

The Role of the Cloud in Meeting Sustainable Development Goals (SDGs) for the Asia-Pacific (APAC) Region



Information technology (IT) is the key to accelerating progress towards the 17 Sustainable Development Goals (SDGs)¹ adopted by all United Nations Member States in 2015, as part of the UN's 2030 Agenda for Sustainable Development. IT allows us to connect Asia-Pacific (APAC) citizens to the world, address and optimise industrial inefficiencies, harness vast amounts of data, and drive leapfrogging innovation in ways that we could have never imagined. This rapid, scalable transformation of sectors and services is what we need to close the identified gaps in healthcare, agriculture, energy, education, and other sectors covered by the SDGs.²

At the centre of these transformative, digitally enabled IT platforms serving populations across the APAC region is cloud computing infrastructure and services, commonly referred to as “the cloud”. Cloud-enabled technologies, such as artificial intelligence (AI), machine learning (ML), Internet of Things (IoT) and edge computing continue to drive systemic transformations at scale.³ Cloud-enabled technologies have already played a critical role in tackling the SDGs, such as the following:

- **SDG2 Zero Hunger:** by improving crop productivity and resilience, as well as optimising food distribution.
- **SDG3 Good Health and Well-being:** by advancing diagnostics, wearables, and superior health data storage and use.
- **SDG7 Affordable and Clean Energy:** by contributing to the efficiency of digital grids and integration of distributed energy resources and clean energy technologies.

The opportunity for cloud-enabled technologies to support governments in meeting all 17 SDGs—and more—is significant and undeniable.

In this critical “Decade of Action” (as unanimously designated by the UN),⁴ the role of cloud-enabled technologies in contributing to practical, actionable, and sustainable solutions for the Asia-Pacific region is vital. APAC is home to nearly 60% of the world’s population,⁵ and simultaneously some of the world’s worst air pollution and other markers of environmental degradation,⁶ – not to mention challenging markets for renewable energy investment.⁷ As such, it is important that any digital strategies we implement – including cloud-enabled platforms and sustainable cloud infrastructure – move the needle in our collective achievement of the SDGs.

Many Asia Cloud Computing Association (ACCA) member companies have supported such efforts in Europe,⁸ where the European Commission approaches digital transformation and decarbonization as mutually-reinforcing ‘twin transitions,’⁹ and we stand ready to do the same in APAC.

¹ <https://sdgs.un.org/goals>

² <https://www.weforum.org/agenda/2019/09/technology-global-goals-sustainable-development-sdgs/>

³ <https://www.iea.org/commentaries/5-ways-big-tech-could-have-big-impacts-on-clean-energy-transitions>

⁴ <https://www.un.org/sustainabledevelopment/decade-of-action/>

⁵ Global population - distribution by continent 2019 | Statista

⁶ World's Most Polluted Cities: India Tops List, China Air Improves - Bloomberg

⁷ Revealed: the most challenging places in the world for business to source renewable electricity | RE100 (there100.org)

⁸ Climate Neutral Data Centre Pact – The Green Deal need Green Infrastructure

⁹ Press corner | European Commission (europa.eu)

ACCA would like to highlight four overarching

Calls to Action in this discussion:

1 The cloud computing industry in APAC must continue to demonstrate its commitment to minimizing the carbon and environmental footprint of cloud infrastructure, through demonstrable targets and clear collaboration with regional stakeholders to ensure continued focus on promoting cloud data centre sustainability.

- ACCA member companies have been at the forefront of promoting sustainability practices for data centres globally. One key example of our commitment is in the EU’s Climate Neutral Data Centre Pact, a pledge by the cloud industry to work with European policymakers and regulators to eliminate the carbon footprint of data centres there by 2030, including via key commitments such as the following:¹⁰
 - Meeting energy efficiency targets of 1.4 for new data centres operating in warm climates, and 1.3 for data centres operating in cool climates.
 - Meeting data centre electricity demand with 100% renewable energy or hourly carbon-free energy.
 - Prioritizing water conservation.
 - Expanding opportunities for the reuse and repair of servers and other electrical equipment.
 - Finding ways to recycle heat and promote circular energy systems.
- ACCA members have also adopted ISO international standards on environmental management and energy use,¹¹ and some have gone further to set goals despite the absence of clear industry standards, such as on enabling circular economy practices.¹²
- Cloud services providers (CSPs) are offering an increasing variety of tools for users to track their carbon footprint on the cloud,¹³ and in many cases are investing in the rapid growth of clean tech innovations well beyond their infrastructure.¹⁴
- CSPs have consistently been the world’s leading purchasers of renewable energy in recent years,¹⁵ and ACCA member companies are keen to also expand opportunities for corporate investments in renewable power across APAC.¹⁶

¹⁰ Self-Regulatory Initiative – Climate Neutral Data Centre Pact

¹¹ For instance, Equinix adheres to ISO 14001:2015, which includes requirements for an environmental management system to contribute to sustainability, and Google follows the ISO 50001:2018, the international standard for energy management to improve energy performance.

¹² See, for example, the Microsoft Circular Centres program, and Google’s circular economy practices.

¹³ See, for example, offerings from AWS, Google, Microsoft and Salesforce.com in this space.

¹⁴ Non-traditional energy companies lead a record year for corporate investment in energy start-ups – Analysis - IEA

¹⁵ Cloud Titans Were the Largest Buyers of Renewable Energy in 2021 (datacentrefrontier.com)

¹⁶ Revealed: the most challenging places in the world for business to source renewable electricity | RE100 (there100.org)

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Governments in APAC should enable corporate renewable energy investments and expand market options for renewable energy procurement.

Existing challenges to renewable energy investments by corporations in APAC include the lack of renewable energy options and high costs. ACCA member companies support regulatory frameworks that incentivize affordable and renewable power options, especially opportunities for investment in new or additional capacity beyond what is currently available on the grid. Increasing market availability of renewable energy and corporate renewable energy investment options is a win-win-win for all. It will not only allow CSPs to achieve their sustainability goals in the region (as lead purchasers of renewable energy), but demand from CSPs will also help the renewable energy sector grow and thrive, bringing with it associated capital, green jobs and the transfer and proliferation of green technologies and approaches across APAC. Most importantly, corporate investments in renewable energy help governments to address national climate targets without the need for taxpayers or other ratepayers on the grid to bear additional cost burdens.

Governments in APAC should proactively seek to expand the market availability of renewable energy and increase corporate renewable energy investment options. This can be through incentives and supporting market structures that facilitate direct procurement between suppliers and corporate customers.



3 The cleanest energy is that which we do not have to use in the first place. Therefore, energy efficiency should be the highest-order priority for CSPs. Investments in this space are already paying dividends.

The growing demand for data in APAC to meet expanding business and development needs is clear. Internet traffic alone has seen a 15-fold increase between 2010 and 2020.¹⁷ The APAC region's data centre market grew by 24%, with cities such as Tokyo, Shanghai and Singapore significantly adding to their capacity.¹⁸ Today, APAC accounts for 28% of the world's data centre capacity, and it is predicted that APAC will become the world's largest data centre region over the next decade.^{19 20}

That said, a recent, comprehensive report by the International Energy Agency (IEA) found that the energy consumption of data centres globally has remained almost flat since 2010.^{21 22} That is to say, despite exponential worldwide growth in Internet and cloud-enabled services during the same period, overall data centre energy demand has not increased significantly in the last 12 years.

This is truly remarkable given the tremendous growth of big data, machine learning, and edge devices that our industry has experienced over that same period of time. Much of what has been keeping the total energy use of data centres in balance – despite massive growth in storage and computing for more than a decade – is due to the prodigious investments in energy efficiency made by data centre operators and CSPs (including ACCA member companies) during that time, as well as the massive migration that we have seen across all industries from less efficient on-premises data centres to highly efficient cloud infrastructure.

A recent survey of over 500 APAC enterprises and public sector organizations by 451 Research corroborates this, finding that cloud infrastructure is at least five times more efficient than typical APAC on-premises data centres. For the average enterprise or public sector organization, moving IT workloads to the cloud would immediately reduce energy use and associated carbon emissions by almost 80% across APAC, just from the associated energy efficiency increase alone.²³ And the impact will be even higher when CSPs are able to purchase 100% renewable energy for their energy use in APAC.

¹⁷ <https://www.iea.org/reports/data-centres-and-data-transmission-networks>

¹⁸ <https://datacentrenews.asia/story/rate-of-data-centre-market-growth-in-apac-exceeds-emea>

¹⁹ <https://www.channelasia.tech/article/693190/asia-pacific-claims-second-place-data-centre-capacity-race/>

²⁰ <https://www.cushmanwakefield.com/en/singapore/news/2022/01/asia-pacific-set-to-become-worlds-largest-data-centre-region-over-next-decade>

²¹ Data Centres and Data Transmission Networks – Analysis - IEA

²² Please Refer to chart in Annex A

²³ [https://d1.awsstatic.com/institute/The carbon opportunity of moving to the cloud for APAC.pdf](https://d1.awsstatic.com/institute/The%20carbon%20opportunity%20of%20moving%20to%20the%20cloud%20for%20APAC.pdf)

Building on the evident decarbonization benefits of cloud migration, we urge the prioritization of clear and effective cloud-first, cloud-native, and cloud migration policies today to rapidly reduce the carbon footprint of public and private sector IT workloads.

As part of decarbonization plans, governments in APAC should take the first step to develop cloud-first principles and policies to accelerate the cloud transition for the public and private sectors.



APAC policymakers should also provide more incentives and financial support for enterprises and small and medium-sized enterprises (SMEs) to adopt green cloud solutions. The UK's Department for Business, Energy and Industrial Strategy (BEIS) sets a good model to follow in providing guidance that encourages enterprises to use cloud computing as a means of mitigating their carbon emissions.²⁴



²⁴ <https://www.computerweekly.com/news/252505293/UK-government-tells-firms-to-use-cloud-to-curb-their-carbon-emissions-and-fight-climate-change>

4 The application of cloud computing can help governments and enterprises across APAC make progress towards their SDG commitments.

According to the IEA, cloud-enabled technologies—such as AI, ML, IoT and edge computing—will be critical to accelerating systemic sustainability transformations at scale.²⁵

Governments in APAC should support enterprises to access these technologies, such as through public-private partnerships in funding research and development; and finding technological tools for industries to achieve SDGs.



²⁵ <https://www.iea.org/commentaries/5-ways-big-tech-could-have-big-impacts-on-clean-energy-transitions>

Additionally, we encourage governments to undertake a stronger focus on the transformative potential of data and cloud-enabled digital applications to accelerate progress on SDGs, such as the following:



Critical Gaps

Over a quarter billion more people will enter extreme levels of poverty in 2022 as a consequence of the global pandemic, rising inequality and the cost of food prices.²⁶

Use Cases of the Cloud

Powered by cloud technology, fintech start-ups can provide financial services to the rural poor and low-income farmers in the region, who tend to be unbanked. Access to financial services means access to loans for greater economic opportunities through business and investment, unlocking financial inclusion in the process. By creating an environment that is conducive to cloud-enabled lending platforms, the poor can have greater access to legitimate and safer alternatives to informal moneylenders with prohibitive interest rates, reducing transaction risk and costs for them.²⁷ For example, Filipino players Cropital and FarmOn have leveraged cloud technology to connect farmers with investors through crowd-funding platforms.

Tanifund uses proprietary data analytics tools to track the buying and selling behaviour of their users, enabling them to build credit history for future qualifications for capital, unlike the strict requirements of traditional banks.²⁸

²⁶ <https://www.wfp.org/publications/unprecedented-needs-threaten-hunger-catastrophe-april-2022>

²⁷ https://www.researchgate.net/publication/270160763_Cloud_Computing_For_Microfinances

²⁸ https://eb-production-media.s3.amazonaws.com/clients/research_paper_reports/Southeast_Asias_Cloud_Story_-_Impact_inclusivity_and_growth.pdf

2 ZERO HUNGER



End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The World Food Programme reports that nearly 811 million people face hunger. Climate shocks are destroying crops and livelihoods and the costs to assist and build resilience is increasingly burdensome.²⁹

Cloud-backed data analytics enhance the operational efficiencies of farmers, and aid them in critical decision-making. With the cloud, changes in weather patterns and crop conditions can be monitored in real time, to assist in efficient crop management. Agricultural productivity is enhanced through improved data accessibility, data processing efficiency, and scalability of remote sensing-based characterizations of crop suitability, which allows for visualization of the spatial distribution of crop suitability and production potential.

South Korea's G-Smart system uses the cloud to support farmers with weather-informed recommendations, greenhouse ventilation and the collection of real-time data on crop-related statistics. This initiative saves time and increases productivity by at least 5% for the perilla leaf growers, for example.³⁰

Farmers in Thailand and Pakistan reported a 50% increase in yield and nearly 40% corresponding increase in profitability after adopting cloud solutions for remote agricultural management.³¹

3 GOOD HEALTH AND WELL BEING



Ensure healthy lives and promote well-being for all at all ages

The UN estimates that in 2018, 6.2 million children and adolescents under the age of 15 died from mostly preventable causes.

The cloud allows the automation and real-time sharing of health information, which enables healthcare providers including telehealth providers to give quality on-demand care regardless of their proximity to patients.³² Cloud-enabled interoperability among various IoT devices also enables better care coordination and medication management, freeing up time for healthcare providers to focus on the quality of services to patients.³³

Indonesia's Halodoc, for example, leveraged behavioural insights from patient data stored and accessible on the cloud, connecting millions of patients to 22,000 doctors and 1,000 partner pharmacies across Indonesia, to make healthcare simpler and more accessible.³⁴

²⁹ <https://www.wfp.org/publications/unprecedented-needs-threaten-hunger-catastrophe-april-2022>

³⁰ <https://www.aboutamazon.com/news/aws/south-korean-farmers-grow-more-perilla-leaf-with-machine-learning>

³¹ <https://borgenproject.org/tag/ricult/>

³² <https://www.forbes.com/sites/saibala/2022/03/23/amazons-new-partnership-with-teladoc-is-a-huge-milestone-for-telemedicine/?sh=514d5eab7f18>

³³ Telehealth on AWS | Healthcare & Life Sciences Solutions (amazon.com)

³⁴ <https://aws.amazon.com/solutions/case-studies/halodoc-analytics/>

4 QUALITY EDUCATION



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Only 66% of the world's population attained a secondary education in 2020.³⁵ Due to the pandemic, 681.71 million students were affected by school closures in 2021.³⁶

The cloud lowers barriers to education while improving the quality of learning by enabling distance learning and more personalized learner recommendations, through cost savings, scalability, and ease of accessibility for students and teachers alike.

Even with Covid-19 disruptions, Vietnam National University coped with an increase of nearly 3,000 students while improving their student satisfaction from 70% to 94%.³⁷ Indian Edtech firm UpGrad moved all its IT workload to the cloud in 2021, and used the cloud to analyse learners' usage patterns to provide a personalized learning experience. Its infrastructure cost decreased by 28%, while its learner base doubled within 8 months.³⁸

5 GENDER EQUALITY



Achieve gender equality and empower all women and girls

The formal employment ratio of female to male is 0.86, however, the ratio for females in leadership positions is 0.37.³⁹

The cloud enables entrepreneurs, including female entrepreneurs, to 'leapfrog' by expanding their business capacity and services more quickly at lower costs, allowing them to thrive in the digital economy.⁴⁰ Reaching out to distant customers and markets can be particularly valuable for women with constrained mobility, such as those in rural areas.⁴¹

The cloud as a platform can also be used by governments and researchers to gather and combine data from multiple sources and apply analytics and ML to expose gender pay disparities, and set targets for improvements.⁴²

6 CLEAN WATER AND SANITATION



Ensure availability and sustainable management of water and sanitation for all

Water, sanitation and hygiene has the potential to prevent at least 9% of global disease burden and 6% of global deaths.⁴³

Data centres equipped with cloud enabled IoT sensors that provide real-time data on changing weather conditions help organizations to further reduce water use. Outside air can be used for cooling much of the year, and on the hottest days when water is needed for cooling, cloud data centres can be further optimised to minimize water use.

In the water utilities and management space, WeGOT Utility Solutions is using the cloud to run IoT-enabled smart water tracking to save

³⁵ https://www.statista.com/topics/7785/education-worldwide/#dossierContents__outerWrapper

³⁶ <https://www.statista.com/statistics/1227574/number-of-students-in-countries-with-closed-schools-worldwide-by-status/>

³⁷ https://aws.amazon.com/solutions/case-studies/vietnam-national-university-case-study/?did=cr_card&trk=cr_card

³⁸ <https://www.aboutamazon.in/news/aws/upgrad-builds-on-aws-to-power-international-growth-and-leadership>

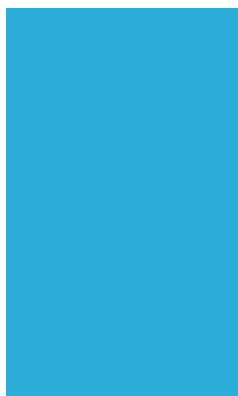
³⁹ <https://www.mckinsey.com/~/media/mckinsey/featured%20insights/diversity%20and%20inclusion/ten%20things%20to%20know%20about%20gender%20equality/ten-things-to-know-about-gender-equality.pdf>

⁴⁰ Bridging the Digital Gender Divide | OECD

⁴¹ <https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf>

⁴² Paid Program: Closing the Gender Pay Gap With Cloud Technology (wsj.com)

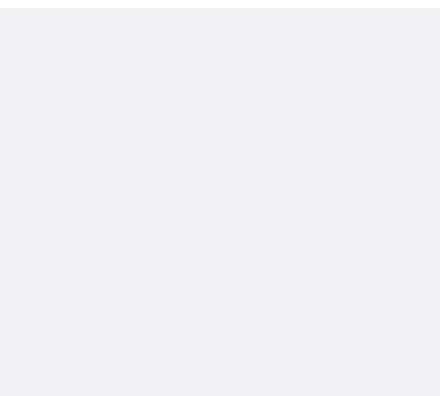
⁴³ <https://apps.who.int/iris/handle/10665/43840>



7 AFFORDABLE AND CLEAN ENERGY



Ensure access to affordable, reliable, sustainable, and modern energy for all



The world's electricity consumption has increased more than five times (to 82.35 EJ) from 1973 to 2019.⁴⁶ This consumption is expected to grow exponentially, especially in APAC, as we move into the technology-driven economy.

In 2019, almost two-thirds of global electricity came from fossil fuels.⁴⁷

In APAC, although electricity currently accounts for less than 25% of all energy consumption,⁴⁸ it has been growing at least 6% per year between 2010 and 2019,⁴⁹ making electricity use an important part of each person's environmental footprint.

billions of litres of water from going down the drain in India and beyond.⁴⁴

IT facilities in India also collect and recycle water on-site with rainwater collection tanks or recharge wells and in-house sewage treatment plants, making it possible to reuse water for flushing and gardening. Communities in and near these locations benefit from the efforts to enhance access to water sources.⁴⁵

More efficient infrastructure and higher utilization rates make cloud infrastructure at least five times more efficient than on-premises data centres, resulting in the reduction of energy consumption and associated carbon emissions by an average of 78% across APAC.⁵⁰ Cloud data centres' efficiency in power and cooling systems contributes a further 11% reduction in energy use and associated emissions relative to on-premises data centres in APAC.⁵¹

If APAC organizations are empowered to move IT workloads to cloud data centres powered by 100% renewable energy, their carbon emissions savings could increase to 93% on average.⁵² This could be further optimised by leveraging cloud-enabled tools to facilitate and drive energy efficiency beyond cloud infrastructure.

In ANZ, Vector uses cloud enabled IoT, ML and big data analytics to facilitate more efficient grid management and greater integration of clean energy resources.⁵³

In Japan, TRENDE uses the cloud to expand solar power offerings and renewable energy retail options for Japanese residential customers.⁵⁴

In India, Greenko uses IoT and serverless for wind power monitoring and grid systems

⁴⁴ <https://economictimes.indiatimes.com/industry/services/property/-/cstruction/wegot-utility-solutions-looks-beyond-residential-buildings-for-smart-water-management>

⁴⁵ <https://www.wateraid.org/us/media/aws-teams-wateraid-clean-water-india>

⁴⁶ <https://www.iea.org/reports/key-world-energy-statistics-2021/final-consumption>

⁴⁷ <https://ourworldindata.org/electricity-mix>

⁴⁸ <https://www.gbm.hsbc.com/insights/global-research/asia-changes-its-energy-mix>

⁴⁹ <https://www.iea.org/regions/asia-pacific>

⁵⁰ <https://www.aboutamazon.com/news/aws/aws-cloud-can-help-lower-carbon-footprints-in-asia-pacific>

⁵¹ <https://aws.amazon.com/blogs/publicsector/why-moving-cloud-part-of-sustainability-strategy/>

⁵² <https://aws.amazon.com/blogs/publicsector/why-moving-cloud-part-of-sustainability-strategy/>

⁵³ <https://aws.amazon.com/blogs/industries/vector-and-aws-join-forces-to-accelerate-the-future-of-energy/>

⁵⁴ <https://aws.amazon.com/jp/solutions/case-studies/trende/>



8 DECENT WORK AND ECONOMIC GROWTH



Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all

The digital economy can only offer productivity gains if it is aligned with priorities in skills development, innovation and efficient reallocation of resources.⁵⁶

management to maximize integration of renewable resources on the grid.⁵⁵

Cloud technology lowers the barriers to entry for aspiring digital entrepreneurs, by providing them with reliable hosting environments and connectivity without prohibitive initial capital commitments. Further, the cloud allows businesses to scale to new markets abroad with minimal marginal cost of expansion.⁵⁷ Given that many governments in APAC are looking to digital entrepreneurship for development and economic opportunities, the cloud will be a critical component to enable this growth strategy.

The cloud enables a digitalized economy through the provision of the underlying infrastructure that allows data accessibility with low latency.⁵⁸ It is expanding job opportunities across Asian economies.

In Singapore, for example, data centres today create and support over S\$2 billion in annual gross domestic product (GDP) and enable up to 1.6 million indirect jobs that are dependent on cloud technology.⁵⁹

In Japan, it is predicted that the cloud will directly or indirectly create 146,000 digital jobs and related non-digital jobs, spanning cloud service and IT system providers, as well as their vertical industry and end-users.⁶⁰ To this end, ACCA member CSPs have been through various programs to upskill the Japanese workforce, such as reskilling programs and free professional training to fill up the foreseeable workforce and digital talent shortage.



Cloud computing is one of the foundational technologies and infrastructures for future economic growth and Industry 4.0, which begins with the digital transformation of businesses and enables the seamless integration of technologies like IoT and

Industry: For companies seeking to future-proof their business and transform at speed, the cloud's ability to act as a vast data warehouse, deliver savings and stronger returns, all with greatly improved systems agility and resilience, is paramount. The rapid uptake of video conferencing services such as Zoom and Teams during the COVID-19

⁵⁵ <https://aws.amazon.com/blogs/industries/how-greenko-uses-aws-iot-and-serverless-solutions-for-wind-monitoring/>

⁵⁶ <https://www.oecd.org/economy/growth/digitalisation-productivity-and-inclusiveness/>

⁵⁷ <https://www.ibm.com/blogs/cloud-computing/2015/01/19/5-reasons-why-cloud-is-vital-in-the-developing-world/>

⁵⁸ <https://www.aboutamazon.sg/news/aws/bringing-aws-even-closer-to-our-customers-in-asia-pacific-and-japan>

⁵⁹ This figure of 1.6 million indirect jobs refers to approximately 25,000 jobs due to presence of physical data centres; 7,000 directly for DCs and rest in the supply chain of DCs; 496,000 jobs that involve transition from on premises-based IT environments to cloud environments, and designing and refining new cloud and hybrid architecture patterns (typically in partners/ ICT sectors); and 1,175,000 jobs that that involve using cloud-based software-as-a-service (SaaS) applications and tools (e.g., finance jobs requiring using cloud tools).

⁶⁰ <https://www.bcg.com/publications/2019/economic-impact-public-cloud-apac/japan>

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

AI for the implementation of Smart Cities by governments.

pandemic, for example, demonstrates the potential of cloud-based software-as-a-service solutions to scale and facilitate employee collaboration and innovation.⁶¹

Cloud computing reduces entrepreneurial risk, as the flexibility of cloud infrastructure allows start-ups to save their limited financial resources for innovative product development.

By building its health service app on the cloud, Taipei-based Ucarer's ICT infrastructure costs were reduced by about 30%, and 97% of the workload associated with operation and maintenance tasks was eliminated, which allowed the company to focus on product development.⁶²

In Southeast Asia, spending on cloud computing is expected to hit US\$76 billion by 2023. Cloud infrastructure is a tech-intensive domain, prone to innovation, and sustained by high quality investments from a multiplicity of technology players. APAC economies can benefit from these investments – for instance, CSPs are doubling down on their commitment to, and presence in, Asia to increase the footprint of their data centres.⁶³

10 REDUCED INEQUALITIES



Reduce inequality within and among countries

The world's richest 10% owns 76% of all wealth, while the poorest half owns just 2%.⁶⁴

While conventional financial infrastructure often fails to reach poorer sections of society, cloud infrastructure and services provides the poor with access to financial services through digital payment services built on the cloud. Thanks to lower scaling costs, these financial products can be made affordable for significant populations of underbanked individuals. Financial inclusion can reduce income inequality by mobilizing savings and fostering the formalization of labour and firms.⁶⁵ Out of the estimated 1.7 billion unbanked population, nearly 40% are in Southeast Asia and India, home to rapidly growing and urbanizing societies, presenting enormous opportunities for financial inclusion in APAC through the cloud.

⁶¹ https://www.ey.com/en_sg/consulting/why-cloud-holds-the-key-to-innovation-delivering-long-term-value

⁶² <https://www.adb.org/sites/default/files/publication/714971/sdwp-079-cloud-computing-tech-start-ups-asia-pacific.pdf>

⁶³ <https://www.mckinsey.com/featured-insights/asia-pacific/how-asia-can-boost-growth-through-technological-leapfrogging>

⁶⁴ <https://oxfamapps.org/fp2p/world-inequality-report-2022-a-treasure-trove-of-trends-and-new-data>

⁶⁵ <https://www.mdpi.com/2227-7099/10/5/118/pdf?version=1652957324#:~:text=Increased%20access%20to%20financial%20services%20was%20the%20focus%20of%20the,formalization%20of%20labor%20and%20firms.>

7099/10/5/118/pdf?version=1652957324#:~:text=Increased%20access%20to%20financial%20services%20was%20the%20focus%20of%20the,formalization%20of%20labor%20and%20firms.



In Vietnam, the national strategy for financial inclusion lays out targets to expand cashless transactions by 20-25% annually, with at least 250,000 Vietnamese SMEs having access to credit lines for business loans by 2025. The State Bank of Vietnam has partnered with the World Bank Group on a comprehensive approach to improving financial inclusion that focuses on digital finance, financial service provision to rural and agricultural and ethnic communities.⁶⁶

In infrastructure-constrained rural areas, the cloud can greatly optimise IT operational costs through the migration of workloads and opportunities for businesses to scale to global markets, potentially uplifting rural economies in the process and reducing inequalities between urban and rural regions. Likewise, developing countries are able to leapfrog economically by capturing digital entrepreneurship opportunities on the cloud, helping to close the development gap.

11 SUSTAINABLE CITIES AND COMMUNITIES



Make cities and human settlements inclusive, safe, resilient, and sustainable

Squeezing half the world's population into just 30% of global land mass brings a host of challenges.⁶⁷ Cities are inherently complex, with interactions among multiple public service and critical infrastructure systems (e.g., water supply network, electricity production, or healthcare facilities). A critical service disruption can lead to life-or-death scenarios, such as power failure in hospitals. APAC is the most affected region, with 29% of global natural disasters occurring in the region in the last 30 years.⁶⁸

Intelligent cloud-based disaster management systems boost cities' resiliency in the face of disasters. When disasters strike, information can mean the difference between life and death. In India, Quantela, a provider of smart urban infrastructure automation, developed a Covid-19 emergency response platform based on the cloud, which helped officials in South India monitor real-time data to make timely decisions to contain the spread of Covid-19.⁶⁹

The cloud also enables governments to make informed decisions to mitigate risks ahead of time through forecasting movement of disasters and weather patterns. The University of Wollongong's PetaBencana platform, for example, uses the cloud for disaster information crowdsourcing – allowing for immediate collection and analysis of data from multiple sources, and transfer for mapping and decision-making.⁷⁰

⁶⁶ <https://d1.awsstatic.com/Enabling-Financial-Inclusion-in-APAC-through-the-Cloud.pdf>

⁶⁷ <https://www.frontiersin.org/articles/10.3389/frsc.2019.00007/full>

⁶⁸ <https://www.visionofhumanity.org/more-natural-disasters-and-water-stress-threaten-asia-pacific>

⁶⁹ https://d1.awsstatic.com/How_the_Cloud_Helps_Cities_Become_Sustainable_and_Inclusive.pdf

⁷⁰ https://d1.awsstatic.com/How_the_Cloud_Helps_Cities_Become_Sustainable_and_Inclusive.pdf

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Ensure sustainable consumption and production patterns

The world generates around 2 billion tonnes of solid waste annually. The APAC region alone accounts for 23% of this waste. Many fast-growing regions currently openly dump more than half their waste; globally at least 33% of all waste is not managed in an environmentally safe manner. This has vast implications for our environment, health and prosperity.⁷¹

Cloud-enabled recycling programmes help to divert waste from landfills and reduce emissions from incineration.⁷²

In Korea, solar powered trash bins, with the help of cloud-enabled solutions, monitor their own quantity of trash and compact them when necessary. This allows them to hold up to eight times more trash and raise waste collection efficiency by up to 70%.⁷³

In Indonesia Rekosistem, an end-to-end zero-waste management business using cloud technology to improve Indonesia's waste value chain, leveraged cloud tools to scale their operations quickly during Covid-19, when more people staying home meant more deliveries of food and other essentials, and resulted in massively increased waste management needs.⁷⁴

13 CLIMATE ACTION



Take urgent action to combat climate change and its impacts

Climate change can bring about harmful effects on food production, human health and the biodiversity of our ecosystem.⁷⁵

The World Health Organization expects climate change to cause approximately 250,000 additional deaths per year between 2030 and 2050.⁷⁶

Cloud-powered model simulations, such as the National Centre for Atmospheric Research Community Earth System Model (Version 2), and its Whole Atmosphere Community Climate Model accelerate climate research and democratize climate science by expanding access to climate-related research tools and data.⁷⁷ This reduces cost and time required for dataset analysis. There are numerous examples where enterprises are harnessing the power of cloud computing to combat climate change.

In Japan, the Ministry of Environment harnessed the cloud to pilot large-scale consumer-focused behavioural change among 300,000 households, successfully reducing CO2 emissions by an average of 2.8% simply by tracking, analysing and reminding consumers of their energy consumption via data-driven insights and peer-comparison messaging.⁷⁸

⁷¹ https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

⁷² <https://aws.amazon.com/blogs/publicsector/road-to-zero-waste-driving-efficiencies-sustainability-cloud-technology/>

⁷³ <https://www.korea.net/NewsFocus/Business/view?articleId=167115>

⁷⁴ <https://technology-indonesia.com/ict/2-startup-lokal-kembangkan-platform-pengelolaan-limbah-dan-monitoring-kualitas-udara/>

⁷⁵ <https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts>

⁷⁶ <https://unfoundation.org/blog/post/4-statistics-that-show-why-we-need-climate-action-to-achieve-sustainable-development/>

⁷⁷ Amazon Sustainability Data Initiative (aboutamazon.com)

⁷⁸ <https://blogs.oracle.com/utilities/post/with-a-nudge-japanese-utility-customers-made-energy-efficiency-a-national-pastime>

14 LIFE BELOW WATER



Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

95% of oceans remain unexplored, which is detrimental to ocean conservation efforts.⁷⁹

Cloud-enabled data storage and analytics allow platforms, such as crowdsourced bathymetry and the NOAA National Bathymetric Source Data support the creation of next-generation nautical charts and efforts to advance ocean-related science.

By providing faster and democratic access to foundational data, the cloud facilitates the government’s monitoring and management of ocean resources.

Initiatives like OCEARCH, which works to accelerate the ocean’s return to balance and abundance, collect critical satellite telemetry data and make them available via open source – contributing to the improved understanding of the ocean’s changing state and inform fisheries management for sustainability.⁸⁰

15 LIFE ON LAND



Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Land degradation affects almost 2 billion hectares of land worldwide. This affects the homes of 1.5 billion people.⁸¹ It also affects our food production, water sources and public health risks.⁸²

The cloud’s ability to host open data helps researchers and non-profit conservationists protect vulnerable species around the world.

The cloud can facilitate governments’ ecosystem service management through the use of geospatial data to predict patterns about real ecosystems. Beyond the democratization of data to researchers worldwide, it also serves as a springboard for specialized initiatives.⁸³

For example, the Elephant Listening Project, records more than one million hours of acoustic recordings of elephant populations for conservationist groups to thwart illegal poaching.⁸⁴

16 PEACE, JUSTICE AND STRONG INSTITUTIONS



Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective,

Information, access, and learning is increasingly digital. While 82% of people in developed countries have access to this, only 35% do in developing countries, 11% in Africa, and 9% in the least-developed countries.

By bringing more people online, we are able to facilitate a global information society. Cloud technology lowers the cost barriers to internet accessibility for the region’s populations.

Furthermore, cloud technology can assist local courts with dispute resolution and administrative matters to cut processing time and backlogs. Through the provision of digital tools, parties can easily access and file

⁷⁹ <https://aws.amazon.com/blogs/publicsector/how-cloud-helping-us-better-understand-manage-oceans/>

⁸⁰ <https://aws.amazon.com/blogs/publicsector/assessing-oceans-health-monitoring-shark-populations/>

⁸¹ <https://www.fao.org/in-action/action-against-desertification/overview/desertification-and-land-degradation/en/#:~:text=Land%20degradation%20affects%20almost%202,is%2023%20hectares%20per%20minute!>

⁸² <https://www.who.int/news-room/questions-and-answers/item/climate-change-land-degradation-and-desertification>

⁸³ <https://aws.amazon.com/blogs/publicsector/predicting-global-biodiversity-patterns-in-costa-rica-with-ecosystem-modeling-on-aws/>

⁸⁴ <https://aws.amazon.com/blogs/publicsector/transforming-animal-conservation-open-data-more-aws/>

⁸⁵ https://www.icm2016.org/IMG/pdf/new_tech_paper.pdf

accountable and inclusive institutions at all levels

17 PARTNERSHIPS FOR THE GOALS



Strengthen the means of implementation and revitalise the global partnership for sustainable development

There are more than 19,000 action networks in joint pursuit of the UNSDGs.⁸⁷ These partnerships are crucial due to the complexities of sustainability challenges that may span across the entire value chain.

These partnerships require a strong alignment of interests, a clearly articulated goal and a clearly defined and standardized position by governments worldwide.⁸⁸

information that help balance fairness within court processes, particularly for those who cannot afford to represent themselves.⁸⁶

The cloud provides for better quality, more granular data to be shared securely with multiple stakeholder groups. This enhances the assessment quality, reporting, alignment, and transparency of work.

The democratization of data also allows for increased scrutiny by authorities on gender equality, environmentally responsible practices and scalability in ways that we have not seen before.⁸⁹



⁸⁶<https://www.govloop.com/community/blog/5-ways-the-cloud-can-transform-courts/>

⁸⁷ <https://sdgs.un.org/partnerships>

⁸⁸ <https://www.eco-business.com/news/cloud-infrastructure-could-be-key-to-meeting-climate-goals/>

⁸⁹ <https://unsdg.un.org/sites/default/files/2020-08/DF-Task-Force-Full-Report-Aug-2020-1.pdf>

In conclusion, an examination of the use cases of cloud computing in the context of the UNSDGs reveals the outstanding array of opportunities for communities to accelerate progress and harness their untapped potential towards sustainable development.

The ambitious efficiency and net zero targets in Europe recognise the importance of cloud computing in driving long-term transformation and creating pathways for countries to achieve the dual goals of economic success and development goals more rapidly, and APAC governments can learn from this example in their own pursuit of the twin goals of digital transformation and decarbonization. ACCA member companies stand ready to support governments in continuing to grow a sustainable cloud industry to maximise societal benefits and impact.

Here in APAC, the twin goals of digital transformation and decarbonization should also be a priority for governments. In conjunction with plans to accelerate the speed of cloud adoption and lowering barriers to renewable energy investments and offering opportunities for stakeholders to contribute renewable energies into local power grids – these ambitious goals can come within reach sooner rather than later.



Annex A

TABLE 1: Global Trends in Data Centre Energy Use⁹⁰

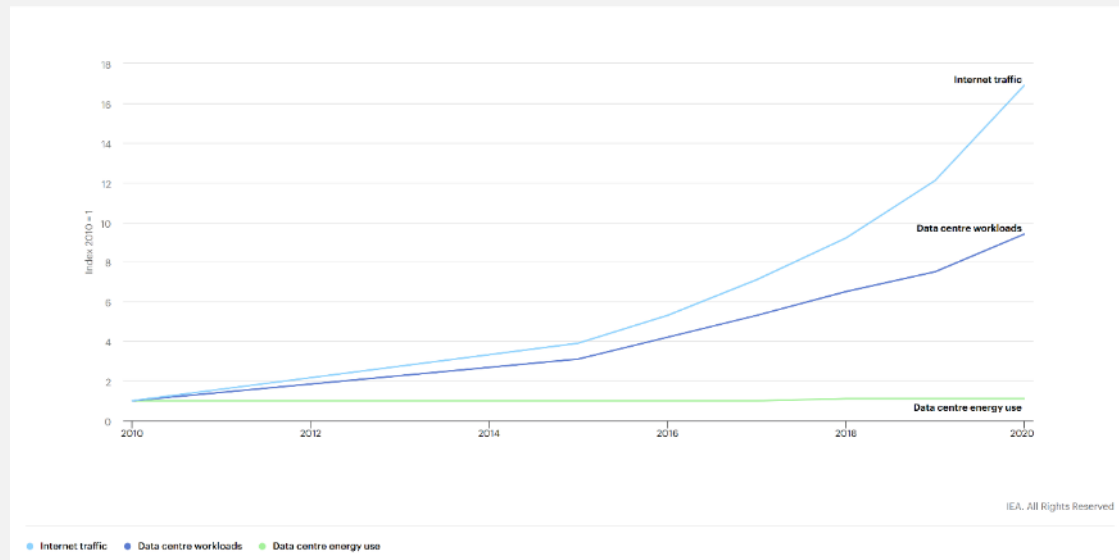
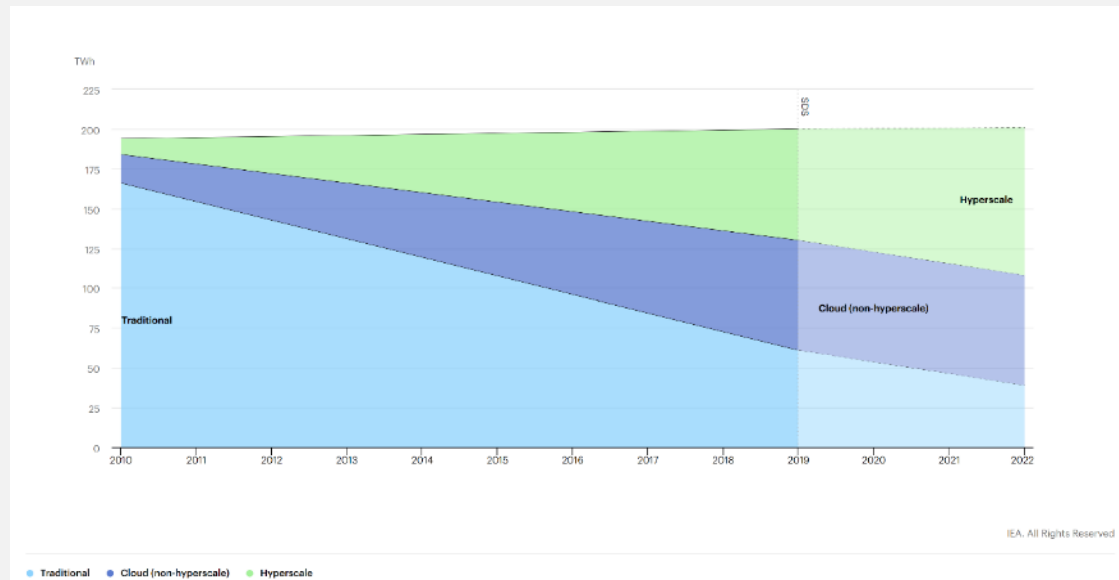


TABLE 2: Global Data Centre Energy Demand by Data Centre Type, 2010 to 2022



⁹⁰ <https://www.iea.org/reports/data-centres-and-data-transmission-networks>