

salesforce

Trail to Net Zero for Singapore

2022





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1. Executive Summary

To address climate change, Singapore has introduced multi-pronged mitigation and adaptation efforts. It is focusing on lowering emissions through efficient power generation, increased renewable energy use, development and adoption of low-carbon technologies, investment in water resource management and flood resilience, and introduction of market mechanisms such as a carbon tax regime.

Since the first Nationally Determined Contributions (NDC) targets in 2016, Singapore has brought forward its net zero emissions target 'by or around' 2050.

Businesses can contribute significantly towards Singapore's trail towards net zero. Salesforce has introduced Sustainability as a core value and a Climate Action Plan which includes six sustainability priorities and serves as a blueprint for the journey towards net zero.

Salesforce has achieved net zero residual emissions across its full value chain and 100 percent renewable energy for its global operations.

Salesforce's Net Zero Cloud solution is an important platform to help organisations accelerate the journey to net zero. It tracks current emissions, forecasts emission patterns, and enables decision making.

Salesforce's Net Zero Cloud helps streamline and simplify the carbon emissions reporting process.

Further, Salesforce is enabling sequestration of 100 gigatons of carbon through the conservation, restoration, and growth of 1 trillion trees, protecting oceans, and energising the ecopreneur revolution.

Commissioned by Salesforce, and prepared by Access Partnership, this report focuses on sustainability efforts in Singapore. It examines the policy environment, evaluates the economic and environmental gains from transitioning to cloud computing, and provides key insights on business sentiment and readiness to address climate change. The report highlights the climate change efforts of Salesforce and provides policy recommendations for Singapore to accelerate climate action.



The report recommends Singapore to:



Develop cutting-edge climate technologies: Singapore should support innovations that reduce emissions and increase energy efficiency. Further it should promote startups, ecopreneurs, and public-private-partnerships (PPP), and those who are working on innovative climate change initiatives.



Increase investment in cloud: The Singapore government should encourage adoption of cloud computing considering its lower environmental impact. It reduces energy consumption, waste generation, and carbon emissions. The report commissioned by Salesforce reveals that a 1 million metric tonne (Mt) CO₂ emissions reduction in 2022 can be achieved by migrating to the cloud, which rises to 1.3 million Mt CO₂ emissions reduction if cloud operates fully on renewable power.



Address sustainability skills gap: Organisations need to focus on creating a workforce equipped with skills to work in the field of climate change. Upskilling initiatives should prepare employees to understand the imperative for climate action and make decisions aligned with their organisational goals.



Use Environment Artificial Intelligence (AI): There are many potential uses of harnessing AI to achieve sustainability outcomes. It is already being used in Singapore to monitor pollution levels and mitigate extreme rainfall events. Other potential uses include smarter decision making for decarbonising industries and efficient allocation of renewable energy.



Enhance international collaboration: Singapore should accelerate initiatives such as the development of a cross-border power grid, as well as exploring supply pathways for green electricity imports, and price-competitive low-carbon hydrogen.



Adopt a shared digital platform to track emissions: Government and organisations should adopt a shared digital platform to track emissions and forecast emission patterns. Having a shared digital platform will ensure better decision making with a single source of truth when measuring and tracking emissions within their own organisation and potentially their supply chain.



2. Singapore and Sustainability

Singapore is vulnerable to climate change. As a low-lying city-state, extreme weather events, rising sea levels, and increased temperatures threaten both livelihoods and infrastructure.

Given this vulnerability, Singapore has shown acute awareness of climate change, with the Climate Change Awareness Programme (CCAP) launched in 2006. Significant policy change began in 2008 with the release of the National Climate Change Strategy¹ and the establishment of the National Climate Change Secretariat in 2010 under the Prime Minister's Office (PMO).²

The Singapore Green Plan 2030³ and Sustainable Singapore Blueprint 2015⁴ are the primary policies guiding action on climate change.

Singapore's climate initiatives focus on lowering emissions through efficient generation (natural gas) and energy demand (efficient infrastructures and modes of transport), boosting local green spaces and resilience, and regional and international initiatives (e.g., ASEAN Power Grid). It also recognises the opportunity to become the regional centre for green finance and carbon services and actively considers this as part of its climate strategies.

Through the Paris Agreement, Singapore originally announced Nationally Determined Contribution (NDC) targets in 2016, with an emissions intensity reduction target of 36 percent (from 2005 levels) by 2030.⁵ In 2020, Singapore updated its NDC targets, and announced an absolute value of peak emissions at 65 million tonnes (Mt) of carbon dioxide equivalent (CO₂e) emissions by 2030.⁶ As part of the Long-Term Low-Emissions Development Strategy (LEDS), it aims to halve its emissions (33Mt CO₂e emissions) by 2050.⁷

Other key goals to enable Singapore's low-carbon transition specified in the NDC and Biennial Update Report (BUR)⁸ include industry transformations through increased renewable energy use, greater energy efficiency, and adoption of carbon capture, utilisation and storage (CCUS) and hydrogen technology.



Changing the power generation mix has been a key priority for Singapore. It has successfully switched away from fuel oil to natural gas, with the proportion of electricity generated from natural gas rising from 26 percent in 2001 to approximately 95 percent in 2019. However, Singapore faces constraints in exploiting other renewable energy sources, as wind speeds are not viable, and it lacks access to hydro or geothermal sources. Solar energy is the most promising, and it aims to meet about 4 percent of current annual electricity needs from it by 2030.⁹

One of its notable solar projects has been the installation of 122,000 solar panels, equivalent to 45 football fields, on the surface of the Tengeh Reservoir and one of the world's largest inland solar farms. Its carbon savings are equivalent to 60 megawatt peak (MWP) capacity.

Singapore is also developing a robust carbon tax scheme, in line with growing interest to become the carbon services and trading hub of Asia.

The carbon tax will be increased progressively from SGD5 per tonne in 2023 to SGD50 to SGD80 per tonne of emission by 2030. The revenue collected will be put towards investment in decarbonisation efforts and subsidies to soften the impact of a carbon tax increase on household utilities.¹⁰ The scheme is expected to have a gross value added (GVA) of USD1.8-5.6 billion based on international climate change developments.¹¹

On the international front, Singapore has played an active role in climate change negotiations and enhanced cooperation through agreements and initiatives. For instance, it has signed Memorandum of Understanding (MoU) with international partners such as Chile and Japan on low-emissions solutions,¹² Brunei Darussalam on bilateral cooperation in environmental affairs and climate change,¹³ and is negotiating a Green Economy Agreement (GEA) with Australia.¹⁴ Singapore has also begun importing renewable energy from Laos, via Thailand and Malaysia, marking the first cross-border power trade arrangement involving four ASEAN countries.¹⁵ In March 2022, Singapore and Indonesia sealed a climate change partnership to work on clean technology research and pilot projects related to various ecosystems on land and sea to help both countries meet emissions reduction targets.¹⁶



3. Salesforce's Approach to Sustainability

Sustainability is one of Salesforce's core values along with Trust, Customer Success, Innovation, and Equality. Salesforce has been on a sustainability transformation journey for over a decade now which has culminated to its Climate Action Plan¹⁷ which acts as a blueprint for the journey to net zero and outlines six sustainability priorities of Salesforce:



Emissions reduction by initiatives like business travel emission reduction, low carbon cloud infrastructure, work from anywhere, and supplier enablement.



Carbon removal by enhancing carbon removal tools of present and scaling future technology-based carbon removal opportunities.



Trillion trees and ecosystem restoration by taking action to enhance the world's natural systems to sequester carbon from the atmosphere.



Education and mobilisation by raising awareness of climate change, and enabling behaviour change to embrace low-carbon solutions.



Innovation by supporting and investing in ecopreneurs and their ideas and technologies to scale.

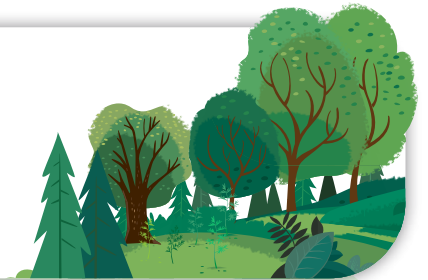


Regulation and policy by working with policymakers on topics like emissions reduction, reorientation of economies, and fostering an equitable and resilient society.

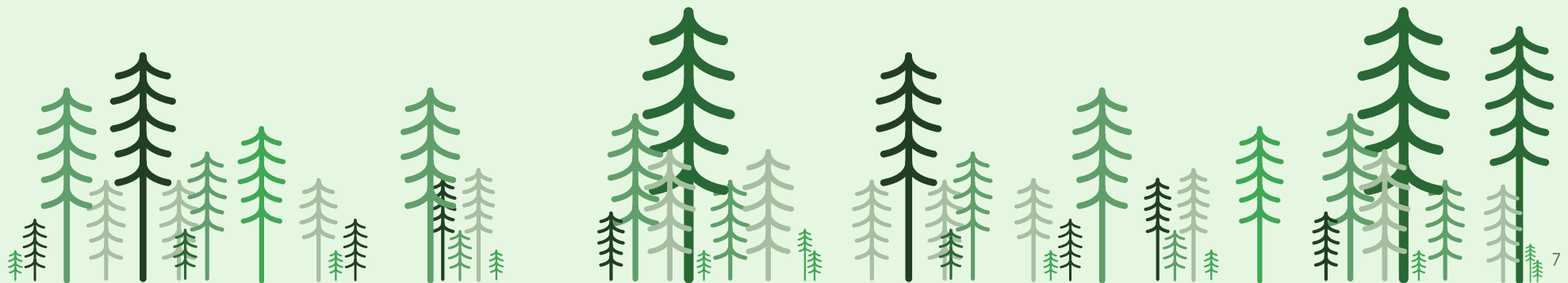
Salesforce is a net zero company, and has increased investment in emission reduction initiatives, achieved net zero emissions across its value chain, 100 percent renewable energy for its operations, and funded more than 40 million trees as part of its 100 million trees goal.

In the year 2022, Salesforce initiated the institutionalisation of its sustainability program in Singapore to make its sustainability journey more inclusive. Just ahead of COP26, Salesforce announced two new natural climate solutions:¹⁸

A global tree equity and urban reforestation initiative to engage ecopreneurs, organisations and volunteers in cities with limited access to green spaces to make cities greener around the world.



Salesforce's first blue carbon program to conserve, protect, and restore coastal and marine ecosystems, and to purchase one million tons of blue carbon credits over four years.



At the World Economic Forum Annual Meeting in Davos in May 2022, Salesforce further announced plans to invest USD 100 million through purchase of carbon credits in technologies that remove carbon from the atmosphere at scale.¹⁹ Recognising that carbon removal is a key tool to address climate change, Salesforce is committed to help scale Carbon Dioxide Removal (CDR) solutions through 2030.

To reduce supply chain emissions, Salesforce has included a Sustainability Exhibit in its procurement contract, requiring suppliers to take up a Science-Based target that aligns with the 1.5°C pathway.²⁰ Further, it plays a key role in helping organisations accelerate efforts to cut emissions and become sustainable. For instance, a recent survey by IDC found that 47 percent of Salesforce’s customers in Singapore look to it for support in reaching their own sustainability objectives.²¹

Net Zero Cloud 2.0

Salesforce’s Net Zero Cloud 2.0 is a sustainability management solution that enables organisations to go net zero now. In this new era of climate accountability, organisations’ carbon data will need to be as trusted as their financial data. Net Zero Cloud 2.0 has been completely rebuilt to offer trusted reporting, deeper insights, and supplier management.²²

With Net Zero Cloud 2.0, organisations can get sustainability insights with rich analytics dashboards, powered by Tableau, to achieve their climate goals and take action with:

- **Environmental Impact SSOT:** Organisations can depend on one trusted platform that serves as the single source of truth (SSOT) for all forms of environmental data.
- **What-If Analysis:** Organisations can perform scenario planning on a real time basis and synchronise it in Net Zero Cloud to track its progress.
- **Useful Dashboards Powered by Tableau:** Get a single view of the organisation’s total carbon footprint; a holistic view of the critical elements that influence the path to net zero; as well as a summary of company-wide travel emissions across air / ground travel, and hotel stays.

- **Scope 3 Emissions Hub:** Track all Scope 3 emissions data with a dedicated app for granular tracking of Environmentally Extended Input-Output (EEIO) and procurement data for effective management of emissions from upstream processes.
- **Energy Use Records:** Instantly translate energy use data to carbon emissions categorised as Scope 1, 2, and 3 emissions, giving complete, granular insight into carbon footprint.
- **Carbon Footprint Forecast:** Organisations can find the fastest path to net zero with a ‘what-if’ analysis to visualise progress and alignment to their climate action commitments.
- **Science-Based Targets:** Setting goals in line with science-based targets and measuring progress.²³
- **Supplier Management:** Track scope 3 emissions across the entire value chain and help suppliers and distributors reduce emissions.
- **Waste Data Management:** Organisations can upload and track hazardous and non-hazardous waste management data and treatment methods like landfilled, composted, or combusted – all in one place.



4. Economic and Environmental Impact of Moving to the Cloud

According to the Climate Economics Index, Singapore's GDP could decrease between 20.2 percent to 35.6 percent if temperatures rise between 2-2.6°C. In case of a more severe 3.2°C temperature increase scenario, the potential loss in GDP could increase up to 46.4 percent.²⁴

Investments in cloud technologies to reduce emissions

Cloud computing offers long-term economic gains including greater flexibility, cost efficiency, speed, and business continuity. An often-overlooked advantage is its impact on the environment. It reduces energy consumption, waste, and carbon emissions.²⁵

A recent study by S&P Global Market Intelligence has shown significant energy savings of 79 percent from moving business applications and IT workloads from on-premises enterprise and public sector data centres to the cloud.²⁶ With data centre capacity expected to reach 2GW in Singapore by 2030, there will be a substantial reduction in energy consumption and carbon emissions, as IT workloads are moved to the cloud. Based on these estimates, for Singapore, Access Partnership projects:

USD 394.8 million
cost savings in 2022 from
reduction in energy use*

1 million
Mt CO₂ emissions reduction in 2022
due to migration to cloud

15 million
Mt CO₂ emissions reduction
between 2022 - 2030 due
to migration to cloud

USD 4 billion
cost savings between 2022 -
2030 from reduction in energy
use*

1.3 million
Mt CO₂ emissions reduction in
2022 if cloud operators source
100 percent renewable power

19.3 million
Mt CO₂ emissions reduction
between 2022 - 2030 if
cloud operators source
100 percent renewable power



* Reduction in energy use due to higher server utilisation rate, the deployment of highly energy-efficient servers as well as the use of advanced power distribution systems and cooling technology by cloud data centres.



19.3 million (Mt) would be equivalent of approximately:⁶

- GHG emissions from 4 million passenger cars in Singapore, or 76 billion kilometres driven on Singapore's roads
- CO₂ emissions from consumption of 8.3 billion litres of petrol
- CO₂ emissions from 5 coal-fired plants in one year
- CO₂ emissions from consumption of 44 million barrels of oil
- CO₂ emissions from charging 2.3 trillion smartphones
- GHG emissions avoided by recycling 820 million trash bags of waste
- GHG emissions avoided by 5,200 wind turbines running for a year
- Carbon sequestered by planting 314 million tree seedlings over 10 year

* Detailed methodology and estimations are included in Appendix I



Salesforce is also encouraging other cloud companies and tenants of co-location facilities to maximise the use of renewable energy solutions and is a signatory of the 'Corporate Colocation and Cloud Buyers Principles' to aid sustainability efforts.²⁷

Reducing emissions from data centres is a key part of the decarbonisation program at Salesforce.

It is addressing this by increasing the efficiency of software code, which helps achieve more with each kilowatt hour of energy it uses. As it operates in shared co-location facilities, it also works closely with data centre partners to ensure high-efficiency, water-free, and zero-waste infrastructure that reduces energy use and minimises cloud's carbon impact.



5. Business Sentiment in Singapore on Sustainability

In March 2022, Salesforce commissioned YouGov to conduct a survey of over 1,000 managers representing small, medium, and large businesses in Singapore.²⁸ Key findings included:



Support for net zero commitments, stronger action, and government incentives

The Government of Singapore has accelerated climate action and this has resonated well in the business community, with 81 percent of managers supporting Singapore setting net zero emissions target by 2050. This level of support is even higher among larger businesses with more than 100+ employees (88 percent). Beyond setting targets, managers believe more should be done to address climate change by both the government (54 percent) and businesses in their industry (66 percent).

Additionally, 83 percent of managers support subsidies and incentives being given to businesses for the development of renewable energy technologies. The National Environment Agency has launched the Energy Efficiency Fund (E2F) consisting of five different grants to support businesses in energy efficiency efforts.²⁹



Jobs growth opportunities

Managers are three times more likely to think that achieving a net economy by 2050 in Singapore will result in more jobs than less jobs (39 percent compared to 13 percent). While a third (33 percent) believed that it would have no impact on jobs as any jobs lost would be balanced by jobs created, while 15 percent were unsure.

This demonstrates a sound level of understanding of the potential for new job creation in the transition to net zero, as well as the overall expected economic, environmental, and health benefits of a low-carbon, green economy.

The Singapore Green Plan 2030 projects a green economy will create 55,000 new jobs in Singapore over the next ten years, with at least 4,000 created to date.³⁰



Role of technology and suppliers

The majority of managers (85 percent) surveyed believe that technology would play an important role in helping achieve a net zero target by 2050 with 43 percent saying that the role of technology would be very important.

Businesses are also more conscious of emissions across their value chain. Almost two-thirds (61 percent) of Singaporean managers surveyed indicated that if a supplying business had a net zero target, then it would make them more likely to purchase their products/services. In Singapore, climate reporting has become a key requirement for businesses. For instance, Singapore Exchange (SGX) has made it mandatory for issuers in the financial, energy, agriculture, and forest product industries from fiscal year 2023.³¹ SGX has also recommended 24 core Environmental, Social and Governance (ESG) metrics as a starting point for sustainability reporting, which include Greenhouse Gas Emissions (GHG) across Scope 1, Scope 2, and Scope 3.³²





6. Recommendations

This section provides five key recommendations to advance Singapore's efforts on addressing climate change.



Develop cutting-edge climate technology

Singapore should support innovations that reduce emissions and increase energy efficiency. Further it should promote start-ups, ecopreneurs, public/private partnerships, and those who are working on innovative climate change initiatives.

Given its limited renewable energy options, Singapore should enhance investments in developing and deploying new low-carbon technologies such as Carbon Capture, Utilisation and Sequestration (CCUS) and hydrogen. Initiatives such as the Low-Carbon Energy Research Funding Initiative (LCER FI) which awarded SGD55 million to support 12 technology solutions should be expanded to pilot new technologies in different sectors such as maritime, aviation, and mobility. In addition, some businesses have venture arms and could dedicate a portion of their investments to ecopreneurs.



Increase investment in cloud

The Singapore government should encourage adoption of cloud computing considering its lower environmental impact. According to a study by Accenture, cloud migration enabled companies to achieve more than 84 percent reduction in carbon emissions compared to legacy infrastructure.³³ Cloud adoption reduces energy consumption, waste generation, and carbon emissions.

This report reveals that a reduction of 1 million Mt of CO₂ emissions can be achieved in 2022 by migration to cloud. Emissions reductions will rise even further if cloud operators begin sourcing 100 percent renewable power for their operations.

With Singapore's data centre industry growing at an unprecedented rate, and the market expected to attract investments of up to USD 5 billion by 2026,³⁴ policies on the use of sustainable sources of energy, and financial incentives to improve energy-efficiency of data centres should be implemented.



Address sustainability skills gap

Organisations need to focus on creating a workforce equipped with skills to work in the field of climate change. Upskilling initiatives should prepare employees to understand the imperative for climate action and make decisions aligned with their organisational goals. These skills may involve environmental impact assessments, environmental, social and governance (ESG) ratings, sustainable product design, circular economy advisors, and environmental accounting experts. To address this demand, government and business should work together to address re-skilling and upskilling the workforce through investments in training and learning programmes.

The Monetary Authority of Singapore (MAS) and the Institute of Banking and Finance (IBF) have identified 12 technical skills and competencies needed for individuals to perform various roles in sustainable finance. The Sustainable Finance Technical Skills and Competencies (SF TSCs) can be used by financial institutions and training providers to design relevant training programmes.³⁵ Similar frameworks should be a prioritised and replicated across other key sectors.³⁶

In addition, organisations should have climate and sustainability training embedded internally because it can impact a variety of functions whether it be finance and risk; building management; branding; regulation; product; supplier management and so forth.





Use environment AI

Environment AI means using AI to address environmental challenges. There are many potential uses of harnessing AI to achieve sustainability outcomes, and organisations need to make full use of its potential. This could include use of machine learning to optimise energy generation; smart sensors and meters that can be deployed within buildings to collect data and monitoring, analysing, and optimising energy usage in buildings; with satellite imagery, AI can detect changes in land use, vegetation, forest cover; invasive species can be monitored; and can be used for more accurate weather forecasting to help with agriculture, improve air pollution; can help decarbonise industries; efficiently allocate renewable energy and assist with disaster resiliency.

The National Environment Agency (NEA) is monitoring pollution levels in Singapore's waters. Through computer modelling, the government is testing flood-resilient infrastructure and mitigating extreme rainfall events.³⁷

AI can also be deployed by emergency services to better forecast and deal with natural disasters; it should be the arsenal of environmental organisations that research our environment; and can be leveraged by manufacturing sector to reduce energy and thereby reduce emissions. Therefore, it is imperative for organisations to determine how best AI can be leveraged.



Enhance international collaboration

Singapore should enhance international collaboration in clean energy. Pursuing and accelerating the development of a regional power grid, increasing green electricity imports, as well as exploring supply pathways for price-competitive low-carbon hydrogen will provide it with opportunities to meet its growing energy needs and diversify its fuel mix away from non-renewable sources.³⁸ Collaboration will also create opportunities across the renewable energy value chain for other ASEAN countries and help position Singapore as a leader in the region, sharing its expertise and knowledge in low-carbon technologies, technologies such as AI and cloud computing, and standards such as for renewable energy certificates (RECs)³⁹ and green data centres.⁴⁰ Singapore should also consider establishing Green Economy Agreements with other countries as well.



Adopt a shared digital platform to track emissions

Government and organisations should adopt a shared digital platform to track emissions and forecast emission patterns. Having a shared digital platform will ensure better decision making, and a single source of truth when measuring and tracking emissions within their own organisation and potentially their supply chain.

It is difficult and near impossible to improve something that you cannot measure, especially if it's not in a consistent standard. This requires agreed parameters of what is defined as emission reduction and net zero for organisations. Having a shared digital platform will help with transparency and provide accurate data in a timely manner. In the short term, this could be piloted to government agencies, or sectors that have specific regulations and standards that need to adhere to, such as financial services, and then rolled out nationally.





Appendix I. Methodology

Economic and environmental impact moving to the cloud

The modelling aims to examine the impact of cloud technologies and associated data centres on energy reductions and carbon emissions. It is based on estimates from a recent study by S&P Global Market Intelligence which shows significant energy savings, of 79 percent, from moving business applications and IT workloads from on-premises enterprise and public sector data centres to the cloud in Singapore.⁴¹

As the data centre capacity is expected to reach 2GW in Singapore by 2030, the model estimates a substantial reduction in energy consumption and carbon emissions, as IT workloads are moved to the cloud. In addition, when designing server and power distribution systems, cloud service providers (CSPs) invest in technologies to ensure a higher level of server utilisation and efficient resource allocation. As cooling systems of cloud facilities can account for up to 55 percent of a data centre's energy consumption,⁴² the use of advanced cooling systems, ventilation, and airflow management in cloud infrastructure will contribute to further energy reduction.

Based on this premise, the model provides annual estimates from 2022 to 2030 on:

- CO₂ emissions due to migration to cloud infrastructure;
- CO₂ emissions due to renewable energy use by cloud service providers; and
- Cost savings from reduction in energy use.

The estimates are based on the following assumptions and inputs:

- Data centre capacity in Singapore has reached 1GW in 2021,⁴³ 412 MW utilised in 2020.⁴⁴
- Data centre capacity in Singapore is growing at a CAGR of 8 percent from 2022 to 2030.⁴⁵
- Reduction in CO₂ emissions (per MW per year (Mt)) totalled 1,542 and increased to 1,976 with 100 percent renewable energy.⁴⁶ It is assumed that all the extra data centre capacity will be taken up in the following years to calculate the maximum amount of CO₂ emissions per year.
- Electricity consumption in 2020 amounted to 48.6TWh,⁴⁷ and will increase 3 percent per year.⁴⁸
- Electricity cost per kWh is USD 0.144⁴⁹ and data centres are responsible for 7 percent of total electricity consumption in Singapore.⁵⁰

	2021 (Base)	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total (2022 - 2030)
Data centre capacity (MW)	1,000	1,080	1,166	1,260	1,360	1,469	1,587	1,714	1,851	1,999	13,487
Reduction in CO ₂ emissions from efficiency (Mt)	906,696	1,030,056	1,163,285	1,307,172	1,462,570	1,630,400	1,811,656	2,007,413	2,218,830	2,447,161	15,078,543
Reduction in CO ₂ emissions from the use of renewable energy (Mt)	1,161,888	1,319,968	1,490,694	1,675,079	1,874,214	2,089,280	2,321,552	2,572,405	2,843,326	3,135,921	19,322,439
Singapore's electricity consumption (GWh)	50,029	51,529	53,075	54,668	56,308	57,997	59,737	61,529	63,375	65,276	
Singapore data centre electricity consumption (GWh)	3,502	3,607	3,715	3,827	3,942	4,060	4,182	4,307	4,436	4,569	
Cost savings due to energy reduction (USD)	383,258,880	394,756,646	406,599,346	418,797,326	431,361,246	444,302,083	457,631,146	471,360,080	485,500,883	500,065,909	4,010,374,665

Source: Access Partnership Research

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