy at large.

As electric utilities become more connected and decentralised, the exposure to malicious attack cannot be eliminated. It is only by embedding cyber security into the mindset of all employees and their daily tasks, and continually enhancing organisational capacity that a company can defend itself or respond promptly should an attack occur.

CLP has been making good progress in building up internal expertise and a strong organisational awareness of the importance of cyber security. As the business evolves and the systems that underlie it change, new vulnerabilities arise.

Going forward CLP will be implementing a range of further cyber security measures at a level of people, process and technology, with the Audit & Risk Committee maintaining an oversight. The Group will also continue its awareness raising and emergency preparedness initiatives, so that employees remain continually vigilant.

Highlights

How CLP has enhanced its cyber security governance, built internal capacity in the area, as well as its performance in relation to safeguarding information protection.

Enhancing cyber security governance

The Audit & Risk Committee continues to maintain oversight on the cyber security governance structure, and has endorsed the CLP Group Cyber Security Strategy.

As CLP's operations and value chain is increasingly digitalised, cyber security and defence have to be integrated and not treated as an add-on. This approach starts with a comprehensive governance framework, ensuring the effectiveness of existing and planned cyber security activities and investments.

One of the key responsibilities of the Audit & Risk Committee (ARC) is to assure that adequate risk management is in place and followed, and appropriate remedial actions are taken where needed. Cyber risk is considered as a top-tier risk for the CLP Group and is regularly assessed and reported to senior management through the risk management process. It is also embedded in all projects from the development phases to ensure cyber risks are considered at the early stages.

In 2018, CLP engaged external specialist cyber security consultants to review and make recommendations regarding CLP's future governance structure to respond to the increasing threats. The key recommendations of that report were accepted by the ARC and Management team. In 2019, the ARC continued to monitor the implementation of these recommendations. The Committee was presented with a detailed analysis and a roadmap for the enhancement of the Group's mitigation measures against the potential threats identified. Most significantly, a CLP Group Cyber Security Strategy has been developed and endorsed. Greater collaboration between Group Internal Audit and the Group cyber security function and the development of a regular statistical cyber security report for the ARC are expected.

The Cyber Security team maintain management oversight of cyber security across the CLP Group . The centralised approach helps to ensure that best practices are consistently maintained across all operations.

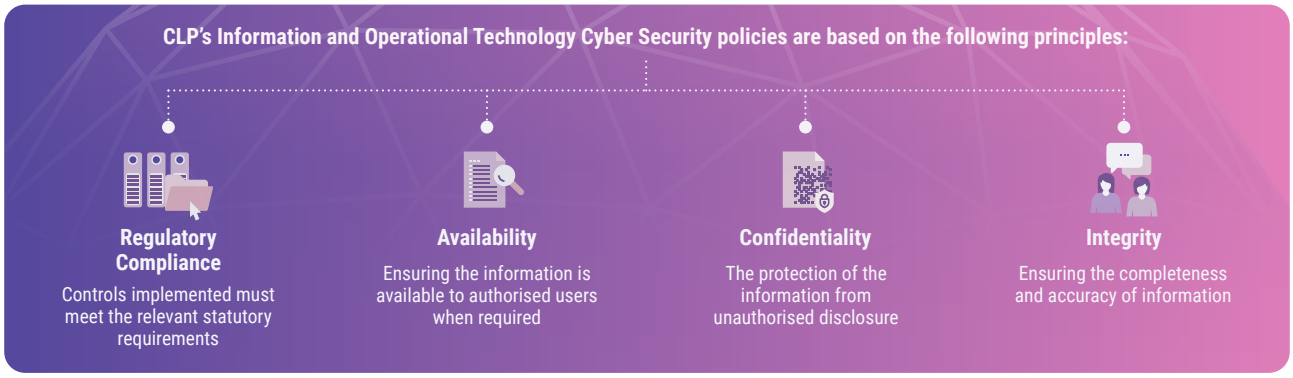
Read more from the Audit & Risk Committee Report

Integrating cyber security and defence into daily operations is essential.

Embedding cyber security practices

The CLP suite of cyber security policies and procedures guides the Company in protecting the information and systems, detecting anomalies early on and responding to any incidents to restore operations and services promptly.

The CLP portfolio is diversified across different countries in the Asia-Pacific. Nevertheless, they are all connected in cyber space. These connections are not necessarily through CLP's own systems but could also be through the systems of suppliers, customers, or even the personal devices of any stakeholders. It is therefore important to ensure sufficient cyber protection measures are in place consistently across all CLP business units, regardless of geographies.



In order to safeguard CLP's information and operations in accordance with these principles, effective security controls, practices and procedures must be implemented by all CLP employees and related business partners at all level across the business. To ensure these technical needs support rather than hamper business needs, the Group Cyber Security team acts as a one-stop-shop in providing cyber security assessment and advisory to different Group functions before any new technologies are deployed. A standardised cyber security requirement has also been developed for vendors so that any procured or outsourced systems are compatible and consistent with those of CLP.

There is no perfect solution to protecting the business, given the rising sophistication and frequency of cyber-attacks and data breaches globally. Early detection coupled with effective response and recovery measures are essential.

The CLP Group Cyber Security Incident Response Process establishes a consistent response protocol upon detection of an incident. The process was tested in regular drills throughout the year.

Find out more about CLP security and cyber security policies and procedures

Protecting personal data

CLP continues to build a holistic approach to managing and protecting data through the implementation of a variety of processes, roles, controls and metrics.

Personal information is essential to CLP's day-to-day operations, helping it improve the services it provides. These include data from customers, employees (both current and former employees and prospective job applicants), contractors and service providers, in addition to data on business partners, shareholders, visitors and members of the public as they interact with the Company.

The CLP Privacy Principles set out the commitment to protecting personal data. There is also an accompanying CLP Personal Data Protection Compliance Manual that provides guidance to business units with operations in Hong Kong on what these principles mean in practice. Both of these documents are enhanced periodically to ensure they meet the latest regulatory requirements and continue to reflect the expectations of CLP stakeholders.

In 2019, the retail business of CLP Power Hong Kong had no customer data loss cases reported.

In March 2019, one of the Internet portals in Hong Kong was infiltrated. Although the impact was negligible, the incident highlighted the importance of bolstering the cyber resilience of all operations.

EnergyAustralia received notification from the Office of the Australian Information Commissioner (OAIC) in relation to three separate privacy complaints received during the 2019 calendar year[2]. EnergyAustralia has provided the required updates to the OAIC and all three have been formally closed by the OAIC with no further action required to be taken by EnergyAustralia.

In addition, EnergyAustralia voluntarily reported eight separate instances of customer privacy breaches to the OAIC during the 2019 calendar year. One of these reported breaches has been formally closed by the OAIC and the Company awaits further instructions from the OAIC in relation to any actions required to be taken for the other seven breaches reported.

Building cyber defence capacity across the organisation

Upholding effective cyber security controls and procedures is the responsibilities of all staff. To this end, a range of awareness-raising activities were conducted throughout the year.

CLP is conscious that some areas of the business may be more vulnerable than others. As a consequence, the Group is investing significant time and resources in enhancing CLP's internal cyber security capabilities. In 2018, CLP established a specialist team of cyber security professionals by training internal experts from electricity operations. This initiative will help embed cyber security practices into CLP day-to-day business. This year, the team had been further enhanced and empowered to maintain management oversight of cyber security across the CLP Group. CLP has appointed a new Senior Director – Group Information Security to oversee the Group's cyber security strategy. CLP will also continue to increase the recruitment of information security experts to add to Group capacity.

A range of awareness-raising activities were conducted for employees throughout the year, including phishing drills, distribution of a regular publication, CyberNews, road shows on OT security across Group offices, and the hosting of Cyber Security Awareness Month during October 2019 in Hong Kong.

In light of the new mandatory data breach reporting obligations legislated under the Australian Privacy Act 1988 (Privacy Act), EnergyAustralia underwent an internal risk assessment to understand its ability to comply. Company-wide communications, employee training and briefing sessions with leadership were conducted to ensure all staff had current privacy and data management training. In addition, a Data Breach Response Plan was implemented, which included the establishment of a Data Breach Response Team to ensure the business has the capability and procedures in place to respond swiftly. The Plan aims to instil a heightened vigilance in CLP staff in relation to potential data breaches, whether in their work or in their personal lives.

[2] The number has been corrected and revised in July 2020 after an internal verification exercise.

MATERIAL TOPICS

Building an agile, inclusive and sustainable workforce

18,000+
employees and contractors

0.11 LTIR
for employees and contractors combined (per 200,000 manhour)

1 fatality
for employees and contractors combined

40.1
average training hours per employee

30+
employees participating in CLP and Decoded data analytics programme

900+
Hong Kong employees participated in Design Thinking training to nurture a people-centric innovation culture

24.2%
Women in **Leadership**

11.4%
Women in **Engineering**

200+
Women participating in CLP's **engineering mentoring programme**

Year in review

Over 18,000 employees and contractors contribute their energy, talent and shared values to CLP's customers, investors and stakeholders every day.

They power the Company's success. CLP's leading priority is safety: providing a safe, healthy and productive work environment for its people, complemented with the necessary training, equipment and support. With safety as the foundation, CLP is focused on addressing the significant opportunities and challenges presented by digitalisation and decarbonisation of the energy sector, together with intensifying demographic and labour supply issues and social and political uncertainties.

CLP is committed to ensuring the highest standards of safety across the entire operations and to making continuing improvements in its safety performance. Tragically, a fatal incident resulted in the death of a subcontractor's worker in Hong Kong in early 2019. An improvement review was carried out following the incident, and the Company is continuing its unrelenting efforts to prioritise safety in operations.

This year, CLP maintained its focus on developing pipelines of future general managers and engineering leaders in preparation for energy transition and digitalisation, and to address future skills shortages. Over 50 future leaders participated in executive and management development programmes, and the Company redesigned the Hong Kong-based Graduate Trainee Programmes into a single programme focused on future leadership and technical capabilities for launch in 2020. CLP continued to resource innovation and energy transition-related activities, recruiting from diverse locations and sectors, introduced new technician grade structures and invested in data analytics re-skilling.

CLP believes that supporting diversity and inclusion is critical to business performance as well as addressing future employment needs, and the Company continued to invest in increasing participation of women in engineering through mentoring schemes, and in strengthening female engineering networks to address potential isolation in the workplace.

The Company piloted more agile team structures and working environments in the CLP Innovation Hub at the Hong Kong Science and Technology Park, CLPe Solutions and Customer teams to encourage collaboration and speed up decision-making. Over 900 Hong Kong employees have participated in Design Thinking training since its launch in early 2019, deploying new skills to solve customer and operational problems.

As the electric utility industry evolves, CLP is committed to supporting all its people to thrive in change, and launched two key support programmes in 2019 in Hong Kong: a Home Loan scheme to support eligible employees to acquire their first home, and Boost Health and Wellbeing programme to help build wellbeing and resilience. The Company continued to focus on working practices across the extended workforce, including continuing to strengthen reporting of labour supply and service contractors and exercising more control and oversight over labour supply in Hong Kong.

Key metrics

1
fatality for employees and contractors combined

0.11
LTIR for employees and contractors combined (per 200,000 manhour)

24.2%
Women in Leadership

11.4%
Women in Engineering

40.1
average training hours per employee

Outlook

Industry, regional, demographic and social and political drivers are bringing unprecedented change to CLP and are redefining the people agenda.

There is no single solution to meet this workforce challenge: it requires a coordinated and integrated range of strategic initiatives to build an agile, inclusive and sustainable workforce.

While conventional energy needs will reduce in significance, the resourcing needs of renewable energy and new digital-based business and operating models will increase. CLP must find ways to attract and retain a more gender- and culturally-diverse, multi-generational workforce and to share talent effectively across the Group portfolio of businesses. This will support a strategy to pursue regional growth and address the demographic and labour market challenges of an ageing workforce and increased competition for science, technology, engineering and mathematics (STEM)-qualified people.

Energy transition, digital evolution and increasing social and political uncertainties and expectations in CLP's markets will result in significant change for its people in the coming years. The digital transformation of work and growth of automation will bring great benefits, together with disruption. The composition of the workforce is changing too. In 2020, millennials will make up around 43% of CLP's employees; this is expected to increase to 65% by 2025. This digital-native generation of employees bring different expectations of work and how CLP should engage and support them.

The changing operating environment also drives the need for greater organisational agility – the ability to adapt and succeed in a rapidly changing environment. The Value Framework provides the backbone, guiding how CLP treats its people. With this as a constant, the Company is focusing on leveraging technology to speed up decision-making, strengthening the culture and practice of innovation, and empowering its people.

As the industry evolves, CLP is committed to supporting all its people to thrive in change. This means helping everyone to embrace change, strengthening their wellbeing and resilience and developing more inclusive workplaces. The Company is investing in equipping leaders to lead transformation under increasingly complex social and political influences. It is also providing opportunities for employees to gain exposure to new technologies and business models across its regional footprint.

CLP is mindful that it operates in a social context where there is increasing concern over inclusive growth, basic rights and freedoms in the workplace and equality of income and opportunity. Consequently, employees and other stakeholders expect them to demonstrate values-based management in dealing with potentially divisive social issues. The Company is focused on ensuring they provide competitive, fair and sustainable benefits, support to employees in need, and on implementing labour standards across the extended workforce.

Highlights

CLP's strategies to manage the workforce and empower its people in an increasingly dynamic energy market reshaped by decarbonisation and digitalisation.

Keeping people safe and well

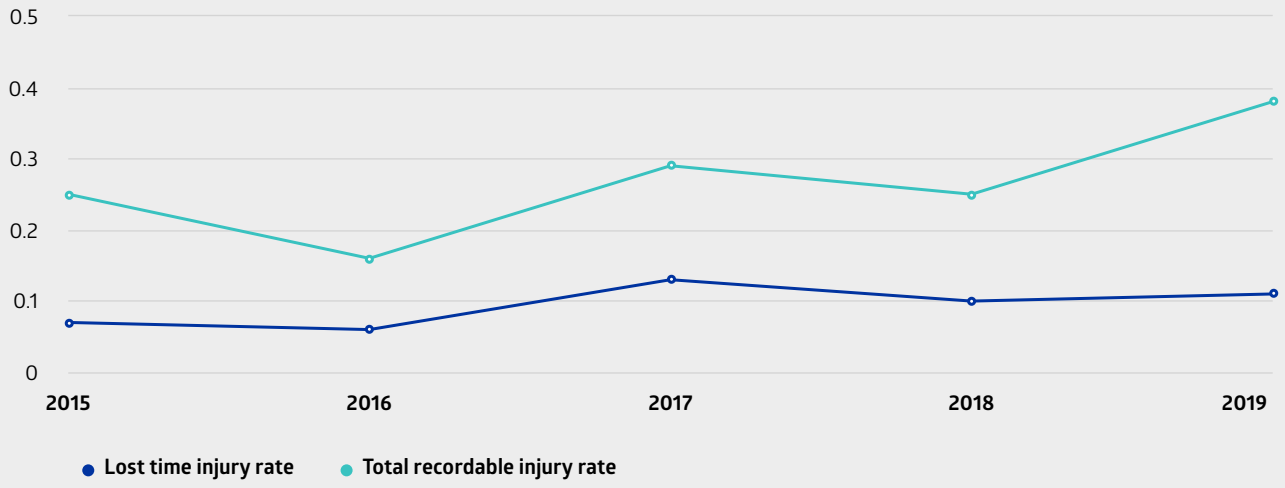
The safety of CLP's people has always been the foremost priority, and the Group remains committed to ensuring the highest standards of safety across the entire operation and ongoing improvements in its safety performance.

Tragically, CLP had one fatal incident that resulted in the death of a subcontractor's worker in Hong Kong in 2019. An internal panel completed an investigation into the incident in order to determine root causes and enable improvements in safety standards and procedures. Investigations into other incidents with the potential to cause serious injuries were also investigated.

The increase in the Group's injury rates in 2019 was driven primarily by the construction of the additional gas-fired generation unit in Hong Kong. The commencement of other planned capital projects will affect the Group's safety risk profile, and safety will continue to be prioritised. At the same time, the data also reflects an increase in the quality, frequency and consistency of incident reporting across the Group, as a result of the Health, Safety and Environment (HSE) improvement strategy established in 2018.

Lost time injury rate and total recordable injury rate of CLP Group (employees and contractors combined)[1]

The moderate increase in the Group's injury rates in 2019 was driven primarily by the construction of the additional gas-fired generation unit in Hong Kong.

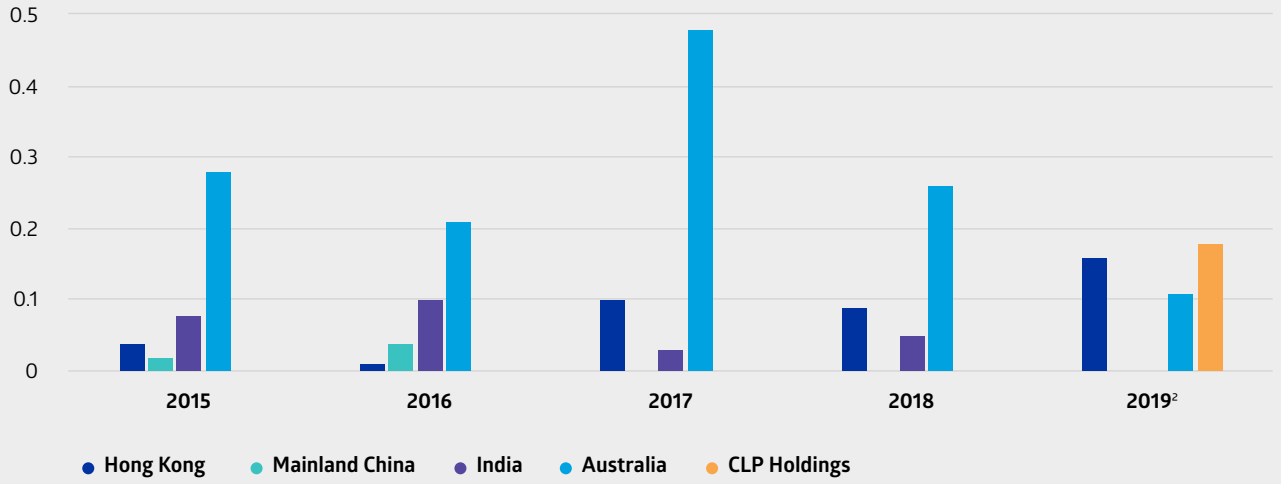


1 All rates are normalised to 200,000 worked hours, which approximately equals to the number of hours worked by 100 people in one year.

	2015	2016	2017	2018	2019
Lost time injury rate	0.07	0.06	0.13	0.10	0.11
Total recordable injury rate	0.25	0.16	0.29	0.25	0.38

Lost time injury rate by region (employees and contractors combined)[1]

The increased LTIR in 2019 was largely due to the performance in Hong Kong. Construction of the additional gas-fired generation unit exposes the Company to a new risk profile.

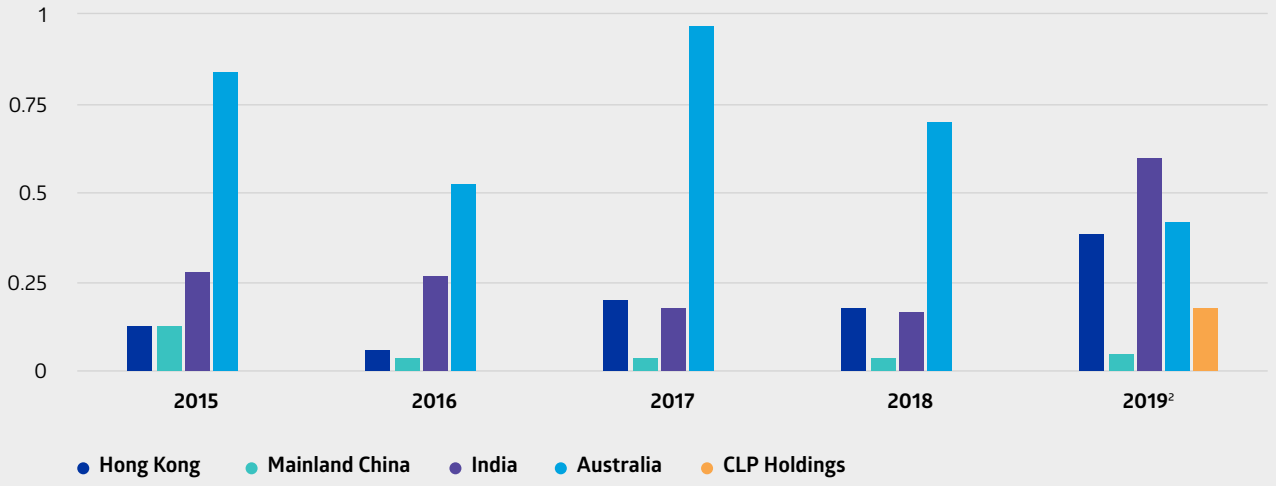


1 All rates are normalised to 200,000 worked hours, which approximately equals to the number of hours worked by 100 people in one year.
2 Starting from 2019, CLPe Solutions is reported under CLP Holdings to align with a change in internal reporting. Before that, it was reported under Hong Kong.

	2015	2016	2017	2018	2019[2]
Hong Kong	0.04	0.01	0.10	0.09	0.16
Mainland China	0.02	0.04	0.00	0.00	0.00
India	0.08	0.10	0.03	0.05	0.00
Australia	0.28	0.21	0.48	0.26	0.11
CLP Holdings	0.00	0.00	0.00	0.00	0.18

Total recordable injury rate by region (employees and contractors combined)[1]

The increased TRIR in India can predominantly be attributed to major maintenance activities, coupled with an overall increased frequency of reporting.



1 All rates are normalised to 200,000 worked hours, which approximately equals to the number of hours worked by 100 people in one year.
2 Starting from 2019, CLPe Solutions is reported under CLP Holdings to align with a change in internal reporting. Before that, it was reported under Hong Kong.

	2015	2016	2017	2018	2019[2]
Hong Kong	0.13	0.06	0.20	0.18	0.39
Mainland China	0.13	0.04	0.04	0.04	0.05
India	0.28	0.27	0.18	0.17	0.60
Australia	0.84	0.53	0.97	0.70	0.42
CLP Holdings	0.00	0.00	0.00	0.00	0.18

The HSE improvement strategy aims to uplift the Group's safety culture across all operating regions, promote more proactive risk management, and engage employees, contractors and other key stakeholders to collectively implement changes to improve safety performance.

CLP is committed to find new and better ways of working, by learning from investigations into incidents, as well as the adoption of best practices. For example, the Group implemented safety improvements in working at height and with other gravitational energies. In addition, Group-wide principles for a safety behavioural framework has been established which sets expectations for all levels of the organisation. CLP continues to support behavioural-safety observation programmes at key assets.

CLP continues to implement consistent standards across the Group for risk management, which includes identifying risks and opportunities.

Read more on safety management and performance

Managing the workforce responsibly today

CLP is openly addressing the fundamental and challenging issue of what constitutes the company's real workforce. Increasing transparency over the broader workforce including flexible and contingent workers ensures CLP is taking a responsible approach to managing costs and risks.

At the end of 2019, CLP had 7,960 full-time and part-time employees across the Group compared with 7,843[3] in 2018. A total of 4,305 employees were engaged in the Hong Kong electricity and related businesses and 3,294 by the businesses in Mainland China, India, Southeast Asia, Taiwan and Australia, with the remaining 361 employed by CLP Holdings. Total remuneration for the year ended 31 December 2019 was HK $6,054 million compared with HK$5,935 million in 2018, including retirement benefit costs of HK$593 million compared with HK$584 million in 2018.

CLP continued to focus on increasing transparency over the broader workforce to ensure a responsible approach is taken to manage the associated costs and risks. CLP employed over 18,000 employees and contractors on a full-time equivalent basis as at the end of 2019. The reporting methodology was evolved after the first reporting year in 2018 to include part-time workers and to estimate the service contractor workforce in each region based on local weekly working norms.

Utilisation of contractors marginally increased in 2019, reflecting the ongoing work in the major construction projects in Hong Kong, and a refined calculation methodology commensurate with generally lower average local working hours in Australia.

Employees and contractors by region

	Employees			Contractors			Total	
	Average FTE (a)	Permanent %	Fixed-term contract %	Labour supply (b)	Service contractor and sub-contractor (c)	Contractors sub-total	Total workforce (a)+(b)+(c)	Contractors in total workforce
Hong Kong	4,539.5	85%	15%	1,309.0	5,063.6	6,372.6	10,912.1	58%
Mainland China	603.7	72%	28%	13.0	350.2	363.2	966.9	38%
India	463.3	99%	1%	78.5	2,453.4	2,531.9	2,995.2	85%
Australia	2,248.9	95%	5%	172.5	1,683.7	1,856.2	4,105.1	45%
Group total	**7,855.4**	**88%**	**12%**	**1,573.0**	**9,550.9**	**11,123.9**	**18,979.3**	**59%**

[3] Year-end total of full-time and part-time employees. Previously-reported data for 2018 includes full-time employees only.

Attracting and retaining tomorrow's workforce

At the end of 2019, CLP's employees had close to 100,000 years of service in total at CLP – a hugely valuable body of experience, skills and knowledge through which the Company delivers value to customers and other stakeholders.

Retaining the organisational knowledge within the Company, together with transferring skills to a new generation of managers and team members is essential to CLP's long-term success, as is developing skills for a low-carbon, digitally-enabled future.

This year, CLP employees received on average 40 hours of internal and external training and development, compared with average 45 hours in 2018[4]. The difference reflected lower training hours in the Paguthan plant in India, as well as in the Mainland China operations due to a lower turnover rate, and hence fewer hours in total of new hire training. A review of validity periods in Hong Kong resulted in longer validity periods being applied for some regular refresher training.

The development of future executives and high-potential Group engineering leaders continues, in partnership with the International Institute for Management Development (IMD), and École Polytechnique Fédérale de Lausanne (EPFL). More than 50 employees participated in leadership and pipeline development programmes, in line with 2018.

Investing in building pipelines of skilled engineers and technicians in response to the energy transition and to address future skills shortages is a key priority. In 2019, CLP introduced new technician grade structures and technician trainee roles in Hong Kong to enhance progression and retention. A group of 22 high-potential engineering leaders participated in a cross-business engineering development programme. The Hong Kong-based Graduate Trainee programmes were reviewed and redesigned into a single programme focused on future leadership and technical capabilities, launching in 2020. In Mainland China, CLP conducted assessment for young local engineers, providing individual development plans and feedback. The Group continued to recruit high potential early- to mid-career engineers to supplement internal development efforts and facilitate international development assignments, as well as strengthen resourcing of innovation and energy transition-related activities and projects, recruiting 29 senior hires in 2019 into critical roles.

Employee training

	2019	2018	2017	2016	2015
Average training hours per employee (hours)[1]	**40.1**	46.1	46.9	49.2	57.2

1 2019 number includes full-time and part-time employees. Numbers in previous years include full-time employees only.

CASE STUDY

Being a CLP Big Data Pioneer: Data Analytics Programme

To support the development of skills for a digitally-enabled future, CLP partnered with Decoded, a technology educator, to launch a one-year data analytics programme in Hong Kong in 2019.

Over 30 employees across the Hong Kong business gained a rich understanding of data and mastered cutting-edge data analysis tools and techniques to leverage CLP's data in new and insightful ways. To date, participants have utilised data analytics techniques to enhance operating efficiency, including reviewing water loss rates in natural gas-firing units, identifying units with sub-optimal operations and increasing the accuracy of predicting failure in wind turbines. At the end of the programme, participants can complete industry qualifications to become accredited Data Science Associates.

4 Includes full-time and part-time employees.

CASE STUDY

CLP Power Academy widens career options for young people

Graduates celebrating at the CLP Power Academy graduation ceremony.

The training and development opportunities provided by CLP go beyond employees. Since its inception in 2017, CLP Power Academy has been offering a range of programmes designed for young people in Hong Kong.

These programmes are suitable for young people with varying academic achievements and work experience. From entry-level courses for secondary school leavers without relevant qualifications to advanced post-graduate degrees for more experienced industry practitioners, the high-quality vocational and professional education programmes at the Academy widen the career options of young people and promote access to opportunities for young people from different backgrounds including those from underprivileged homes and ethnic minorities. Students include individuals referred by CLP partners such as the Society for Community Organization and Youth Outreach, both of which support grassroot and disadvantaged young people.

The Academy continued to broaden its range of curricula in 2019, offering new courses in mechanical engineering as well as programmes focused on electrical engineering. In January 2019, the Academy celebrated the graduation of its first intake of students after they successfully completed the Professional Diploma in Power Engineering and the Certificate for Junior Electricians programmes. In September 2019, a new Dual Master's Degree Programme in Future Energy and Power System Operation and Management has been launched, which is collaborated with The Hong Kong University of Science and Technology (HKUST) and The University of Strathclyde (UoS). The Academy will continue to explore opportunities to launch more professional training programmes.

CLP Power Academy is a founding member of the Corporate Tech Academy Network (CTAN), an alliance formed by Hong Kong companies in May 2019 to promote vocational training and professional education and training for young people. Other members of CTAN are MTR Academy, Hong Kong Institute of Construction, Hong Kong International Aviation Academy, Towngas Engineering Academy, and the academy of the Hong Kong Productivity Council.

The work of the Academy is complemented by other CLP programmes, such as the Engineer in School programme. It collaborates with organisations including the Hong Kong Association of Career Masters and Guidance Masters, to promote power engineering as a profession. More importantly, it is hoped that the education and engagement provided by the Academy will empower young people, support their positive development and offer them an alternative career pathway.

Find out more about CLP Power Academy

Supporting diversity and inclusion

A diverse workforce and an inclusive culture support high performance and CLP's ability to operate effectively in the many communities which host the Group's assets.

Given the opportunity presented by increasing levels of female workforce participation, CLP has set several Group-wide gender diversity targets which support the UN SDGs, in particular the commitment to SDG 8 – Decent Work & Economic Growth. CLP's Women in Leadership percentage increased to 24.2% while Women in Engineering increased to 11.4%. This progress reflects the Group's continued commitment and efforts in attracting and developing female employees, and the focus on creating a diverse and inclusive workplace.

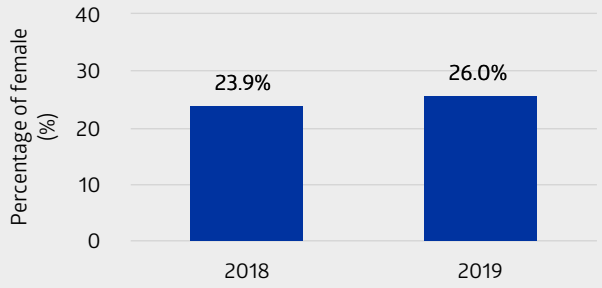
CLP continues to undertake initiatives to encourage more women into the workforce. These included mentoring programmes for over 40 female engineering students to provide exposure to its operations and help them become more work-ready, together with holding the annual Female Engineer Networking event for the first time in India, with over 20 female engineers participating from across the Group. In Mainland China, hiring staff with ethnic-minority backgrounds continues.

Across the Group, the Company continued to enhance leave and flexible working policies, providing continuation of full medical and other benefits for employees working part-time or on unpaid leave. Recognising the diverse backgrounds and needs of employees, EnergyAustralia is piloting flexibility for employees to choose public holiday dates in 2020 to meet cultural and social obligations.

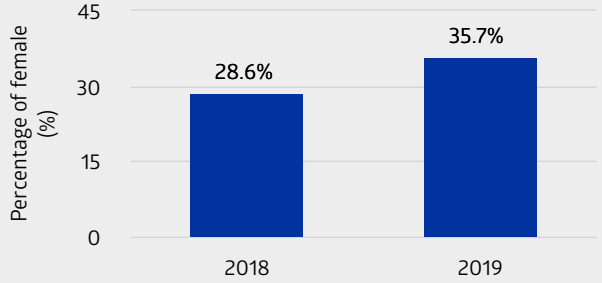
Following certification of the Hong Kong operations as a Fair Wage Employer in 2018, a follow-up assessment was conducted in 2019 and confirmed extended recognition for another year. In Australia, gender pay differentials were addressed in 2018. Analysis conducted on a job grade basis in 2019 showed that the gender pay gap issue has been addressed, with no further direct action required.

Female representation has increased across all levels in 2019 compared to the previous year, as shown in the charts.

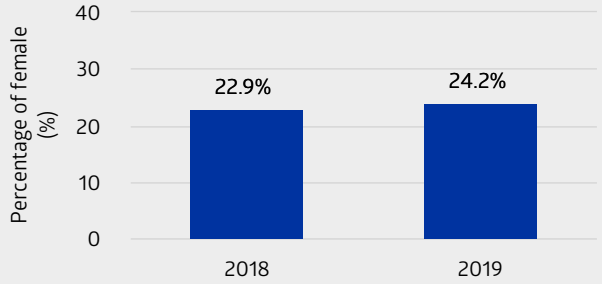
Total employees



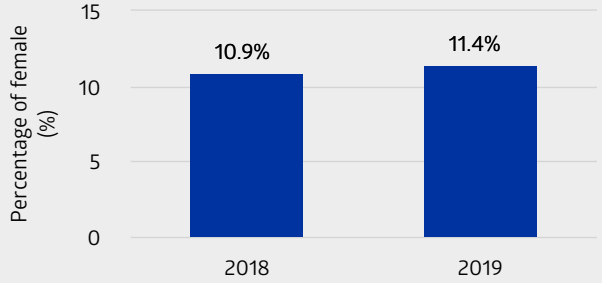
Group Executive Committee (GEC)



Women in Leadership



Women in Engineering



CASE STUDY

Supporting Women in Engineering

Over 20 participants joined the Group-wide female engineer networking events in India in November 2019.

To transform the business into a Utility of Future, CLP needs talented, diverse engineers on board.

To achieve its goals as an organisation, CLP needs people from all backgrounds who want to make a difference and help transform the business. As part of this, the Company has committed to significantly increasing the number of female engineers in each of the businesses over time, and to developing a strong network of female engineers across the Group. A mentoring programme was launched in Hong Kong in 2015 to provide opportunities for female engineering students from local universities to better understand the engineering profession and the power industry, and to support them to pursue a career in engineering. Over 200 women have participated in the programme to date as mentees and mentors, with over 80% indicating an increased interest in an engineering career.

CLP recognises that isolation in the work environment is one of the key reasons for women leaving engineering careers and Group-wide female engineer networking events were organised annually to address this issue. This year, the networking event was held for the first time in India, with over 20 participants gaining insights into renewables technologies and business models, as well as training in career management and storytelling.

Building organisational agility

The complexities of the energy transition, digital evolution and increasing social and political uncertainties and expectations in CLP's markets drive the need for greater organisational agility – the ability to adapt and succeed in a rapidly changing environment.

In response to these developments and trends, CLP is developing and implementing action plans across the business to simplify processes and ways of working to free its people from non-value adding tasks so they can focus on key priorities. The Company is also accelerating impact through new agile ways of working. Across the Group, the Company is piloting more agile team structures and working environments in the CLP Innovation Hub at the Hong Kong Science and Technology Park, CLPe Solutions and Customer teams to encourage collaboration and speed up decision-making and planned significant working environment changes for the China and EnergyAustralia teams for 2020 launch.

Over 900 Hong Kong employees have participated in Design Thinking training since its launch in early 2019. The programme is intended to nurture a people-centric innovation culture throughout the business, and to provide a practical problem-solving framework for product and service development with users' needs in mind. To date, colleagues have applied Design Thinking in projects spanning across digital transformation, productivity, safety and customer services.

CASE STUDY

Applying design thinking on plant digitalisation

CLP employees have applied Design Thinking in projects spanning across digital transformation, productivity, safety and customer services.

Applying new ideas and technologies to make work more effective is critical to CLP's future success. CLP Power has launched an organisation-wide initiative to promote Design Thinking at all levels, providing tailored training to teams.

Among many Design Thinking applications this year, a team of maintenance engineers worked together to apply their new skills to reduce risk in regular power station site inspections, many of which take place at height or in confined spaces. Through consultation, drone technology was identified as a potential solution. The team used low-cost materials and tools to simulate the user experience and prototype the solution, before successfully trialling a fully-functional drone model. Inspection safety has improved, and costs reduced. Further technology refinements have now been introduced based on user feedback and the team is working on extending the solution to other parts of the business.

Supporting people to thrive in change

As the electric utility industry evolves, CLP is committed to supporting all its people to thrive in change. This underpins the core value of 'Care for People' as well as being good business practice in constrained labour markets.

Supporting its people to thrive in change means engaging and helping CLP's people to embrace change and strengthen their wellbeing and resilience, in addition to developing more inclusive workplaces, supporting increased gender, age and cultural diversity.

CLP was again voted Hong Kong's Most Attractive Employer in the Randstad Employer Awards in 2019, the first company to win the award three times since the programme's launch.

Two key programmes – the CLP Home Loan Scheme and the Boost Health and Wellbeing programme – were introduced in 2019 in Hong Kong. The CLP Home Loan Scheme provides additional financial support for employees seeking to buy a first home. The Company recognises that housing affordability is a significant issue for Hong Kong's young people. At the same time, attracting and retaining staff in an increasingly competitive talent market is critical for CLP's long-term sustainability. The Home Loan scheme is an important initiative to address both challenges. Since the scheme was launched, feedback from employees has been very positive and 40 employees have received assistance to date.

The Boost Health and Wellbeing programme aims to support Hong Kong-based employees to look after their physical health, mental wellness, social health and financial wellbeing. An online survey was launched to learn more about employees' lifestyles and seek their ideas for the programme, achieving a very encouraging response rate of over 80%. Survey results will drive major initiatives to improve the health and wellbeing of employees in 2020 and beyond.

Demonstrating fair work practices

The commitment to caring for all its people, as a leading responsible employer, has guided how CLP works for nearly 120 years.

The Company's human resources policies and procedures are intended to ensure that it complies with all local laws and regulations in relation to compensation and dismissal, recruitment and promotion, working hours, rest periods, equal opportunity, diversity, non-discrimination, and those covering benefits and welfare in the markets where it operates. CLP takes immediate action to investigate and address any suspected breaches or issues that are brought to its attention and carries out independent audits to proactively identify any risks of legal non-compliance and to take remedial action if any risks are identified.

In addition to local legal compliance, CLP respects internationally-proclaimed human rights across its value chain. It is recognised that the responsibility to respect human rights extends to the network of suppliers and contractors. In 2019, the Company continued to focus on working practices across the extended workforce, including continuing to strengthen the reporting of labour supply and service contractors and exercising more control and oversight over labour supply in Hong Kong.

CLP prohibits the employment of child labour or forced labour in any of its operations. The Group did not identify any operation or supplier as having significant risk of child labour, young workers exposed to hazardous work, or forced or compulsory labour in 2019. There was no breach of laws and regulations in relation to child and forced labour across CLP in 2019.

The Group monitors pay carefully to ensure that it is competitive and rewards employees for individual and company performance. CLP complies fully with any local legal requirements with respect to minimum wage, and in practice, the remuneration and benefits often significantly exceed local legal requirements. The core benefits are also reviewed regularly to ensure they are fit for purpose and sustainable. In recognition of the high value placed on sustainable retirement benefits, in 2019, CLP received a Good Mandatory Provident Fund (MPF) Employer award and e-Contribution awards from the MPF Schemes Authority in Hong Kong, and an award for the Best ORSO (Occupational Retirement) Scheme from the publication Asia Asset Management.

Glossary

Accelerator programme	A competitive programme that supports the development of startup companies by providing them access to mentorship, networking and sometimes financing opportunities.
Air emissions	The emission of air pollutants such as sulphur dioxide (SO_2), nitrogen oxides (NO_x) and particulate matter (PM).
Capacity purchase	Power generation capacity contracted under long-term agreement.
Capital investments	Includes additions to fixed assets, right-of-use assets and intangible assets, investments in and advances to joint ventures and associates, and acquisition of business.
Carbon credit	A carbon credit is a tradeable instrument which represents either (a) a permit which gives the holder the right to emit one tonne of carbon dioxide or equivalent greenhouse gas ($tCO2_e$) into the atmosphere or (b) a certificate from a project that represents the removal or avoidance of one $tCO2_e$ from the atmosphere. CLP Carbon Credits (https://www.clpcarboncredits.com) are generated from renewable sources (like wind or solar) and can be used to offset carbon emissions generated by governments, organisations or individuals.
Carbon neutral	When the GHG emissions associated with an activity or entity are balanced by carbon removal elsewhere, such as carbon credits, carbon sinks or storage. Also known as net zero carbon dioxide emissions.
Clean energy	Generally refers to power sources that add no extra carbon to the atmosphere. Non-carbon emitting energy, including renewable energy, is considered clean energy in CLP's context.
Climate Action Finance Framework (CAFF)	Launched by CLP Group in 2017 on how it proposes to finance projects with positive climate impact through two types of bonds. Energy Transition Bonds are used for financing of projects delivering significant greenhouse gas emissions reductions. New Energy Bonds are used to finance investments in renewable energy generation, improvements in energy efficiency and low carbon transport infrastructure.
Climate Vision 2050	CLP's Climate Vision 2050 sets out a series of 10-year targets from 2010 to 2050 compared to 2007 levels. These targets are based on the company's generation capacity on an equity plus long-term capacity and energy purchase basis. They consist of decarbonisation targets, measured in terms of the Group's carbon intensity, and clean energy targets, based on the renewable and non-carbon emitting energy share of CLP's generation portfolio.
Combined-cycle gas turbine (CCGT)	A technology used in gas-fired generation to enable significantly higher efficiency by utilising residual heat from gas turbine exhaust to run steam turbine and generating additional electricity.
Decarbonisation	Decarbonisation of the power sector primarily refers to the reduction in the greenhouse gas emissions from electricity generation. At CLP it is measured by the reduction in the carbon intensity, which is expressed in kilograms of carbon dioxide per kWh of electricity sent out.
Decentralised generation / distributed generation	Refers to electrical generation and storage performed by a variety of technologies of a smaller scale located close to the load they serve. In contrast, centralised generation is the large-scale generation of electricity serving multi-loads connected to the transmission network.
Demand response	Demand response programmes encourage participating customers to commit to short-term reductions in electricity demand, helping energy suppliers to keep the grid running optimally during high load periods.
Design thinking	Design Thinking is a human-centred, problem-solving methodology that focuses on the needs of users, enabling organisations to create better products, services and processes that solve users' pain points.
Digitalisation	The application of new information technologies including artificial intelligence and data analytics to help electricity utilities develop new customer-centric services and improve operations.
Dispatchable energy	Refers to power sources that can be used on demand and dispatched at the request of power grid operators according to market needs.

Distributed energy	Includes power generated from sources such as solar panels and wind turbines located close to the users, as well as controllable loads or storage such as electric vehicles and batteries.
Electricity sent-out	Gross electricity generated by a power plant less self-generated auxiliary power consumption, measured at connecting point between generating unit and transmission line.
Energy purchase	Electricity purchased from assets not owned by CLP to meet customer demand as per a long-term contractual agreement.
Energy transition	Transformation of the global energy sector from fossil-fuel based energy systems to low- or zero-carbon sources.
Energy transition enablers	Non-generation products or services that facilitate the energy transition, including energy storage, transmission and distribution, electric vehicle charging points and smart meters, amongst others.
Equity basis	An approach set out by the GHG Protocol Corporate Standard for an organisation to consolidate GHG emissions for the purpose of accounting and reporting GHG emissions. On this basis, the organisation accounts for GHG emissions from operations according to its equity share in the operations.
Feed-in Tariff (FiT)	Payable by Hong Kong power companies under the SoC Agreement to purchase electricity from approved renewable energy projects. Find out more at http://www.clp.com.hk/en/community-and-environment/renewable-schemes/feed-in-tariff.
Flue gas desulphurisation (FGD) facility	Equipment used to remove sulphur oxides from the combustion gases of a boiler plant before discharge to the atmosphere.
Generation capacity	The maximum amount of power that a generator is rated to produce. Also known as installed capacity or nameplate capacity.
Greenhouse gas (GHG)	The emission of gases that contribute to the greenhouse effect causing a changing climate. CLP's GHG emissions inventory covers the six GHGs specified in the Kyoto Protocol. Nitrogen trifluoride (NF_3), the seventh mandatory gas added under the second Kyoto Protocol, was was deemed immaterial to CLP's operations after an evaluation. The GHG Protocol Corporate Standard classifies an organisation's GHG emissions into three 'Scopes'. Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 are indirect emissions (not included in Scope 2) that occur in the value chain of the organisation.
Intergovernmental Panel on Climate Change (IPCC)	The United Nations body for assessing science related to climate change. IPCC assessments provide a scientific basis for governments at all levels to develop climate related policies, and they underpin negotiations at the UN Climate Conference – the United Nations Framework Convention on Climate Change (UNFCCC). Find out more on https://www.ipcc.ch.
International Energy Agency (IEA)	An autonomous organisation which works to ensure reliable, affordable and clean energy for its 30 member countries and beyond. Find out more on https://www.iea.org.
Megatrends	Large, transformative global forces that define the future by having a far-reaching impact on business, economies, industries, societies and individuals. A megatrend is distinguished from other trends in that it cannot be stopped or significantly altered, even by powerful actors such as governments. Megatrend analysis is an important tool for companies aiming to drive sustainable growth as competition increases and new disruptive ideas and concepts affect entire industries.
Microgrids	Localised networks with generation, energy storage and load entities, that can operate in tandem with an existing grid or independently. They can potentially be deployed to meet the energy needs of remote areas cost-effectively, forgoing the expenses of transmission grids.
Non-carbon energy / non-carbon emitting energy	Energy from power sources that add no extra carbon to the atmosphere, such as nuclear and renewable energy.
Offshore LNG terminal	Offshore LNG terminals receive cargos of liquified LNG for processing into fuel. The Floating Storage and Regasification Unit (FSRU) is where the LNG cargo is unloaded, stored and regasified for transport to a power station or other users.

Operational control basis	An approach set out by the GHG Protocol Corporate Standard for an organisation to consolidate GHG emissions for the purpose of accounting and reporting GHG emissions. On this basis, the organisation accounts for 100 percent of the GHG emissions from operations over which it has operational control, but does not account for GHG emissions from operations in which it owns an interest but has no control.
Particulate matter (PM)	Microscopic solids or liquid droplets in the air.
Phase out coal-fired generation capacity	In CLP's context, phasing out coal-fired generation capacity refers to (a) the retirement and closure of a coal-fired power asset; (b) the move away from a build-operate-transfer coal-fired project before the end of the contract term or according to the terms of the project; or (c) the divestment from a coal-fired asset.
Power Purchase Agreement (PPA)	A long-term electricity supply agreement specifying deliverables such as the capacity allocation, the quantity of electricity to be supplied and financial terms.
Pumped storage	Method used for large-scale storage of power. During non-peak times, electricity is used to pump water to a reservoir. During peak times, the reservoir releases water for hydroelectric generation.
Renewable energy	Energy that is generated from renewable resources, which are naturally replenished on a human timescale, including sunlight, geothermal heat, wind, tides, water, and various forms of biomass.
Renewable Energy Certificates (RECs)	RECs represent all the environmental attributes associated with electricity produced by local renewable sources in Hong Kong including solar, wind and waste-to-energy power projects, purchased or generated by CLP.
Scheme of Control Agreement (SCA)	The SCA with the Hong Kong Government provides a regulatory framework for the city's electricity industry, enabling CLP Power Hong Kong to operate the facilities and plan new investments to meet the electricity demand of customers, as well as environmental objectives.
Science-based target	A target for greenhouse gas reductions that is in line with the goals of the Paris Agreement to limit global temperature increase to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.
Science Based Targets initiative (SBTi)	A collaboration between CDP, World Resources Institute (WRI), the World Wide Fund for Nature (WWF), and the United Nations Global Compact (UN Global Compact) and is one of the We Mean Business Coalition commitments. The initiative defines and promotes best practice in science-based target setting, offers resources and guidance to reduce barriers to adoption, and independently assesses and approves companies' targets. Find out more on https://sciencebasedtargets.org.
Sectoral Decarbonisation Approach (SDA)	The SDA of the Science Based Targets initiative allocates a 2°C carbon budget to different sectors. This method takes into account inherent differences among sectors, such as mitigation potential and how fast each sector can grow relative to economic and population growth. Within each sector, companies can derive their science-based emission reduction targets based on their relative contribution to the total sector activity and their carbon intensity relative to the sector's intensity in the base year.
Sustainable Development Goals (SDGs)	The 17 SDGs, adopted by all United Nations Member States in 2015, are the blueprint to achieve a better and more sustainable future for all. Find out more on https://sustainabledevelopment.un.org.
Task Force on Climate-related Financial Disclosures (TCFD)	The TCFD seeks to develop recommendations for voluntary climate-related financial disclosures that are consistent, comparable, reliable, clear, and efficient, and provide decision-useful information to lenders, insurers, and investors. The TCFD's members were chosen by the Financial Stability Board to include both corporates and users of disclosures from across the G20's constituency covering a broad range of economic sectors and financial markets. Find out more on https://www.fsb-tcfd.org.
World Business Council for Sustainable Development (WBCSD)	The World Business Council for Sustainable Development is a CEO-led organisation of over 200 leading businesses and partners working together to accelerate the transition to a sustainable world. Find out more on https://www.wbcsd.org.

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