

Sustainability Review

FY 2021/2022



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About this report

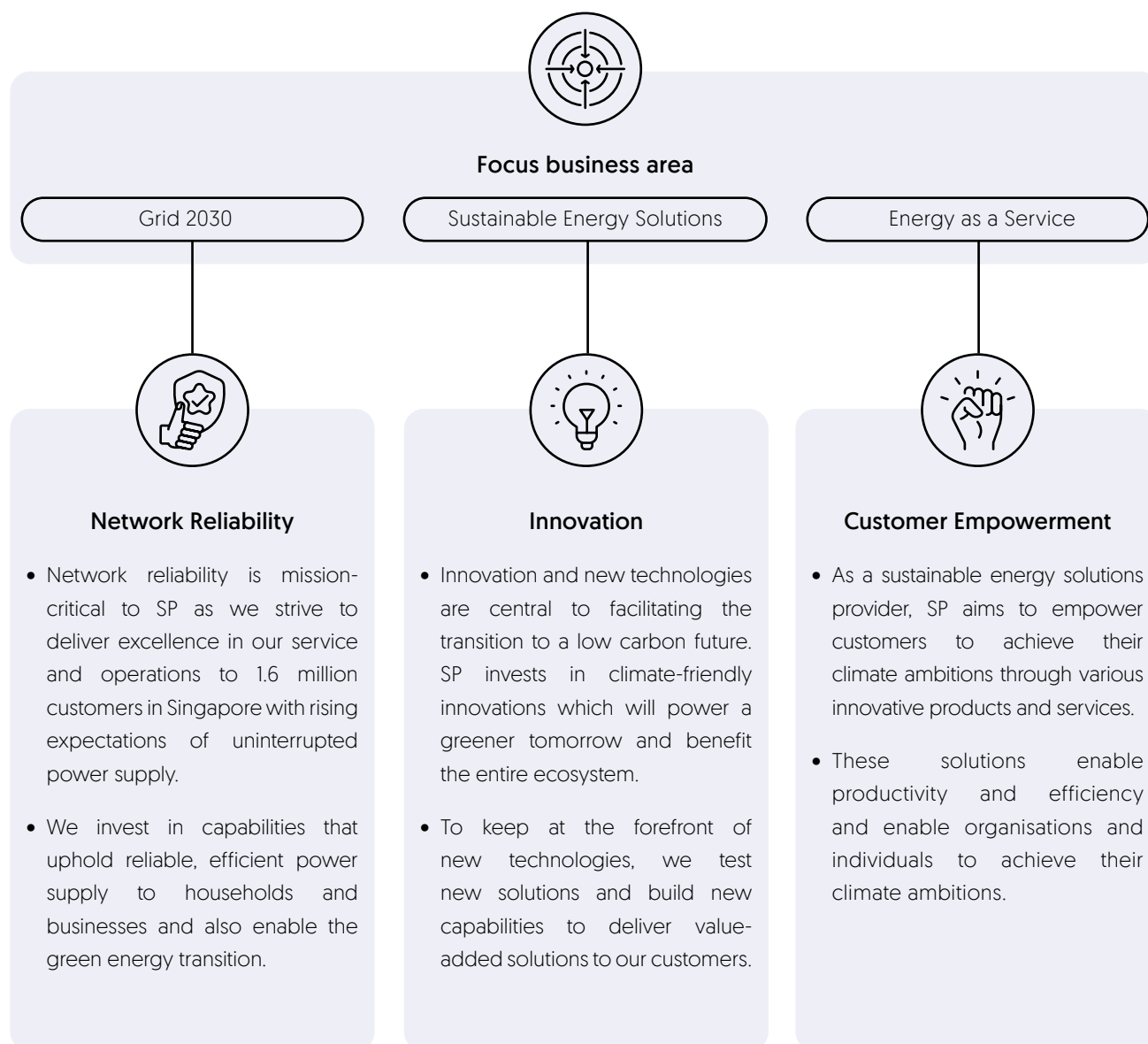
This is SP Group's [SP] third sustainability review and the first to incorporate the reporting recommendations of the **Taskforce on Climate-related Financial Disclosures (TCFD)**. It reflects our commitment to accountability to stakeholders as well as our drive for continuous improvement in our sustainability performance, towards climate action.

This review showcases the initiatives and performance of our operations across our key business areas for the **financial year from 1 April 2021 to 31 March 2022 (FY21/22)**, unless otherwise stated. The scope of this review covers **SP's operations in Singapore, China, and Vietnam**.

The report is to be read in conjunction with the Chairman's message and other sustainability-related information on SP's corporate website, [SP Energy Hub](#). We have included historical data from FY19/20 and FY20/21 for comparison where applicable.

Materiality

The contents of this review have been informed by an assessment of the material sustainability topics that are of greatest importance to our business and stakeholders. We have identified three material topics that support our actions towards the achievement of the targets of United Nation's Sustainable Development Goals [SDG] 7 and 9, 1) Network Reliability, 2) Innovation and 3) Customer Empowerment.



In 2021, our Executive Leadership Team [ELT] reviewed the identified material topics and they were determined to be valid. The urgency to address the identified material topics have heightened and we need to tackle the challenges expeditiously. Furthermore, we recognised the need to incorporate corporate governance disclosure in our sustainability review.

We also assessed the climate-related risks and opportunities that are material to SP. The process and results of this exercise are presented in the [Resilience to climate change](#) section of this report.

About SP Group

SP Group [SP] is a leading utilities group in Asia Pacific, empowering the future of energy with low-carbon, smart energy solutions for our customers. We own and operate electricity and gas transmission and distribution businesses in Singapore and Australia, and sustainable energy solutions in Singapore, China, and Vietnam.

In 2021, SP updated its tagline to **“Empowering the Future of Energy”** to reflect our 2030 ambition to create a low carbon, smart energy Singapore and be a regional leader in sustainable energy solutions.

As Singapore’s national grid operator, about 1.6 million industrial, commercial, and residential customers benefit from our world-class transmission, distribution, and market support services. These networks are amongst the most reliable and cost-effective in the world.

SP provides a full suite of sustainable energy solutions including district cooling, electric vehicle charging, renewables, and energy as a service to achieve our 2030 ambition:



Grid



District cooling



Electric vehicle charging



Renewables

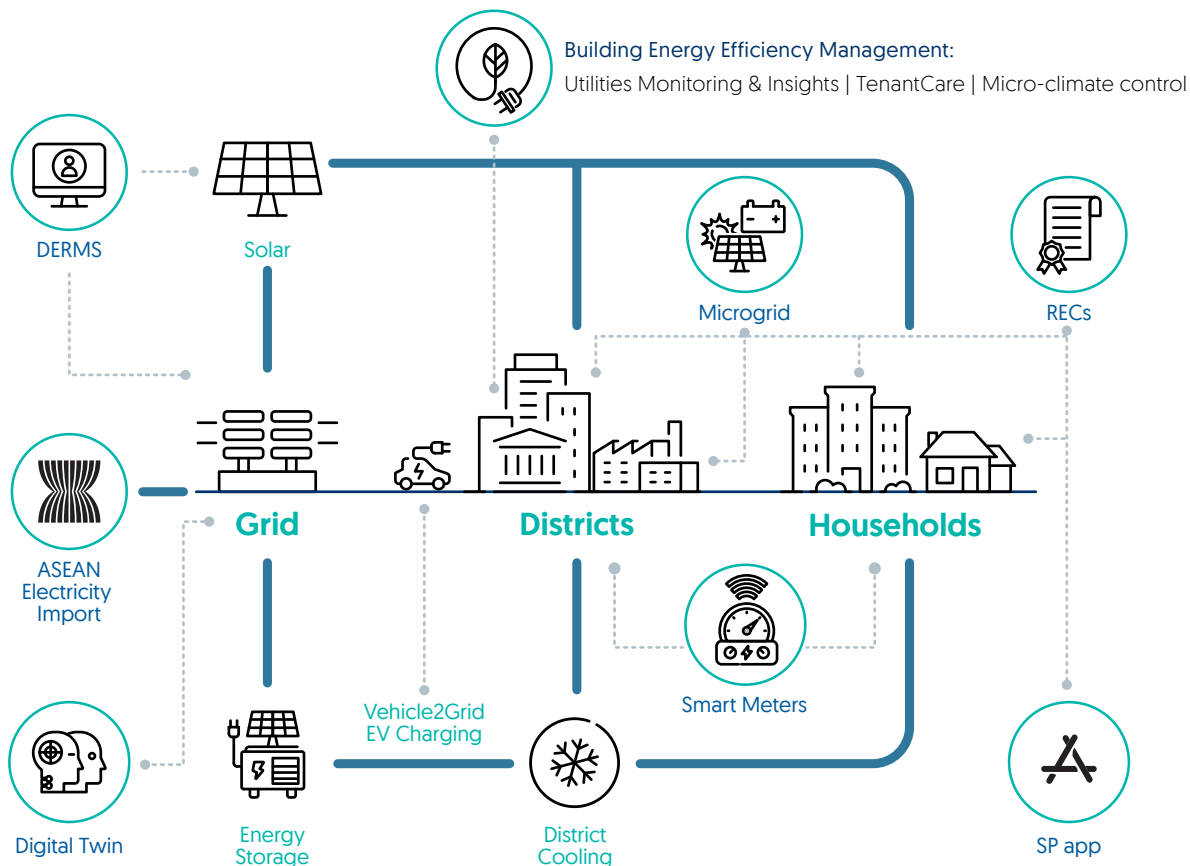


Energy as a Service

(Smart Metering, Digital Solutions, and RECs)

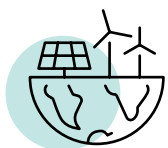
SP’s sustainable energy solutions enable green buildings and sustainable infrastructure, enhance efficiency, and empower customer with sustainable tools. District cooling for business districts and residential townships enhances energy efficiency. Electric vehicle charging and renewable energy enables decarbonisation of the transportation and power sectors, while digital energy management tools provide customers with the information to make greener choices.

Our sustainable energy ecosystem



Empowering the Future of Energy

At the SP energy ecosystem, we



Enhance
Grid reliability
and enable renewable
energy integration



Decarbonise
transport
with electric vehicle charging



Green
buildings and districts
with district cooling systems and
building efficiency solutions



Empower
consumers
with data and carbon solutions

Our impact

Overall



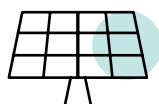
0.11 min and **0.1979** min
SAIDI achieved for **Electricity and Gas Grid** respectively



More than **190,000** RT
of **district cooling**
secured regionally



525 EV charging points
installed in Singapore¹



111 MWp solar capacity
secured across Asia.

Almost **320** MWp
under development²



1.5 million downloads
of the **SP app**

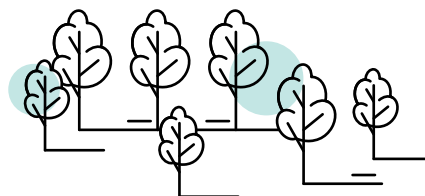


40x increase
in **RECs volume**

Environmental



Scope 1 emissions of
78,173 tonnes CO₂e



Emissions avoided - more than **206,000 tonnesCO₂e**,
equivalent to planting more than

10 million rain trees³ or taking more than **180,000 cars**
off the road for a year⁴.



Scope 2 (market-based) emissions
of **419,959** tonnesCO₂e

People and Community



179,000 hours of
staff training and development
provided



Zero fatalities,
Lost time injury frequency rate of
0.42 per million working hours



\$4.5 million in
donations, sponsorships and volunteer
manpower

¹ As of 31 May 2022.

² As of 31 July 2022.

³ One mature rain tree absorbs 0.0201 tonnesCO₂ a year - data from My Carbon Footprint study by South Pole

⁴ Annual carbon emissions from 1 internal combustion engine (ICE) car of 1.1tCO₂e/year. Data from SP Group and Temasek (August 2021): Taking The Heat Off Cooling: A Greener Way to Cool.

Sustainability strategy

SP is a leading utilities company that creates value and enables the climate ambitions of our stakeholders. With the development and implementation of our Corporate Strategy 2030, a 10-year roadmap that guides us towards a low carbon, smart energy Singapore - sustainability has become central to achieving our mission and business objectives in a responsible and committed manner.

To embed sustainability considerations across our key roles as a grid operator, utilities and sustainable energy solutions provider, we have defined three material topics for our business:



Network Reliability

Maintaining world-class grid reliability in a distributed energy landscape

With the proliferation of distributed and intermittent energy sources, we continue to invest in innovative technologies and integrate renewables into our world-class grid while maintaining stability and reliability.



Innovation

Becoming the leading sustainable energy solutions player in Asia Pacific

Leveraging our strengths and experience in enabling a sustainable energy future for customers in Singapore, we are bringing our solutions and expertise to overseas markets such as China and Vietnam to benefit more customers in the region.



Customer Empowerment

Empowering customers to achieve their sustainability objectives

To create a low carbon, smart energy Singapore, we extend our efforts beyond our own operations to empower residential, commercial, and industrial customers to make changes to their daily behaviours and operations. Innovative solutions such as district cooling solutions in new HDB towns and installing EV charging points are key to achieving this goal. In addition, we seek to educate local residents and equip them with tools on how to live more sustainably. Through the SP app, users can monitor their energy consumption, measure their carbon footprint, and learn ways to decarbonise, all in one integrated digital platform.

Alignment with the global goals

Based on the three material topics of our sustainability strategy, our initiatives to enable a sustainable future are aligned with

SDG 7 - to ensure access to reliable, sustainable and modern energy for all.

SDG 9 - to build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

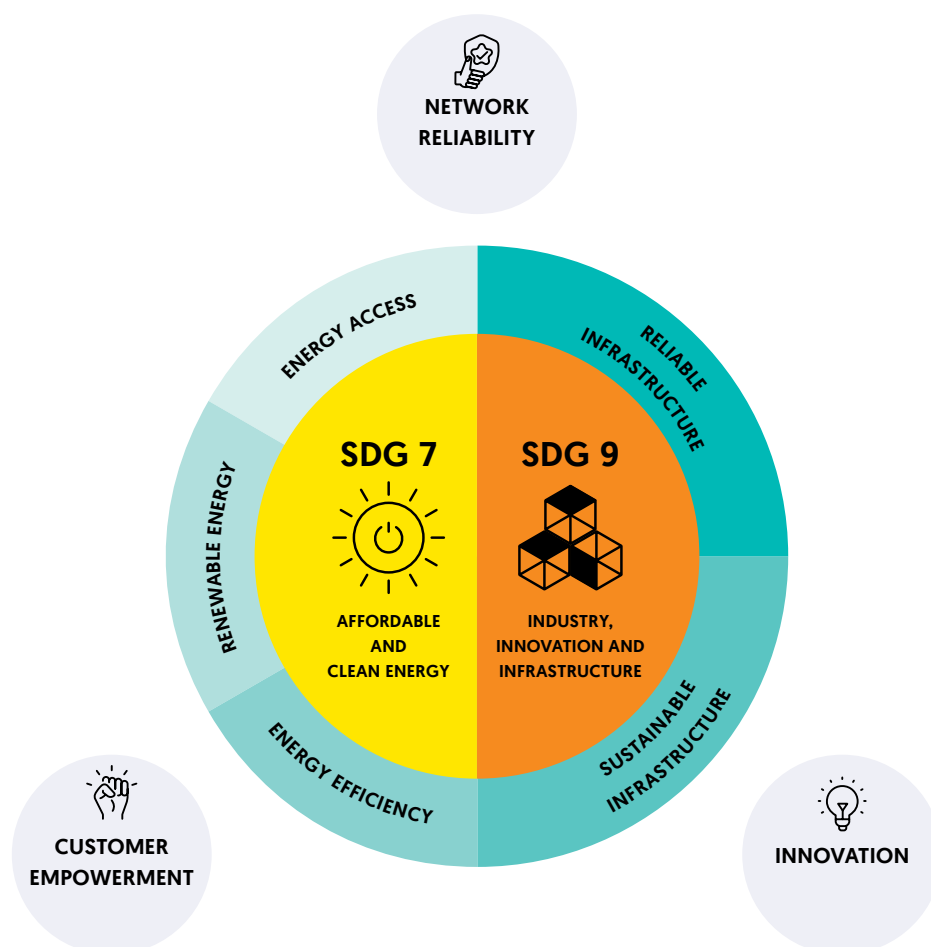
Additional details of our contribution to these SDGs can be found in the Disclosures: [Our contribution to the SDGs.](#)

SP's Mission:

Deliver reliable and efficient utilities services to enhance the economy and the quality of life

Core Values:

Commitment, Integrity, Passion, Teamwork



Financing sustainable energy solutions

To deepen the integration of our sustainability ambitions within our financing strategy, we established a Green Financing Framework⁵ in 2020. The Framework is benchmarked against relevant international principles and guidelines. Under the Framework, the group, and its subsidiaries are able to issue green financing instruments to finance and/or refinance eligible green projects in four categories, namely: **1) clean transportation, 2) energy efficiency projects, 3) renewable energy and 4) green buildings.** This allows investors and lenders to have greater visibility of the use of proceeds and the positive environmental impact of the group's investments in sustainable energy solutions as well as projects that are funded by green financing instruments.

⁵ SP's Green Financing Framework can be accessed [HERE](#)

Sustainability governance

At SP, sustainability governance is embedded in the corporate governance structure – from Board-level committees to management-level Group functions and business units.

One of our key sustainability-related priorities this year was the adoption of the TCFD recommendations, which were designed to help companies identify, measure and respond to climate risks and align their disclosures to meet investors' expectations.

We commenced our journey on TCFD reporting by embedding climate-related risks into our Enterprise Risk Management (ERM) framework and incorporating climate-related scenario analysis in assessing the resilience of our assets and operations. We analysed various climatic scenarios, both physical and transitional, and identified the main risks and opportunities of climate change that may affect us in the short, medium and long term. The exercise validated our strategy in the two focus areas of Clean and Smart Energy, and Reliable and Sustainable Infrastructure.



Types of climate-related risks and opportunities. Image source: TCFD (2017)

Board's role

The Board of Directors (Board) has overall responsibility for sustainability and reviews long-term business and organisational goals while also providing strategic direction for the organisation's sustainability practices.

The Board undertakes key investment and funding decisions, ensures that SP's management maintains a robust system of internal controls to protect the company's assets and reviews its financial and non-financial performance. The Board meets at least four times a year to review SP's business performance, of which sustainability and climate-related issues are incorporated into the discussions at two of these meetings.

The **Board Risk Management Committee (BRMC)**, established by the Board, assists the Board in providing oversight of the business risks faced by the group. They also ensure that risks and opportunities, especially climate-related ones, are appropriately considered and adequately managed.

The **Board Executive Committee (ExCo)** assists the Board in overseeing the performance of the Company, its subsidiaries, and its associated companies. The ExCo provides direct advisory supervision on SP's sustainability strategy, material environmental, social and governance (ESG) issues, work plans and performance targets.

Management's role and internal controls

Reporting to the ExCo is the Executive Leadership Team (ELT) which has the strategic responsibility to assess and manage sustainability issues for SP. The team oversees key sustainability initiatives on climate risks and opportunities, greenhouse gas (GHG) accounting, and disclosures. Heading the ELT is the Group Chief Executive Officer, who has executive-level responsibility for ESG matters.

The Group Risk Management's (GRM) role is to help establish and manage our ERM Framework and to carry out its independent identification and analysis of the climate-related risks faced by SP. The GRM reports to the BRMC every quarter on all business risks. Essentially, the GRM acts as a critical central node of communication through which risk issues are surfaced and directives are passed down to cover the end-to-end risk management process.

The Head of Strategy and Sustainability regularly reports to and seeks guidance from the ELT on the sustainability roadmap and initiatives. The Strategy and Sustainability team monitors climate change issues and updates the ELT on emerging risks and opportunities. It also leads GHG reporting, corporate sustainability reporting and TCFD implementation.



Group risk management

SP's ERM framework aims to identify, prioritise, document, and manage key risks, opportunities, and resources.

For risk management practices to be effective, three pillars are emphasised:

- Board and Senior Management oversight
- Sound risk management policies and processes
- Risk ownership and culture



Risk management

SP implements a 'Top-Down' and 'Bottom-Up' approach to facilitate communication and participation by both management and employees. For effective risk management, all aspects of the business must be considered so that the Board and Management can identify risks and assess those risks properly and swiftly. The 'Top-Down' approach facilitates oversight and guidance on material risks from both the BRMC and Management. An in-depth analysis is done to avoid strategic risks, and if not, contained through mitigation measures. The 'Bottom-Up' approach allows employees to identify and escalate risks in their day-to-day operations to Management. This enables the Management to be informed of major risks in all business operations and approve actions to be taken. This approach allows every employee in SP Group to proactively participate in highlighting the risks they face in the course of their work.



Resilience to climate change

At SP, we recognise that climate change is one of the greatest threats to the prosperity and well-being of people and our planet earth. According to the Intergovernmental Panel on Climate Change (IPCC), human activities are responsible for approximately 1.1°C of warming since 1850-1900, and this has implications for our climate. The world must act now to reduce global GHG emissions and accelerate the transition to a lower-carbon economy to reduce the effect of climate change. In line with Singapore's climate ambitions, it has never been more critical for us to ascertain the potential impact on our business strategies and operations due to climate change.

In 2021, we commissioned a study to assess our climate change resilience and to identify the climate-related risks and opportunities material to our business. Through this detailed study, material physical and transition risks were identified in the short to long term range. The material climate risks identified have since been integrated into ERM risk workshops and Risk Management Committee meetings across business units for further evaluation and risk mitigation.

Climate risk assessment and scenario planning

Two scenarios were identified to understand the extent of the risks and opportunities – “**Net Zero**” as the best-case scenario and “**Business-as-usual**” as the worst-case. In defining the physical risks for these scenarios, we selected two of the climatic projections developed by the IPCC on a global scale, characterised by the Representative Concentration Pathway which is the concentration pathway extending up to 2100. For transition risks, the parameters were selected from Network for Greening the Financial System (NGFS) to understand how climate change would affect transition risks such as policy and technology trends in the future.

	Physical Risks 	Transition Risks 
	IPCC RCP 2.6	NGFS Net Zero 2050
Best-Case scenario: NET ZERO	This pathway represents a stringent mitigation scenario. Warming is limited to 2°C by 2100 and the radiative forcing peaks at approximately 3W/m ² before 2100 and shows a decline.	In this ambitious scenario, the global community agrees on the need to decarbonise to limit warming to 1.5°C through stringent and immediate climate policies. In this scenario, physical risks are relatively low, but transition risks are high.
	IPCC RCP 8.5	NGFS Nationally Determined Contributions (NDCs)
Worst-Case scenario: BUSINESS-AS-USUAL	This pathway represents a future where warming exceeds 4°C by 2100 and radiative forcing reaches as high as or even greater than 8.5 W/m ² by 2100 and continues to rise for some amount of time.	This path assumes that the moderate climate ambition reflected in the NDCs in early 2021 continues over the 21st century and presents relatively low transition risks. With the NDCs, emissions demonstrate decline but still result in approximately 2.5°C of warming
Time Horizons	Short term: 2020-2050 Medium term: 2040-2070 Long term: 2070-2100	Short term: 2025 Medium term: 2030 Long term: 2050

Insights from the climate risk assessment

Physical risks

We performed this assessment at an asset level, overlaying local climate hazards, asset costs and operation needs. We evaluated our key assets in Singapore, China and Vietnam and the business-as-usual scenario revealed that there are four material risks in the medium to long term range [2050-2100] across our **Transmission and Distribution (T&D), District Cooling (DC), Solar Photovoltaic (PV) assets:**



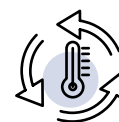
Riverine flooding



Coastal flooding



Heavy Precipitation




Air Surface Temperature Change

Physical risk parameter 	Impact 	SP's strategic response 
<p>Riverine Flooding</p> <p>Coastal Flooding</p> <p>Heavy Precipitation</p>	<p>Flooding may lead to erosion of our above ground infrastructure and underground cables may become susceptible to deterioration if there is moisture ingress.</p>	<p>Our above ground infrastructures are located above the nationally mandated Minimum Platform Level (MPL). Maximum flood levels are below the MPL.</p> <p>We will monitor updates for future Singapore flood maps.</p>
<p>Air Surface Temperature Change</p>	<p>An increase in air surface temperature will reduce the efficiency of the T&D network and accelerate the rate of insulation degradation of equipment.</p> <p>Air surface temperature rise can result in a larger DC cooling load and result in efficiency losses.</p> <p>Increased temperatures cause a decrease in the conversion efficiency of solar PV cells, affecting the maximum possible power output.</p>	<p>Currently, maximum air surface temperatures are within the equipment specifications.</p> <p>SP will continue to monitor maximum air surface temperatures and ensure that equipment specifications are within the limits regularly.</p>

As there is limited flood risk data specific to Singapore currently, we will be monitoring the updates in this area to accurately evaluate the scale of impact and identify the mitigation actions accordingly.

Transition risks

Based on a qualitative assessment, we identified three material transition risks that would potentially have the most impact on our business without any intervention or mitigation. This is especially evident in the Net Zero scenario with more stringent policies and requirements being put in place.

Material risk parameter 	Impact 	SP's strategic response 
Policy and Legal	Increased expectations from regulatory bodies for organisations to track and publicly report on GHG emissions or climate risks. Under both scenarios, there may be penalties associated with non-disclosure.	Starting from FY21/22, climate risk disclosure will be included in SP's annual Sustainability Review, with the GHG emissions data externally assured.
Market	A shift in investor preference and emergence of responsible investment mandates. In the Net Zero scenario, failure to incorporate climate risks into the company's strategy may diminish investor confidence and reduce access to capital.	Climate risks discussions will become part of the Board agenda and will be incorporated into the company's strategy.
Technology	Changing the energy mix due to the adoption of distributed renewable energy resources may impact overall grid stability and flexibility. Especially when capacity additions in solar and storage capacity are expected to increase in both scenarios.	SP will actively invest in the upgrading of our grid network infrastructure and adopt new technologies to make our grid network "smarter". For more details, please refer to the Grid 2030 section.
	Investments in energy-efficient technologies will be required to meet national energy efficiency targets.	



Transition opportunities

With the right initiatives, selected transition risks can be transformed into opportunities, by way of increasing access to new markets, and developing innovative products and services. As a sustainable energy solutions provider, we have started leveraging these opportunities to enable our customers to achieve their climate ambitions. The initiatives are further elaborated in the respective sections for each business area of Grid 2030, Sustainable energy solutions and Energy as a Service.

Metrics and targets

To manage our climate-related risks and opportunities, and ensure we are enabling a low carbon and smart energy future, we have established metrics to track our performance and drive improvement. A primary focus is the reduction of GHG emissions from our direct business activities, which contributes to Singapore's net-zero emissions ambitions. Since 2019, we undertake an annual data collection exercise to calculate the GHG emissions from our business activities following the principles in the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (revised edition) and GHG Protocol Scope 2 Guidance.

For FY21/22's GHG emissions data, we have taken a step further to seek external assurance according to ISO 14064-3:2019 standards to provide credibility to our data and demonstrate our alignment with international best practices. Learn more in Disclosures: [Emissions audit statement](#).

Emissions	Absolute, tonnesCO ₂ e			Intensity, kgCO ₂ e/MWh sold		
	FY19/20 ⁶	FY20/21 ⁶	FY21/22	FY19/20	FY20/21	FY21/22
Scope 1 	78,546	90,088	78,173	1.63	1.92	1.58
Scope 2 	Location-based					
	375,102	384,578	423,225	7.81	8.19	8.56
	Market-based					
	375,102	382,972	419,959	7.81	8.15	8.49

GHG emissions from our activities can be mainly traced back to the indirect carbon dioxide [CO₂] emissions from electricity use/losses, the fugitive emissions along the length of the gas pipelines and to a lesser extent, the sulphur hexafluoride [SF₆] leakages across our transmission and distribution network. The bulk of SP's Scope 2 GHG emissions resulted from the dissipated energy emissions from technical losses from the transmission system and distribution network in Singapore. SP is actively investing in the digitalisation and automation of the electricity grid to reduce these losses and increase reliability. While these emissions are relatively stable and inherent in the operations of the network, SP is committed to identifying opportunities to reduce emissions from other key business activities. We are also actively accounting for our indirect emissions along the value chain [Scope 3] to evaluate our total carbon footprint.

To reduce the impact of our direct operations through the support of renewable energy, we have pledged to cover 100 per cent of the electricity consumption at SP's Singapore headquarters with Renewable Energy Certificates [RECs] from October 2020 onwards.

SP's low carbon initiatives such as district cooling, solar and electromobility have enabled customers to avoid more than 206,000 tonnesCO₂e in FY21/22. This is equivalent to planting more than 10 million rain trees or taking more than 180,000 cars off the road for a year. Measuring this progress against the target of helping customers reduce their carbon footprint, these initiatives have achieved more than a seven-fold increase in the CO₂ avoided since 2018. The significant increase in the avoided CO₂ for our customers demonstrated an increased demand for sustainable energy solutions and augment our role in enabling our customers reduce their carbon footprint.

⁶ FY19/20 and FY20/21 emissions are restated to account for categories not included prior to the GHG audit in FY21/22.

Focus areas

Grid 2030

The grid of the future is increasingly complex. A greater role for distributed energy that is low in carbon but intermittent in nature will require a grid that is reliable, safe, and updated. Despite Singapore having one of the best electricity and gas network systems in the world, supply interruption is inevitable and may occur due to various reasons including network failure, damage by third parties, faulty equipment at customer sites or issues with the source of the supply.

Electricity network

To minimise the possibility of supply interruption, SP follows a systematic regime of maintenance, timely replacement of ageing equipment and close monitoring of equipment performance.

If a power failure occurs, we take four remediation actions to minimise the impact and downtime:

Remote switching	When a power fault is detected, this first course of action disconnects the affected equipment from the network and reconnects it to an alternative supply source. Since 2019, we have implemented remote switching capabilities for all 6.6 kV distribution networks substations, allowing for quicker restoration should a supply interruption occur.
Manual switching	This is conducted when remote switching is unable to restore the power supply. Power faults in low-voltage networks, such as damage to over ground boxes that are used to transmit electricity to customers, are usually resolved through manual switching.
Mobile generators	These generators are immediately deployed when power faults are reported and are used to provide temporary electricity supply while the network issues are being resolved.
Cable jointing	This is conducted when switching is unable to resolve the power fault and the mobile generators cannot access the substation where the fault has occurred.

Gas network

SP has adopted an asset life cycle approach to our asset management so that we can manage risks and ensure that our gas network is consistently developed, maintained and operated in a safe and reliable manner. The gas transmission network is monitored round the clock in a system control centre.

Regular inspections and maintenance are also conducted on our network assets to maintain reliability. An asset renewal programme tracks asset performance and replaces deteriorating assets efficiently. Patrol and leak surveys of the pipelines are conducted to detect illegal third-party activities and gas leaks respectively.

We monitor network pressure closely by deploying pressure sensors across the entire transmission network. Our gas network operations team monitors the pressure readings to ensure that network pressure at different nodes is maintained within an optimal range.

To enhance our remote monitoring capability and productivity, we have developed a prototype machine learning solution that learns from pressure data to detect deviations from expected pressure levels and alert the operations team of an anomaly in the gas network.

A supervisory control and data acquisition system is deployed on the transmission system to avail remote monitoring and operations capability, which enables us to respond immediately to incidents. When incidents occur, the response is centrally managed to ensure that performance recovery is quick and directed, thus minimising disruption to customers.

To further improve network reliability and enable the transition to a green economy, we invest in numerous solutions and innovative technology.

SP GROUP-NTU JOINT LAB

SP contributed \$30 million for research and education initiatives at the Nanyang Technological University (NTU) in Singapore aiming to enhance the resilience of Singapore's electricity network, improve the reliability and efficiency of supply to customers, and nurture experts in the energy sector. Under this collaboration, the SP Group-NTU Joint Lab is also exploring energy-related projects in the areas of asset management and network operations.



Project 4: Online Condition Monitoring for Distribution Switchgear

Green energy imports

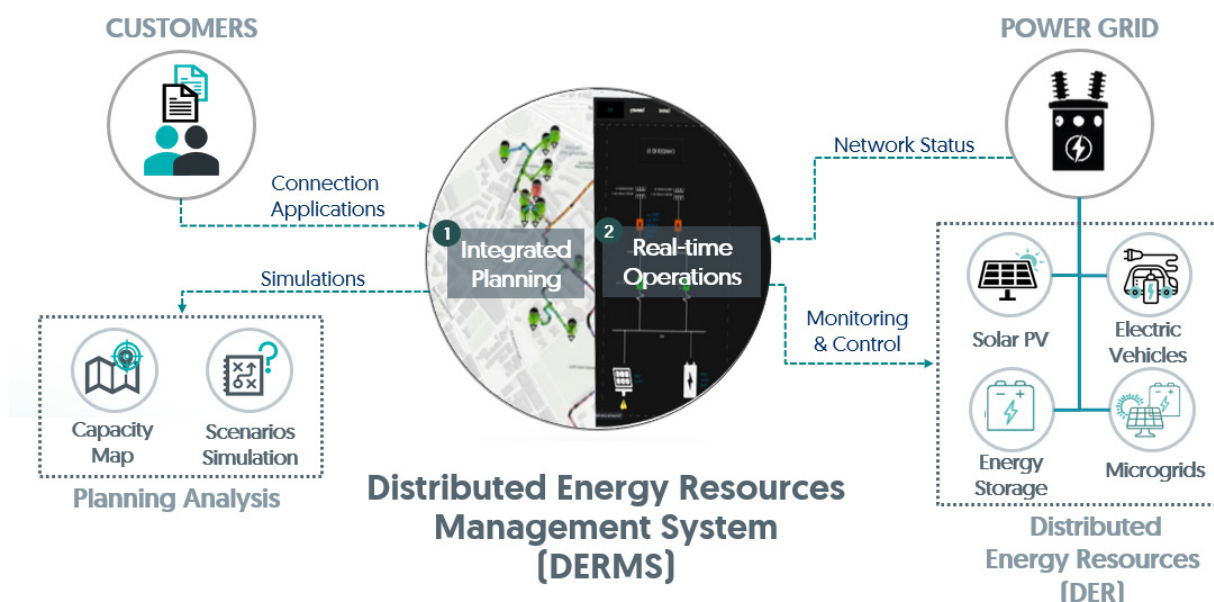
SP actively supports the upgrading of infrastructure to tap into regional power grids for cleaner energy resources and further diversify Singapore's energy supply. SP is working with partners to import low carbon energy from other countries by constructing and operating interconnectors to strengthen our regional grid architecture. One such project is a feasibility study, with French utility EDF Group, on a subsea cable that could potentially transmit green energy generated from a 1-GWp solar photovoltaic plant in Indonesia to Singapore.

Singapore has one of the most reliable electricity networks globally. We must continue to develop and grow our local capabilities to prepare for the future. This collaboration between NTU and SP Group will boost our network resilience and develop innovative solutions that will serve our future energy needs.

~ Dr Tan See Leng,
Second Minister for Trade and Industry

DERMS for effective integration of renewables

Renewable energy will play a greater role to enable a smarter grid for a low carbon Singapore. To prepare for this, SP has piloted a Distributed Energy Resources Management System (DERMS) to manage the influx of solar photovoltaic generation, energy storage systems and electric vehicles that will be connected to the network in the future. Through real-time monitoring and smart control capabilities, the integration of these distributed energy resources can be optimised while ensuring the reliability of our electricity network. A pilot conducted on the implementation of DERMS on the 22kV network has been completed and a research and development collaboration with NTU is ongoing to demonstrate the distributed management of technologies at substation level via Grid-Edge control.



A visual representation of the distribution system

Energy Storage Systems

SP has deployed Singapore's first utility-scale Energy Storage Systems at a substation in Woodlands which is designed for local conditions to manage solar intermittency and other network applications. It is also capable of incorporating additional renewables and other sustainable energy solutions into our electricity grid.

Vehicle2Grid

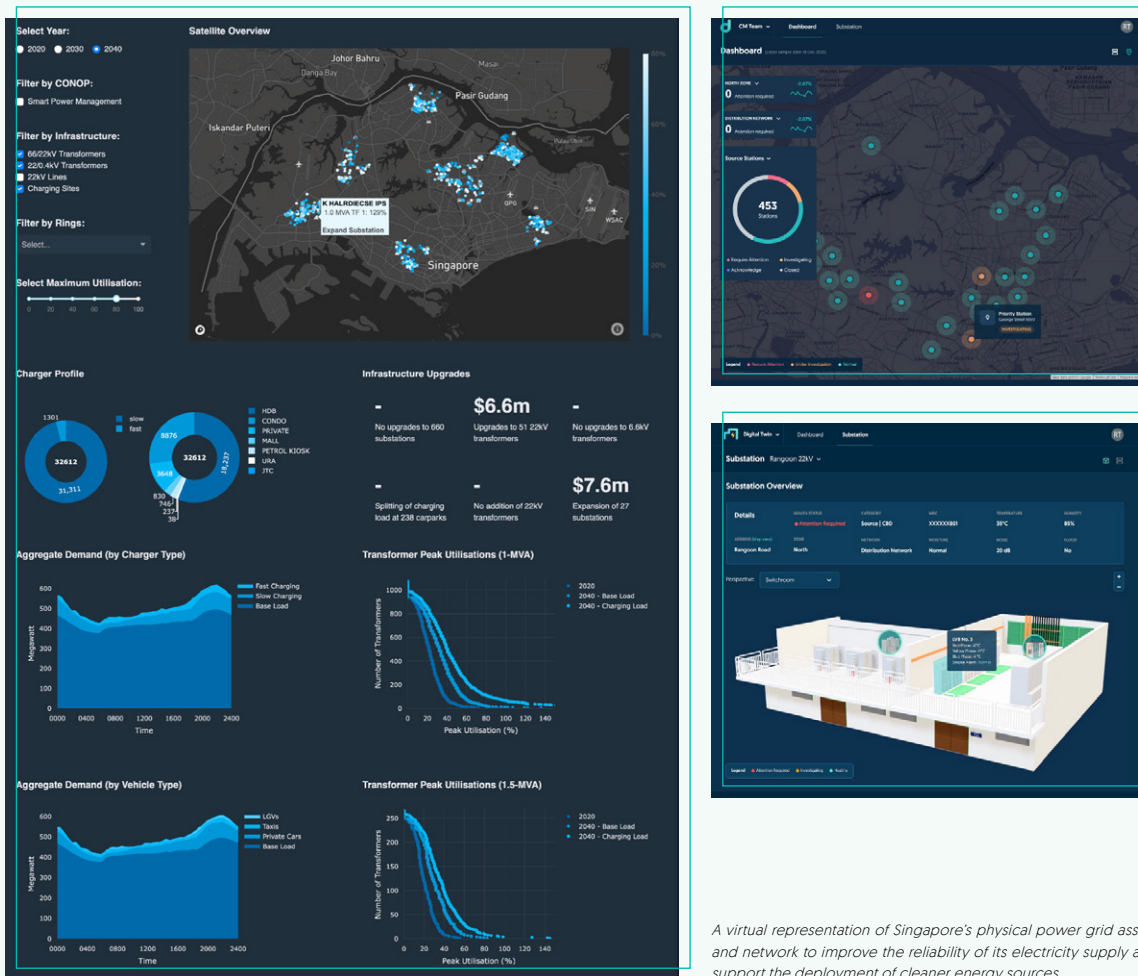
To enhance Singapore's grid reliability when it phases out internal combustion engine (ICE) cars by 2040, SP embarked on a trial of vehicle-to-grid (V2G) technology – the first of its kind in Southeast Asia. The trial studies tapping electric vehicles (EVs) as energy storage facilities via a bi-directional energy transfer between the EV and the grid to support load and frequency management. This innovation can be used to balance and stabilise the grid, acting as a cost-effective solution to overcome intermittency from renewable energy sources. EV owners could potentially be compensated for their vehicles acting as storage units.



Staff charging the V2G car

ASSET HEALTH DIGITAL TWIN

The Digital Twin, a digital representation of the power grid, is an important innovation that SP is creating in-house. It consists of a Network Twin and the Asset Twin.



A virtual representation of Singapore's physical power grid assets and network to improve the reliability of its electricity supply and support the deployment of cleaner energy sources

The Asset Twin, developed in conjunction with NTU, is a virtual replica of the physical network and assets that can perform functions such as condition monitoring, analysing asset health and optimising asset failure mitigation measures. The Asset Twin consists of a one-stop integrated dashboard containing up-to-date information on all distribution assets of over 12,000 substations across our entire electricity network. Virtual 3D models of actual electrical assets are also created to visualise assets in a substation. This helps to identify specific components that require attention. Field technician crews are then equipped with vital information prior to heading on-site for an inspection. Sensors are also installed to remotely monitor assets for signs of anomalies and deterioration. The prototype of the Asset Twin was developed in 2021 and trials were held to develop the system further.

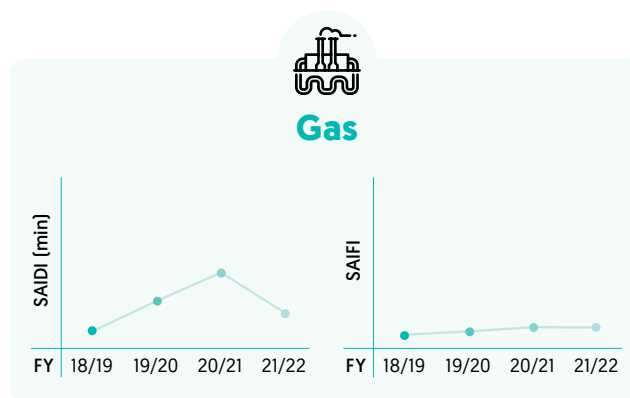
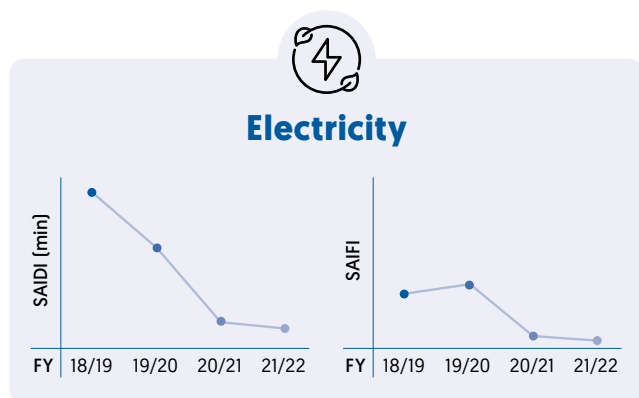
The Asset Twin is a crucial component to the future grid of Singapore that ensures network reliability and safety to electricity users, as well as SP technicians and staff who regularly monitor grid health.

Our Performance

Two key indicators that our industry measures to assess network reliability performance are System Average Interruption Duration Index [SAIDI], a system index of average duration of interruption in the power supply indicated in minutes per customer, and the System Average Interruption Frequency Index [SAIFI], a system index of average frequency of interruptions in the power supply indicated in number per customer.

In FY21/22, our SAIDI for the electricity network improved by 26.7 per cent.

		FY18/19	FY19/20	FY20/21	FY21/22
Electricity	SAIDI (min)	0.87	0.56	0.15	0.11
	SAIFI	0.0307	0.0366	0.0073	0.0043
Gas	SAIDI (min)	0.0932	0.2637	0.4223	0.1979
	SAIFI	0.0014	0.0019	0.0024	0.0024



Smart Grid Index

To measure and benchmark our performance in operating the best-in-class electricity grid, SP developed the world's first Smart Grid Index (SGI). The SGI measures the grid on seven key dimensions:



Supply Reliability



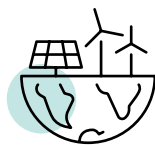
Monitoring & Control



Data Analytics



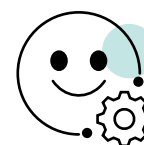
Integration of Distributed Energy Resources (DER)



Green Energy



Security



Customer Empowerment & Satisfaction

In 2021, utilities companies around the world deepened their commitment to tackling climate change and speeding up energy transition. As a result, the SGI indicates around 65 per cent of utilities companies have solar and wind energy contributing more than 10 per cent of system demand, an increase of nine per cent from a year ago. About 45 per cent of utilities companies have enabled the use of electric vehicles through public charging infrastructure. SP maintained a high score of 75.0 from the previous year, due to our near-zero network reliability downtime and high customer satisfaction scores.

For further details on the benchmarking scores, please refer to the [SP Group Website](#).

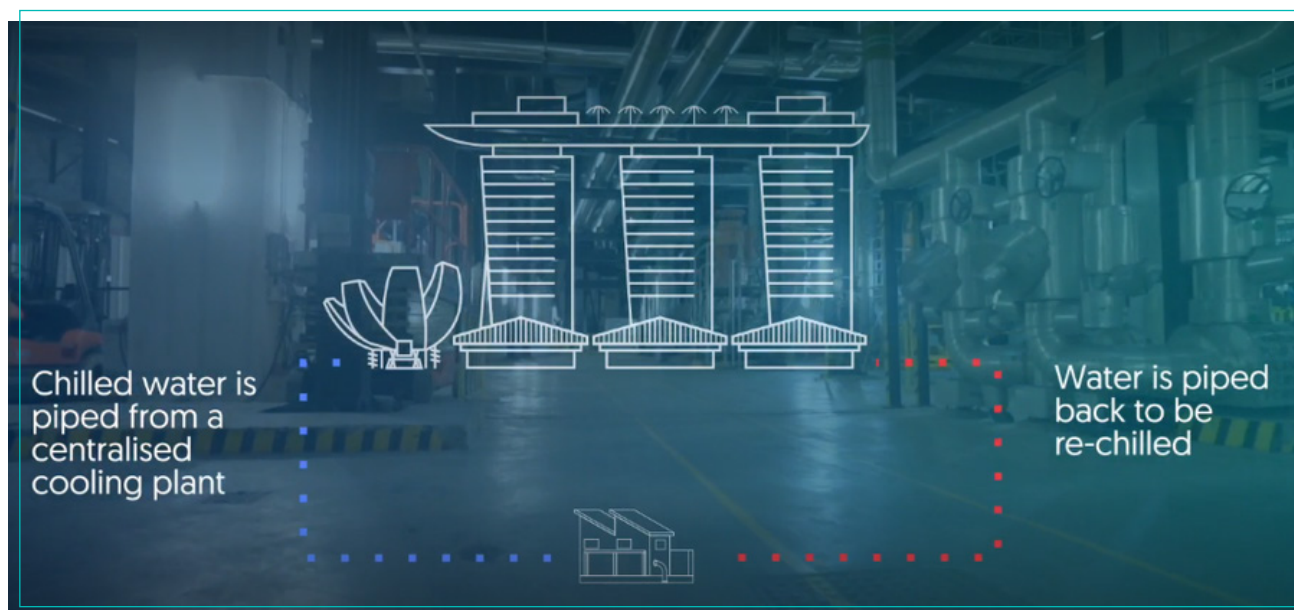
Sustainable energy solutions

To facilitate the transition to a low carbon future, we develop sustainable solutions for individuals and organisations, powered by our in-house energy technology and digital capabilities.

District cooling across all customer segments

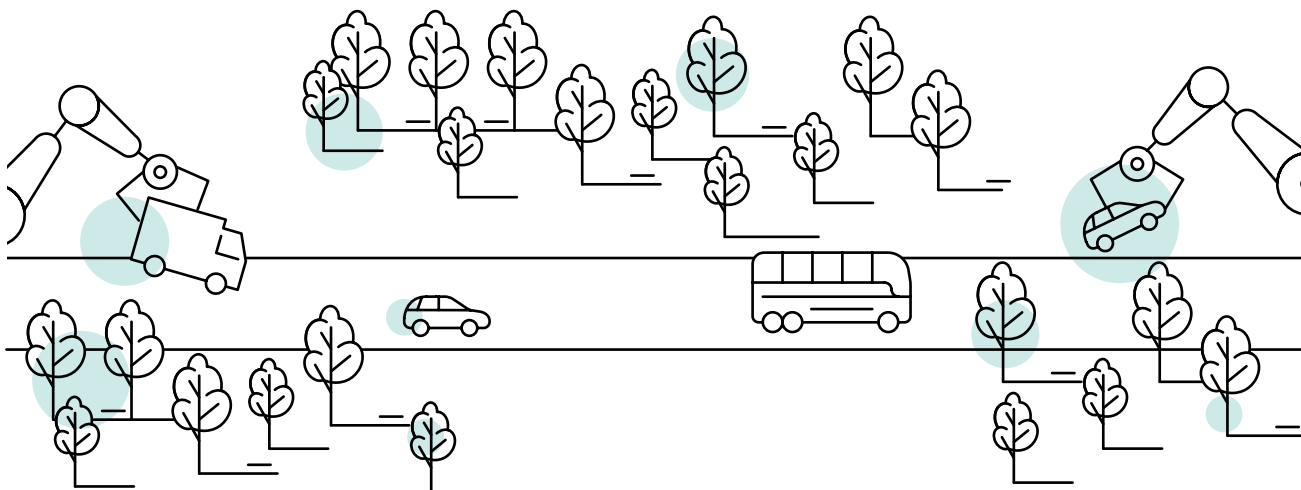
District cooling and heating are important tools in SP's arsenal to battle climate change and provide smart, sustainable, energy-efficient, and low-carbon solutions that help districts, cities and townships achieve their decarbonisation goals.

Since 2006, SP has operated the world's largest fully underground district cooling network in the Marina Bay financial district. In May 2010, SP commissioned its second district cooling plant at the Marina Bay Sands. Five new and retrofit developments have committed to subscribing to district cooling in early 2022, bringing the total number of buildings served by SP's Marina Bay operations to 28.



The world's largest fully underground district cooling network in Singapore's Marina Bay financial district

In FY21/22, the Marina Bay district cooling system helped customers in the area avoid more than **21,000 tonnesCO₂**, equivalent to **planting more than 1 million rain trees** or taking more than **19,000 cars off the road**.



TAMPINES ECO-TOWN

SP has also established capabilities for district cooling in brownfield development cluster settings. Our approach applies the concept of interconnecting chiller plants to create a centralised district cooling system within the cluster, which lowers the overall carbon footprint for all the buildings within the development. This novel approach is suitable for highly developed and dense cities such as Singapore, where most land has previously been utilised and buildings are operating their standalone chiller plants for air-conditioning.

Applying the concept of having interconnected chiller plants to create a district cooling system within the cluster lowers the overall carbon footprint for all the buildings within the development.

Together with Temasek and the Ministry of Sustainability and the Environment, SP has been working to execute Singapore's first brownfield district cooling system in Tampines Central. The system leverages existing chiller assets that are more efficient and have excess capacity to support the cooling demands of the other buildings in the vicinity.

All in, this Distributed District Cooling (DDC) network will help the town centre reduce its carbon emissions by 1,359 tonnes annually, equivalent to removing

1,236 cars off our roads. It will also achieve energy savings of more than 2,800,000 kilowatt-hour (kWh) annually, which can power more than 905 three-room HDB households for a year.

In addition to the energy savings and reduction in carbon emissions, this network will provide building owners combined life-cycle economic benefits of up to \$50.8 million over 30 years. Through interconnection across the various buildings, the network will also reduce the current unutilised cooling capacity by up to 42 per cent, freeing up chiller plant gross floor area that can be converted to commercial and lifestyle spaces.

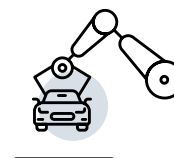


Singapore's first brownfield district cooling system in Tampines Central

Reduce **carbon emissions**
by **1,359** tonnes annually



Removed **1,236**
cars off our roads



Powered more than
905 three-room HDB
households for a year



Provide building owners
combined **life-cycle economic**
benefits of up to **\$50.8**
million over 30 years



Tengah residential town

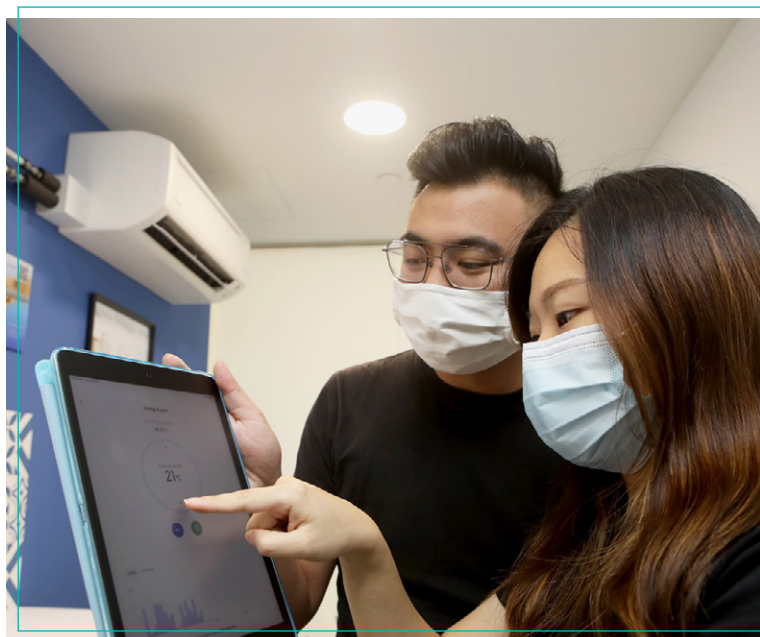
In the residential space, SP is bringing its first large-scale residential district cooling system to Tengah's future residents. Chilled water is centrally produced and distributed to individual residential homes for indoor cooling. This residential district cooling system provides an alternative to the conventional split unit air-conditioning system commonly in use in residential homes. The system will be operating in a more energy-efficient, reliable, and resilient manner thus achieving long-term environmental and economic benefits compared to conventional split unit AC systems. It is expected to save at least 30 GWh of electricity per year. This is equivalent to powering 6,300 four-room flats, removing 800,000m³ of carbon emissions from the air or taking around 400,000 cars off the road annually.



The first large-scale residential district cooling system in Tengah

Tengah is a showcase of SP's integrated sustainable energy solutions to help residents become greener, and more sustainable and provide a blueprint for the future of residential living in Singapore – in alignment with the government's plan to make every HDB estate an eco-town by 2030. In addition, SP's solutions empower individuals to make conscious decisions to lower their carbon footprint and factor in habits that promote sustainability in the daily lives of Singaporeans. Learn more about our initiatives in the [Energy as a Service](#) section of this report.

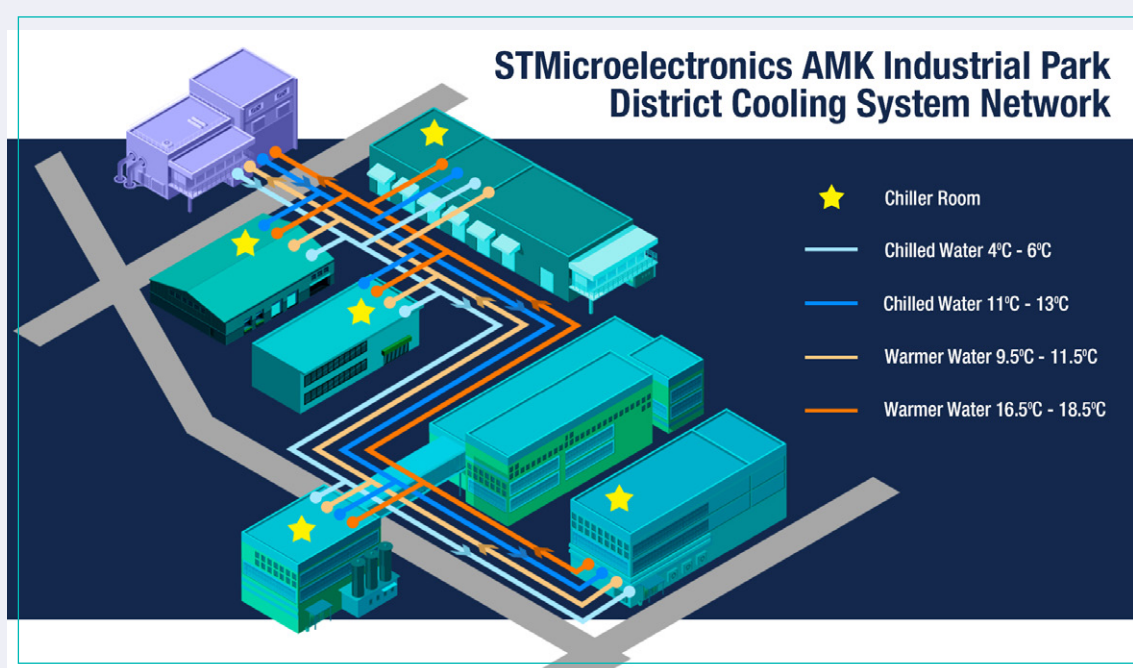
As of end March 2022, almost 7,000 Tengah households have signed up for the centralised cooling system, which could help homeowners save as much as 30 per cent in life cycle costs.



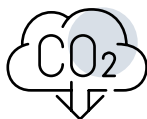
Future Tengah homeowners at MyTengah Experience Centre

STMicroelectronics

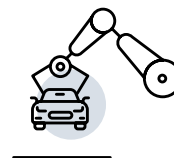
In what is set to be the largest industrial district cooling facility in Singapore, SP has secured a project with STMicroelectronics (ST) to build a district cooling plant with up to 36,000 RT cooling capacity at ST Ang Mo Kio (AMK) Technopark. SP's district cooling plant will help ST achieve 20 per cent savings in cooling-related electricity consumption annually by improving aggregated chiller system efficiency, as well as enable ST to reduce carbon emissions of up to 120,000 tons per year, equivalent to taking 109,090 cars off the road. This is achievable by lowering energy consumption, increase capacity to incorporate solar energy and Perfluorocarbons (PFC) abatement equipment. More than 4,000 square meters (sqm) of chiller plant space will be freed up once the district cooling plant is operational. For this plant, one of the most efficient 2,000-tonne HFO Chiller will be deployed for this project. HFO or Hydrofluoro-Olefins is the new generation of synthetic refrigerants with zero ozone depletion effect and is designed to significantly reduce the Global Warming Potential.



Reduce **carbon emissions** of up to **120,000** tons per year



Equivalent to taking **109,090** cars off the road



Achieve **20%** savings in cooling-related electricity consumption annually



Repurposing more than **4,000** square meters (sqm) of **chiller plant space**



Exporting our expertise

Beyond our shores, SP has exported our district cooling expertise and capabilities to China. Since 2019, we have been operating a 15,000 RT plant in Raffles City Chongqing, the largest shopping mall in Chongqing, China, enabling more than 40 per cent energy savings for the building owner. In FY21/22, the plant helped the building avoid more than 4,000 tonnesCO₂, equivalent of planting more than 210,000 rain trees or taking more than 3,800 cars off the road.

OVERSEAS CAPABILITIES

Leveraging our operational track record in Raffles City Chongqing as well as our brownfield experience in Singapore, SP is supporting the rejuvenation of the Wuhou Heritage District, in Chengdu, Sichuan province. Started in 2021, we will be designing, building and operating an integrated energy solution that includes district cooling and heating system, smart metering, energy management and monitoring for four existing buildings over the next 25 years.

Similarly, SP will bring our Marina Bay experience to the Guangzhou Knowledge City – a cluster of commercial buildings, and cultural and convention centres. We will install and operate an 8,000 RT district cooling system for Knowledge Tower. There is also potential for expansion of the cooling systems to encompass other buildings within the business district to achieve greater cost savings and energy efficiencies.



Artist's impression of the International Urban Design Centre in Wuhou district in Chengdu, China
Photo credit: Three Kingdoms Themed Innovation Park Management Committee of Wuhou District, Chengdu

Intelligent micro-climate control

Besides district cooling, SP also offers 75F – an intelligent, micro-climate control solution that helps save more than 30 per cent in energy consumption while improving occupant comfort in buildings. The solution applies artificial intelligence [AI] and the Internet of Things [IoT] to consider factors like occupancy levels and the weather into the optimisation of airflow that distributes cooling evenly throughout a building. It is also a self-learning, intuitive system that regulates air conditioning to improve operational efficiency and occupant experience by dividing large open spaces into smaller zones while balancing the temperature, airflow, and carbon dioxide levels within each zone. This micro-climate solution also optimises air conditioning operations by using the least amount of energy to maintain desired comfort levels.

Electric vehicle charging

As more Singaporeans switch from ICE cars to low-carbon EVs, SP continues to support this with more charging stations installed across the nation. As of March 2022, we are operating more than 480 charging points out of which 30 per cent consist of DC fast charging points, making us the largest fast public charging network operator in Singapore. By May 2022, the number of charging points has increased to 525.

We are also one of the most diverse in terms of locations. SP has installed EV chargers across petrol stations, residential, commercial, and industrial areas allowing drivers greater accessibility to a charging point island-wide.

Compared to the carbon emissions from a typical internal combustion engine vehicle, the electricity sold from the charging points helped EV customers avoid almost 800 tonnesCO₂e in FY21/22.

Leveraging the extensive and diverse charging network that SP operates, we are aligning our business strategy with the government's target of installing 60,000 charging points by 2030. We are supporting their target of replacing all ICE cars on the road with EVs by 2040 by ensuring access to EV drivers remains convenient, affordable, and reliable. We will continue to work with our partners to provide convenient charging locations to EV users all around Singapore. For example, we will continue our collaboration with fleet operators such as Strides Transportation and Grab for their fleet electrification by extending our charging points to their vehicles.

At SP, we are progressively converting our fleet of service vehicles from diesel engines to electric. As of March 2022, we have converted around 17 per cent of them to EVs, avoiding an estimated total of more than 100 tonnesCO₂e.



SP's direct current [DC] fast charging points for electric vehicles [EVs]

525

Charging points secured



Singapore's largest fast-charging EV network

Data as of May 2022

Renewables

SP combines our rooftop solar expertise with proprietary digital energy management services for commercial and industrial facilities as our key market differentiator. We continue to extend our solar expertise to commercial and industrial clients as we aim to provide green energy solutions that align with our target of building a low-carbon, smart grid for Singapore. For example, our solar implementation for Sembcorp Marine Shipyard – the largest shipyard in Singapore – utilises integrated energy solutions and the Green Energy Tech (GET™) system to bring energy storage capabilities, energy sensors and a real-time digital platform to the array, helping to monitor, analyse, and optimise energy usage. The initial 4.5 Megawatt-peak (MWp) of solar energy commissioned (in 2018) at Sembcorp Marine's flagship Tuas Boulevard Yard's steel fabrication facility has been expanded to include an additional 4.0 MWp across seven rooftops in May 2022. The total solar capacity of 8.5 MWp can deliver up to 10,400 megawatt-hours (MWh) of electricity annually, or equivalent to power more than 2,300 four-room flats each year.



Largest shipyard rooftop solar for Sembcorp Marine
Photo credit: Sembcorp Marine

The GET™ leverages the IoT, AI, sensors, and advanced metering infrastructure to manage the generation of solar power and monitors the deployment and storage of the generated electricity, optimising the energy consumption of the shipyard. This provides close to 60 per cent of electricity consumed by the shipyard's steel fabrication facility at peak load.

For our customers, a total of 4.5 MWp of solar panels were installed as of March 2022. Based on an average estimated generation yield in Singapore, the panels have helped the customers avoid more than 2,300 tonnesCO_{2e}, equivalent to planting more than 110,000 rain trees or taking more than 2,100 vehicles off the road.

Across our premises, we have installed almost 800 kWp of solar panels to access renewable energy. Collectively, they have helped us to avoid close to 370 tonnesCO_{2e} in FY21/22.

Regional renewables

Our strategy to build renewable energy capacity abroad has led SP to partner with Vietnam's Bamboo Capital Group, a clean energy project developer, and China Three Gorges, one of the largest power companies in China, to pursue utilities and distributed scale projects in the two countries. The joint ventures will open new doors for SP to tap into overseas markets as well as to develop our own expertise in our pursuit to become a leading regional player in renewable energy.

In January 2021, SP opened a regional office in Ho Chi Minh City to seek growth opportunities in renewables and district cooling. In July 2021, a joint venture with Bamboo Capital was formed to acquire a rooftop solar portfolio of 47 MW and further secured 28 MW of new projects. In addition, SP has self-originated solar rooftop projects serving the customers in industrial parks to provide them with an option to 'green' their operations.

We have also built a network of channel partners such as CJ OliveNetworks Vina Co. [CJ ONS], a subsidiary of South Korea's CJ OliveNetworks in Vietnam. In March 2022, the partnership with CJ ONS aims to boost Vietnam's clean energy transformation through the development of rooftop solar projects. A memorandum of understanding was signed to jointly invest, build, and develop up to 50 MWp of rooftop solar projects across Vietnam over the next two years. Through this partnership, SP and CJ ONS will combine their expertise, experience, and resources in sustainable energy solutions to explore solar projects for CJ ONS' affiliates and other commercial and industrial customers in Vietnam. The partnership leverages SP's capabilities in sustainable energy and digital solutions to create value-added solutions for its customers in Vietnam, and is aligned with SP's ambition to be a leading sustainable energy solutions player in Asia Pacific.

SP's partnership with China Three Gorges, the world's leader in hydropower, allows us to capture renewables growth organically. SP, through its 100 per cent owned subsidiaries, has secured a 5 MWp of rooftop solar project in Sichuan, as well as another 6 MWp of rooftop solar project in Shandong that supplies green electricity to the local industrial park via the local grid.



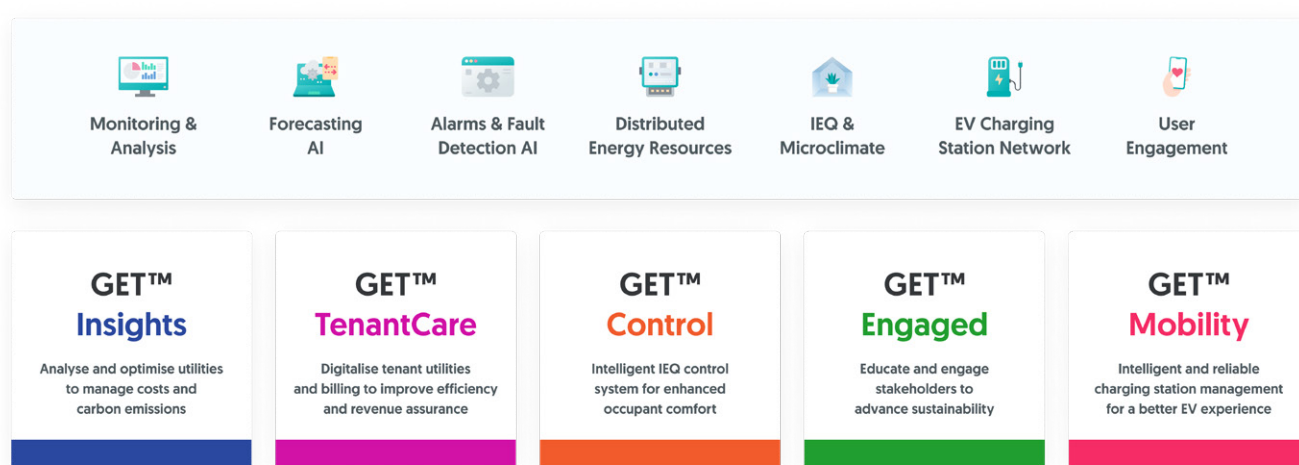
Partnering CJ OliveNetworks to develop rooftop solar projects in Vietnam

Energy as a Service

Energy efficiency plays a central role in tackling climate change and is one of the key ways the world can meet energy service demand with lower energy use. As energy efficiency offers some of the fastest and most cost-effective actions to reduce GHG emissions, SP recognises the importance of educating our customers and supporting their adoption of energy efficient practices. With our innovative sustainable energy solutions, we enable customers to make decisions that can help reduce their carbon footprint and increase cost savings where possible.



SMART INSIGHTS . ENERGY EFFICIENCY . OCCUPANT EXPERIENCE . SUSTAINABILITY



SP deploys a host of digital solutions for business districts, commercial buildings, and households to be more energy efficient, and we aim to expand our offerings to more customers to help them become more sustainable. Our journey started with the digitalisation of our services through the SP app, our bill payment services and smart electricity and water meters, empowering Singaporeans to become more efficient through energy, water, and gas consumption monitoring. The app then evolved to become an integrated tool for promoting sustainability amongst local residents. Enhanced features to promote sustainable living allow users to measure their carbon footprint, 'green' their power usage by purchasing Renewable Energy Certificates [RECs], providing a platform to charge their EVs, and so much more.

SP expanded its sphere of influence to buildings in commercial and industrial complexes and districts. In 2020, we developed Green Energy Tech (GET™) – a suite of digital solutions that integrates different building management systems and diverse data sources to create a seamless, sustainable energy management experience for customers. Powered by EnergyTech, IoT and AI, GET enables building owners to make smarter decisions that improve the overall building performance, sustainability and occupant well-being. Building managers and developers can also purchase RECs through SP to achieve their decarbonisation goals.

As SP continues to expand our energy solutions, we believe that smart cities are the next stage of the evolution and the future of a sustainable and green economy. We are committed to developing our energy of our energy services at scale, promoting convenience and sustainability to our consumers, and empowering them with tools to build a greener and more sustainable world.

Our key digital solutions include:

GET TENANTCARE

GET™ TenantCare is a smart submetering solution designed to help landlords and property owners efficiently manage tenant energy consumption. Powered by SP Digital's advanced metering infrastructure, GET™ TenantCare simplifies operational challenges involved in utilities management while providing accurate billing and metering. In 2021, four new building owners [Jurong Point 1 & 2, Ang Mo Kio Hub & One Marina Boulevard] adopted this solution.



GET INSIGHTS

Launched in April 2021, this utilities monitoring and insights dashboard allows facilities management teams and tenants to manage, monitor, report, analyse and optimise utilities usage while also helping identify wastage, achieve cost savings, and reach their sustainability targets. With access to real-time consumption information, adjustments can easily be made to improve energy efficiency. In 2021, six new customers implemented this solution to gain better insights into their utilities usage, reduce these costs and, achieve their energy efficiency targets.

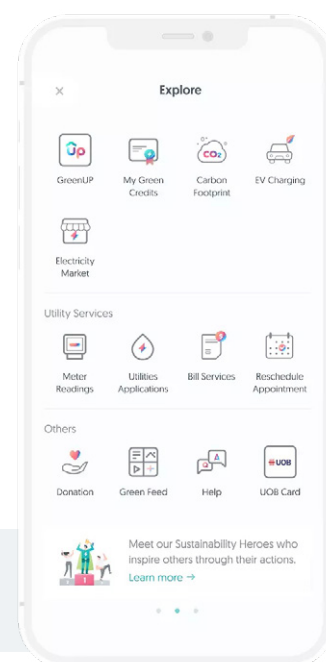


SMART METERS AND THE SP APP

SP has deployed smart electricity meters in all households. We have installed over 648,000 smart meters nationwide as of March 2022. Through the SP app, residents can monitor their electricity usage every half hourly. Electricity, gas and water consumption can be tracked through a time chart, giving users a better picture of their energy usage patterns. This enables residents to quickly implement energy-saving measures to reduce costs and achieve their green goals.

Today, consumers are empowered with sustainability tools via the SP app, on top of the usual energy monitoring feature. The app integrates the utilities bill payment channel, EV charging, My Green Credits, GreenUP™, and My Carbon Footprint to cater to differing needs of the users. With more than 1.5 million app downloads, customers are submitting their meter readings, viewing their bills and paying them directly via the SP app. Customers can pay with credit cards and enjoy

The SP app enables a greener lifestyle with features providing you with insights to help reduce your utilities consumption, ways to go green through your purchases when you're out and about, and even a special calculator to tabulate your carbon footprint.



rebates and rewards offered by banking partners for bill payments through the app. We have processed over 5.6 million transactions through the app since 2019, offering customers greater convenience.

When they are ready to charge their vehicles, EV owners can log onto the app and search for the nearest charging location, scan the QR code on our charging points, and make payment conveniently. Households can also learn more about their carbon footprint by measuring it on the app and purchasing RECs to green their energy usage. Consumers learn more about sustainability through our GreenUP™ platform on the app – a fun way to earn retail rewards by adopting sustainable practices and lifestyle changes.

Beyond smart electricity meters, SP rolled out Singapore's first large scale smart metering project to supply, install and manage around 300,000 smart water meters across seven locations islandwide from early 2022. We are supplying, installing, and operating smart water meters for businesses and households, and will leverage our wireless communications network and develop supporting IT infrastructure for the retrieval and management of water meter data. This data is crucial to helping homes and businesses better understand their consumption patterns and aims to support the sustainable use of our water resources for decades to come.

RENEWABLE ENERGY CERTIFICATES

SP provides a one stop Renewable Energy Certificates [RECs] service platform to allow both small and large scale customers to achieve their green targets with ease.

Customers can utilise RECs to make clean energy usage claims for GHG scope 2 reporting. With SP, customers can choose from a variety of RECs across Asia. In 2021, we saw a 40-fold increase in transacted volume compared to the previous year.



MY GREEN CREDITS

A feature on the SP app that was launched in October 2020 to provide all with easy access to green their electricity, My Green Credits promotes accessibility to RECs as they are sold in multiples of kilowatt-hour [kWh]. This allows residential consumers and individuals to “green” any percentage of their monthly electricity consumption. The purchase of these certificates drives awareness of renewable energy and allow customers to achieve their green goals and to play their part in helping Singapore transit to a low carbon economy.

GREEN BUILDINGS

Climate-friendly and energy-efficient buildings are crucial to achieving the Paris Agreement's goal of keeping global warming under 2°C, and preferably under 1.5°C. Yet there are many challenges associated with the design and management of these buildings. Ever rising demand for energy services— particularly electricity to power cooling equipment, appliances and connected devices – has been outpacing energy efficiency for many years. At SP, we are committed to addressing these challenges by helping to accelerate digitalisation and by embracing the IoT, AI and other innovative digital technologies. We are confident that Singapore can achieve smarter, healthier, and more sustainable buildings and we are investing in creating solutions that will help in this endeavour.

Singapore Institute of Technology

SP and the Singapore Institute of Technology (SIT) are building the country's first multi-energy urban microgrid at the university's campus in Punggol Digital District. The microgrid will integrate electricity and thermal energy into a unified smart energy network through multiple phases of execution. The new SIT campus will also be powered by solar energy, generated by building-integrated photovoltaics and thermal sources. SP also plans to install energy storage technologies, a microgrid controller, and smart metering to optimise consumption and reduce carbon emissions. The campus will serve as a living lab for future test-bedding of innovative solutions that will help Singapore decarbonise and become more sustainable.



*Singapore's largest private microgrid at Singapore Institute of Technology
Photo credit: Singapore Institute of Technology*

MAXIMISING SPACE AND MINIMISING ENERGY

One of SP's core strengths is our ability to combine many of our solutions and in an integrated manner to achieve optimal energy efficiency, sustainability and decarbonisation.

To develop sustainable infrastructure and space optimisation in land-scarce Singapore, SP has embarked on a journey to construct Southeast Asia's first large-scale underground electrical substation at Labrador. The 230 kV substation, scheduled to be completed in 2024, occupies a land size of three hectares, or about the area of four football fields. Aboveground, a 34-storey super low energy commercial building will be built.

Labrador Tower, is a showcase of all of SP's sustainable energy solutions and has recently achieved certification in June 2022 as a Green Mark Platinum Super Low Energy (SLE) building under the Singapore BCA Green Mark Certification Scheme. This award highlights its best-in-class energy performance, use of renewable energy and other intelligent energy management strategies. The building incorporates energy-saving features such as a smart air conditioning system, high-performance façade, optimal building orientation and floor plates. With its various sustainable features, Labrador Tower is expected to use at least 40 per cent less energy annually compared to other conventional similar-sized buildings.

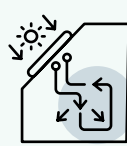


Labrador Tower - achieved Green Mark Platinum Super Low Energy (SLE) certification in June 2022

Combining a 255 kWp rooftop photovoltaic system, the GET Control, an efficient chiller plant, thermal energy storage and electric vehicle charging stations, these sustainable energy solutions work with regular building systems like lighting and controls to achieve the SLE certification. With the SLE certification for Labrador Tower with SP's suite of solutions, SP hopes to answer the government's Green Plan which targets 80 per cent of buildings to be green, 80 per cent of new buildings to be SLE and an 80 per cent improvement in energy efficiency by 2030.



Smart air conditioning system



High-performance façade



Optimal building orientation

Environmental awareness

SP is committed to doing our part for Singapore's environmental sustainability by raising awareness through various initiatives and platforms such as My Carbon Footprint, GreenUP™ and Eco boards.

Launched in 2020, My Carbon Footprint on the SP app enables everyone in Singapore to gain a deeper understanding of what a carbon footprint is and how much carbon emissions they emit. By answering a few simple questions about the user's daily routine, their annual carbon emissions are calculated. Accessed via the SP app and the web version, users can keep track of their emissions, using a monthly tracking chart that will be released in the second half of 2022. This feature allows users to view their emissions trends in a single glance and enables them to be more precise when purchasing any carbon offsets or RECs that can reduce their monthly carbon emissions.

Another feature on the SP app is GreenUP which provides a fun and engaging way to help customers adopt a more sustainable lifestyle. Daily challenges such as going meatless and using reusable cups aim to help users reduce their carbon emissions and earn rewards. Users have completed over 9 million challenges since its launch in September 2019.

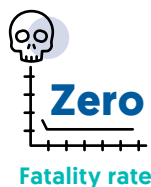
Building on the success of this initiative, in 2021, we worked with more than 45 like-minded partners to create the GreenUP sustainability programme to create various challenges to help app users adopt green habits such as forgoing disposable cutlery when ordering food. We are also partnering popular consumer brands such as Amazon, Foodpanda, Huggs coffee and many more, to promote more conscious buying through various green challenges and integrating sustainable habits into our customers' lives.

People and the Community

We are committed to safe operations and we work diligently to protect the health and safety of employees, customers, visitors and contractors at all of our operations. We achieve this by providing thoughtful, targeted training to our team so that they have the skills and knowledge needed to help us become Asia Pacific's leading sustainable energy solutions player.

Health and safety

Safety Performance:



At SP, safety is our highest priority and we strive for zero accidents. The commitment to safety stems from our top management. They play an instrumental role in developing and committing to a safe working culture. Over 500 management staff conduct site safety inspections to bring the message of safety to all staff and contractors. In FY21/22, we recorded almost 30,000 inspections (physical and remote monitoring) conducted at our work sites.

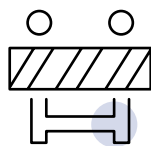
We achieve this using SP's Occupational Health and Safety Management System which was developed based on the ISO 45001 framework and covers all of SP's Singapore operations. This system is subject to regular annual reviews including an internal and external audit by ISO 45001 auditors as well as a safety & health management review by our Management Safety Committee [MSC]. Should any areas for improvement be identified during these reviews, they are followed through to completion.

⁷ Lost Time Injury Frequency Rate per million manhours. Includes staff and contractors' injuries with more than 1 day lost time.

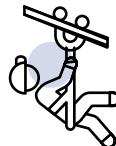
Eight key risks associated with the nature of our work include:



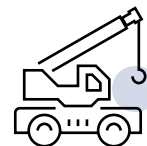
Excavation & Trenching



Traffic Management



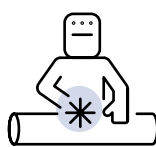
Working at height



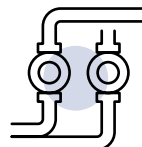
Lifting Operation



Confined Space



Hot Works



Electrical/Gas Works



Slips, Trips & Falls

Any incidents, including near misses, that occur within SP's premises or as a result of work activities performed by the group and/or its contractors are reported to the MSC. The person involved in or is witness to the incident shall notify the reporting officer as soon as reasonably practicable. The reporting officer then notifies management and the MSC of the incident within one hour.

The location of any incident is immediately secured ensuring that only authorised persons can enter the incident location. No equipment, material or other evidence of the incident is removed unless deemed necessary to prevent further injury or damage or upon instruction by management. Photographs at the scene of any incident are taken and attached to an incident report. An investigation team is formed to investigate incidents and establish accountability and make recommendations to prevent a recurrence.

Progress is regularly reported to the MSC on addressing these risks via established risk control activities, namely safety inspections by the Management team, Group Safety and Health (GS&H) and independent HSE inspectors, project safety reviews for all SP projects, and thrice-yearly risk assessment workshops conducted by sections with the departments, supported by GS&H officers.

Overall health and safety management is governed by the MSC which is chaired by the Chief Risk Officer and comprises senior management representatives of each business unit. The respective business units have their own Health, Safety and Environmental (HSE) committees chaired by senior management to provide health and safety leadership in those units. Units that have formed HSE Committees, comprising senior management, middle management, and ground staff from the various operational entities.

To ensure relevant information on occupational health and safety is readily available to our staff, we utilise a Safety Information Management System that is available to all staff to access information on health and safety via our intranet. Documentation relating to ISO 45001 is available to staff via the portal. We also host regular communication sessions and on-site training, such as monthly section communication sessions to share up to date health and safety information to ground staff, 'Safety Pauses' for contractors to communicate key issues with contractors and share best practices, and on-site safety inspection training for new management inspectors. Additional health and safety information is regularly communicated to staff and contractors via various platforms, such as mass email, yammer, safety alerts, circulars, town halls and briefings.

We have also developed a comprehensive workplace health programme which is based on the WHO model for healthy workplaces. The programme has been developed with the objective of occupational disease prevention and personal health promotion and is backed by the Union of Power and Gas Employees [UPAGE] and supported by the joint efforts of the MSC, the workplace health programme committee, and the ReCharge committee.

Beyond our Occupational Health and Safety Management System, we host numerous voluntary **health promotion services and programmes** for our staff. Highlights include:



- An annual health screening, which is available to all staff at no charge. This provides staff with an assessment of their current health status such as cholesterol levels, BMI, and diabetes risk so that they are aware and able to take timely action where required. The data collected is also taken into consideration when developing their work plan for the following year.



- A lifestyle survey was conducted with staff as part of our health promotion initiative. The outcome of the survey guides the development of programmes, targeted at everyone's interest areas, such as physical or mental health workshops or smoking cessation programmes.



- We have a network of Care Ambassador volunteers who are trained to aid staff who are suffering from mental health issues. Care Ambassadors undergo formal training to prepare themselves for their roles.



- Turning-23 [Weight Management] Programme was launched for all staff to assist in managing their BMI. \$100 vouchers are given to staff who achieve a 10% weight reduction and additional \$20 vouchers are given to staff who attend all associated group exercises and workshops.



- Mental Health Week, organised in Oct 2021, in conjunction with World Mental Health Week aimed to create awareness of mental health issues and to reach out to staff who may need assistance in managing their mental health.



- Launched a one-stop Online Health Portal – With the increasing isolation and inactivity due to the work-from-home arrangement, it became even more important to bring our health resources online expeditiously. GS&H and HR set up a one-stop e-depositories on health matters and a line-up of activities [LIVE WELL and ReCharge] and publicity of programmes over the company intranet, common TVs in offices and on screensavers of individual laptops.

We also hosted several physical and mental health workshops, launched “Zoom with ActiveSG Masters” for staff to work out at home daily, held monthly bite-size talks to equip participants with self-help tips, and more.

To ensure all our staff and contractors are aware of and maintain SP's standards for health and safety, training is provided through a variety of means. All new staff are required to attend a safety induction e-training course when joining the company. Annually, a safety e-learning refresher course is rolled out to all staff to provide more in-depth learning about safety in various work environments and mitigation measures to address key safety risks. There is an assessment at the end of each module to reinforce key concepts and learnings. In addition, Site Safety Inspection Training is delivered to SP Project Officers and Management Staff to enhance their skills in identifying safety hazards and understanding safety regulatory requirements relating to actions undertaken by each operation. These skills are required when conducting a safety inspection at SP worksites.

For contractors, a mandatory safety course conducted in the native language of foreign workers called Safety@SPPG has been provided since 2014. The objective is to raise safety awareness and to equip them with the necessary skillsets and knowledge to carry out works safely at sites. All workers are required to undergo Safety@SPPG before deployment onto SP worksites. In 2021, the course was extended to include practical stations, covering high-risk work activities, to enhance the learning experience of the participants.

We also rolled out a new Project Safety Management Course in January 2022. Targeted at all Contractor Project Managers, Workplace Safety and Health Officers, Project Coordinators and Supervisors the course is designed to build their capabilities and enhance site safety management skills. The training also helps them to better understand SP safety requirements and the importance of working safely.

Training and development

3,574



Number of employees

[as of end Mar 2022]

179,000



Total Training Hours

50



Average training hours per employee per year

7.1



Average training days per employee per year

100%



of our staff received a regular performance and career development review⁸

To prepare our company for growth now and in the future, we have trained our employees in “Core” and “Future-Ready” programmes in the key areas below. Examples of the programmes are:

Core programmes

Safety



- Defensive driving and riding

Network Reliability



- Condition monitoring of switchgear
- Singapore's gas network

Customer First



- Go-the-extra-mile service
- Project a positive and professional image

Functional-Specific



- Project management
- Chilled water terminal system

Soft-skill



- Effective communication
- Operational teamwork and collaboration

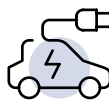
Future-ready programmes

Network Reliability



- Online Condition Monitoring for Transmission and Distribution Equipment
- Operation and Maintenance of Energy Storage System (ESS)
- Distributed Energy Resources Management System (DERMS)
- Trends for Microgrid

Electric Vehicle Charging



- Introduction to Electric Vehicle (EV) and EV Charging System
- Electric Vehicle Charging System
- Grid Connected Electric Vehicles

Energy Efficiency



- Foundational Workshop on Energy Efficiency

Cybersecurity



- OT/IoT Cybersecurity
- Advanced Penetration Testing
- Advanced Malware AnalysisTrends for Microgrid

Data and Artificial Intelligence



- AI and Machine Learning
- Data Science and Artificial Intelligence

App Creation



- Power BI
- PowerApps Development 23

To ensure that our employees continued to be upskilled during the pandemic, courses were converted to virtual platforms such as e-learning or blended training approaches. For our other training providers and Singapore Institute of Power and Gas, trainers adapted their course materials to enable virtual delivery.

For transition programmes for employees going into retirement, reporting officers engage them about six months prior to re-employment to discuss possible arrangements, and training needed should they be redeployed to a different job role. There is also flexible work arrangements subject to operational needs extended to returning retirees, for example shorter workweeks as a transition to eventual exit.

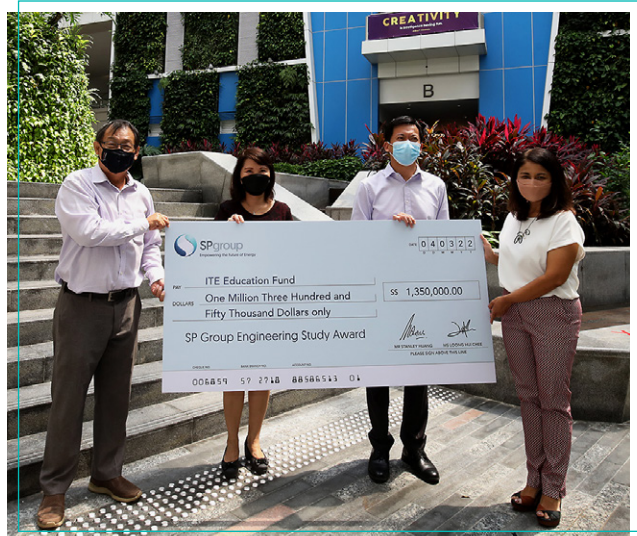
⁸ Including all men, women, executives and non-executives

Community engagement

Our initiatives for the community are aligned with our mission – to improve quality of life and create sustainable solutions for the community, today and for future generations. We recognise that we have a responsibility to demonstrate our contribution to the community by educating them on energy efficiency practices and providing innovative products and services with adequate support to help them meet their decarbonisation targets.

As the world learns to live with the Covid-19 pandemic, SP is committed to helping communities in need through sustained philanthropy, and skills-based volunteering. Collectively in the past year, we have contributed \$4.5 million to various community causes, education, and industry initiatives.

A key initiative is SP's \$1.35 million donation to the Institute of Technical Education to establish the SP Group Engineering Study Award. The award provides monthly financial support to 450 engineering school students from low-income families over three years. This initiative builds on SP's contribution over the years, through book prizes for ITE's electrical engineering students and job exposure as part of its commitment to nurturing the next generation of technical officers and engineers for Singapore.



A \$1.35million donation to ITE Education Fund



SP Power Packs amounting to \$1.1 million for 10,000 low-income families



We increased by five-fold the reach of our annual SP Power Packs charity drive, committing \$1.1 million for 10,000 low-income families to receive bags of food and essential items to guard against Covid-19, such as Antigen Rapid Test kits, sanitiser, hand wash, wet wipes, and vitamins.

Through the SP Heartware Fund, we have supported programmes for vulnerable seniors to promote active ageing and prevent social isolation. At Toa Payoh West – Thomson, we have provided more than 13,000 meals for seniors. SP Kids at Heart, set up last year, has benefited 2,000 KidSTART pre-schoolers from low-income families through educational tools, books, toys, and electronic devices such as tablets and internet routers to support online and home-based learning.

Our staff volunteers, known as SP Heart Workers, have continued to drive outreach activities such as packing and delivering Power Packs and SP Kids at Heart learning packs and organising festive gatherings and grocery shopping for seniors. Our teams have also supported nationwide activities, including Temasek Foundation's pandemic response programmes by manning the public hotline, as well as the Ministry of Health's Covid-19 helpline to address queries from patients and the public. In total, our staff have contributed more than 63,000 hours towards these activities.

Disclosures

Contribution to SDGs

SDG Target by 2030	Initiatives to support the targets
 SDG 7 AFFORDABLE AND CLEAN ENERGY Clean and Smart Energy - Leveraging on the climate opportunities in the provision of low carbon solutions, aligning with the SDG 7 targets:	
7.1 Energy access Ensure universal access to affordable, reliable and modern energy services	<ul style="list-style-type: none"> Increasing electric vehicle charging stations Enabling access to the Open Electricity Market by empowering customers with options for electricity packages and to enjoy savings
7.2 Renewable energy Increase substantially the share of renewable energy in the global energy mix	<ul style="list-style-type: none"> Renewable energy imports from the region Deploying solar PV projects Encourage use of Renewable Energy Certificates for clean energy claims Launch of My Green Credits™ on the SP app to enable households to match their electricity consumption with an equivalent amount of green energy produced
7.3 Energy efficiency Double the global rate of improvement in energy efficiency	<ul style="list-style-type: none"> GET™ TenantCare Utilities Monitoring & Insights Deploying smart technology and SP app to access half-hour electricity usage Spreading environmental awareness through Eco-Boards, GreenUP and My Carbon Footprint Deploying smart technologies for Tengah smart energy town
 SDG 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE Reliable and Sustainable Infrastructure – Ensuring resiliency in the infrastructure through addressing the climate risks to uphold reliability of our services in alignment with relevant SDG 9 targets:	
9.1 Reliable infrastructure Develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	<ul style="list-style-type: none"> Investing in network infrastructure upgrades Deploying smart grid technologies Asset Health Digital Twin to monitor equipment health – prototype in place Constructing the first large-scale underground substation in Southeast Asia to optimise space in land-scarce Singapore Deploying district cooling and energy-saving solutions Developing urban micro-grid
9.4 Sustainable infrastructure Upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	<ul style="list-style-type: none"> Capacity upgrades for the Interconnector between Singapore and Peninsular Malaysia to support a regional grid energy import pilot Developing DERMS to enable the effective integration of renewables Developing a utility-scale energy storage system

Task Force on Climate-related Financial Disclosures (TCFD)

TCFD's Core Element	TCFD recommendations	SP Group's Approach	Addressed in Sustainability Review
Governance	Describe the board's oversight of climate-related risks and opportunities.	<p>The Board is committed to integrating sustainability into SP Group's strategic directions and plans.</p> <p>The Board Risk Committee was established by the Board and is responsible for the oversight of the climate risks faced by the group.</p> <p>The Board Executive Committee (ExCo) assists the Board and provides advisory supervision on SP's sustainable strategy, material ESG topics and targets.</p>	Board's role, pg [10]
	Describe management's role in assessing and managing climate-related risks and opportunities.	<p>The Executive Leadership Team (ELT) reports to the ExCo and is headed by the Group Chief Executive Officer (GCEO). The ELT's role is to oversee and manage material sustainability initiatives.</p> <p>The Group Risk Management identifies and analyses the climate-related risks faced by SP and reports to the Committee every quarter.</p> <p>The Strategy and Sustainability team monitors climate change issues and gives regular updates to the ELT.</p>	Management's role and internal controls, pg [11]
Risk Management	Describe the organisation's processes for identifying and assessing climate-related risks.	The Strategy and Sustainability team and Risk Management team had jointly conducted a climate risk assessment to identify material climate risks under different climate scenarios. The risks identified were then integrated into the Enterprise Risk Management (ERM) Framework.	Group risk management, pg [12]
	Describe the organisation's processes for managing climate-related risks.	<p>The Board Risk Management Committee is supported by the Group Risk Management (GRM) and provides oversight of the business risks that the group faces.</p> <p>The implementation and management of the ERM Framework are undertaken by the GRM and ERM workshops on material risks are held across business units. "Top-Down" and "Bottom-Up" approaches are adopted across the entire group so management and employees communicate and participate in effective risk management.</p> <p>The Group Risk Management then reports to the Board Risk Management Committee and provides updates on the risk management activities of the group's operations.</p>	Group risk management, pg [12]
	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.	All risks that are considered material to operations and are considered as strategic business risks and managed under the Enterprise Risk Management (ERM) Framework, including risks that arise from climate change. Physical and transitional risks are closely monitored by the related business units and escalated to the Risk Management Committee when necessary.	Climate risk assessment and scenario planning, pg [13-15]

Task Force on Climate-related Financial Disclosures (TCFD)

TCFD's Core Element	TCFD recommendations	SP Group's Approach	Addressed in Sustainability Review
Strategy	Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long term.	<p>The adoption of two United Nations Sustainable Development Goals (SDG) shows the group's support of the global call to action that all would enjoy peace and prosperity by 2030.</p> <p>SP had conducted our first climate risk assessment in FY21/22 based on a net-zero and business-as-usual scenario, where short to long term horizons were considered.</p> <p>The adoption of TCFD's reporting framework was done in FY21/22, focusing on the physical and transition risks and opportunities that occur with climate change.</p>	<p>Sustainability strategy, pg [8]</p> <p>Climate risk assessment & scenario planning, pg [13-15]</p>
	Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning.	<p>Strategy 2030 aims to create a low carbon, smart energy Singapore and be a regional leader in sustainable energy solutions. SP provides a full suite of solutions to customers and businesses to assist them in their sustainability journey.</p>	<p>Our sustainable energy ecosystem, pg [6]</p>
	Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	<p>To strengthen the sustainability resiliency of our strategies, SP has done a detailed study on two climate change scenarios. Of which, one scenario is considered a net-zero scenario, where warming temperatures are kept below 2°C.</p> <p>To demonstrate our commitment to sustainability, SP is committed to reducing our own emissions and also helping our customers achieve their green goals through digital solutions, energy-efficient technologies and accelerating the transition to renewable energy.</p>	<p>Climate risk assessment & scenario planning, pg [13-15]</p> <p>Sustainable energy solutions, pg [22-29]</p> <p>Energy as a Service, pg [30-35]</p>
Matrices and Targets	Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.	<p>The TCFD reporting framework was adopted in FY21/22 to address the increasing demand for clear, comprehensive and high-quality information on climate-related risks and opportunities.</p> <p>To track the progress of our goals, metrics have been provided since the base year of FY19/20.</p>	<p>Metrics and targets, pg [16]</p>
	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	<p>SP has been reporting our Scope 1 and 2 GHG emissions since FY19/20, in accordance with the GHG Protocol Corporate Accounting and Reporting Standard.</p> <p>To ensure that our GHG emissions data is aligned with international best practices, we had our data externally validated in accordance with ISO 14064-3:2019, 'specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals'.</p>	<p>Metrics and targets, pg [16]</p> <p>Emissions audit statement, pg [44]</p>
	Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets	<p>Corporate strategy 2030 aims to create a low carbon, smart energy Singapore and be a leading player in sustainable energy solutions by 2030.</p>	<p>Sustainability strategy, pg [8]</p>

Emissions audit statement



LRQA Independent Assurance Statement Relating to SG Group's GHG Report for the Financial Year 2021/22

Terms of Engagement

This Assurance Statement has been prepared for SP Group.

LRQA Limited (Singapore Branch) (LRQA) was commissioned by SP Carbon Solutions Pte. Ltd. to assure SP Group's GHG Report for the financial year 2021/22 (hereafter referred to as "the Report"). The financial year is from 1 April to 31 March.

The Report relates to direct GHG emissions and Indirect GHG emissions from imported energy.

Management Responsibility

SP Group's management was responsible for preparing the Report and for maintaining effective internal controls over the data and information disclosed. LRQA's responsibility was to carry out an assurance engagement on the Report in accordance with our contract with SP Impact Pte Ltd.

Ultimately, the Report has been approved by, and remains the responsibility of SP Group.

LRQA's Approach

Our verification has been conducted in accordance with ISO 14064-3:2019, 'Specification with guidance for verification and validation of greenhouse gas statements' to provide limited assurance that GHG data as presented in the Report have been prepared in conformance with ISO 14064-1:2018, 'Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals'.

To form our conclusions the assurance engagement was undertaken as a sampling exercise and covered the following activities:

- conducted site visits covering SP Group's key activities:
 - SP Group's HQ building, including data centre at 2 Kallang Sector, Singapore 349277,
 - Substation for electricity transmission and distribution,
 - National Gas Control Centre (NGCC), Onshore Receiving Facilities, pressure regulator station and metering station for gas transmission and distribution,
 - Central warehouse, and
 - District cooling plants;
- reviewed processes related to the control of GHG emissions data and records;
- interviewed relevant staff of the organization responsible for managing GHG emissions data and records, both during the site visits and at a sample of overseas locations;
- reviewed activity data at the summarised source data, both during the site visits and at a sample of overseas locations;
- interviewed relevant staff of the organization responsible for managing GHG emissions data and records;
- verified historical GHG emissions data and records at an aggregated level for the financial year 2021/22; and
- verified the emission factors used for fossil fuel, lubricant oil/grease, fugitive sources, electricity with the source reference and confirmed its appropriateness.



Level of Assurance & Materiality

In accordance with our contract agreement, the assurance was conducted at a limited level of assurance at a materiality of 5% for Categories 1 and 2. The opinion expressed in this Assurance Statement has been accordingly formed.

LRQA's Opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that the GHG emissions for Category 1 direct GHG emissions and Category 2 indirect GHG emissions from imported energy disclosed in the Report as summarized in Table 1 below are not materially correct, and that the Report has not been prepared in conformance with ISO 14064-1:2018.

Signed

Cindy Zhang
LRQA Lead Verifier
LRQA Limited (Singapore Branch)
18 Cross Street, #02-101, Suite S2039, Singapore 048423

Dated: 28 June 2022



On behalf of LRQA Limited
1 Trinity Park, Bickenhill Lane, Birmingham B37 7ES,
United Kingdom

LRQA reference number: SNG00000324

Table 1. Summary of SP Group, GHG Emissions Report FY2021/22

Scope of GHG emissions	Tonnes CO ₂ e
Direct GHG emissions (Category 1)	78,173
Indirect GHG emissions from imported energy (Category 2, Location-based)	423,225
Indirect GHG emissions from imported energy (Category 2, Market-based)	419,959
Location based and Market based are terminologies from Annex E of ISO 14064-1:2018.	

This Assurance Statement is subject to the provisions of this legal section:

LRQA Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as LRQA. LRQA assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant LRQA entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

The English version of this Assurance Statement is the only valid version. LRQA assumes no responsibility for versions translated into other languages.

This Assurance Statement is only valid when published with the GHG Report to which it refers. It may only be reproduced in its entirety.

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SPgroup

Empowering the Future of Energy