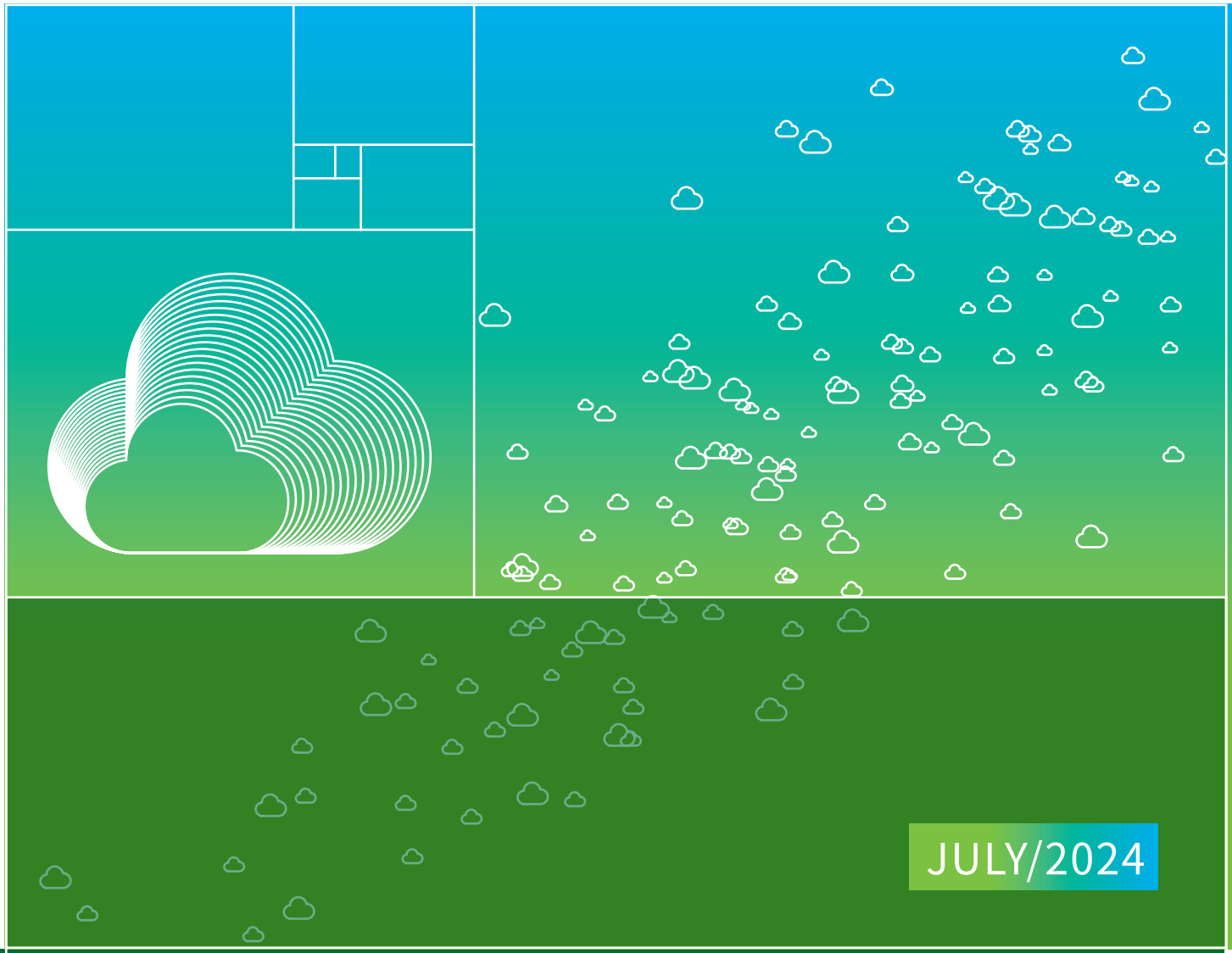


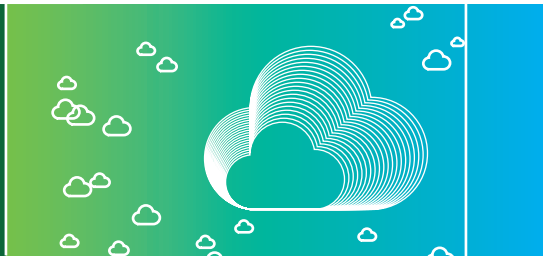
JULY/2024

Clean Cloud 2024

Tracking Renewable Energy Use in China's Tech Industry

GREENPEACE

Introduction



In recent years, the rapid development of generative artificial intelligence (AI) has catalyzed a new era in digital infrastructure. Globally, AI is fueling a boom in data center construction. According to Synergy Research Group, hyperscale data center capacity is on track to double within the next four years, with generative AI technology a primary factor behind the growth.[1]

China's digital economy is forecast to see particularly sharp growth in the coming years. In October 2023, China's Ministry of Industry and Information Technology and five other departments released the Action Plan for the High-quality Development of Computing Power Infrastructure, which targets that the country's computing power exceed 300 EFLOPS by 2025, a roughly 30% increase compared to 2023.[2, 3]

However, as computing power has surged, so has demand for energy. According to research by Goldman Sachs, by 2030, AI is projected to drive a 160% increase in power demand for data centers worldwide compared to 2023.[4]

In China, construction of new renewable energy infrastructure is urgently needed to match the growth in energy demand. The Action Plan for the High-Quality Development of Computing Power Infrastructure explicitly encourages computing centers to adopt technologies such as source-grid-load-storage and to support the development and consumption of local renewable energy resources, such as wind and solar power.[5] Furthermore, the National Development and Reform Commission targeted that new data centers at national hubs achieve a renewable energy usage rate of 80% by the end of 2025.[6]

---

1. Synergy Research Group (2024). 'Hyperscale Data Centers Hit the Thousand Mark; Total Capacity is Doubling Every Four Years' Published online on April 17, 2024. Accessed on June 29, 2024 from: https://www.srgresearch.com/articles/hyperscale-data-centers-hit-the-thousand-mark-total-capacity-is-doubling-every-four-years
2. The State Council. The People's Republic of China (2024). 'Digital economy expands in scale, demonstrating enormous potential' Published online on May 26, 2024. Accessed on June 29, 2024 from: https://english.www.gov.cn/archive/statistics/202405/26/content_WS6653223bc6d0868f4e8e77a9.html
3. The State Council. The People's Republic of China (2023). 'China unveils action plan for computing power infrastructure development' Published online October 9, 2023. Accessed on June 29, 2024 from: https://english.www.gov.cn/news/202310/09/content_WS6523e392c6d0868f4e8e00f8.html
   Ministry of Industry and Information Technology (2023). 'Action Plan for the High-Quality Development of Computing Power Infrastructure' Published online October 8, 2023. Accessed on June 29, 2024 from: https://www.gov.cn/zhengce/zhengceku/202310/content_6907900.htm
4. Goldman Sachs (2024). 'Generational Growth: AI, data centers and the coming US power demand surge' Published online April 28, 2024. Accessed on June 29, 2024 from: https://www.goldmansachs.com/intelligence/pages/gs-research/generational-growth-ai-data-centers-and-the-coming-us-power-surge/report.pdf
5. Ministry of Industry and Information Technology (2023). 'Action Plan for the High-Quality Development of Computing Power Infrastructure' Published online October 8, 2023. Accessed on June 29, 2024 from: https://www.gov.cn/zhengce/zhengceku/202310/content_6907900.htm
6. National Development and Reform Commission (2023). 'Implementation Opinions of the National Development and Reform Commission and Other Ministries and Commissions on In-depth Implementation of the "East-to-West Computing Resource Transfer Project" to Accelerate the Construction of a National Integrated Computing Power Network' Published online December 25. Accessed on June 29, 2024 from: https://www.ndrc.gov.cn/xxgk/zcfb/tz/202312/t20231229_1363000.html

The ability to rapidly expand renewable energy consumption has become a core competency for China's tech companies, and it is also an area in which there remains much room for progress. Our latest Clean Cloud Report tracks China's 25 leading cloud providers and data center operators on their advancement toward 100% renewable energy and provides recommendations for how they can most effectively achieve full decarbonization by 2030.

Scope

This report analyzes ten of China's leading cloud service companies and 15 leading data center operators. It assesses the responsiveness of China's tech industry to the country's national carbon reduction goals and provides recommendations for the sector to achieve a low-carbon transition.

Researchers used publicly available information to rate the companies in the categories of transparency, carbon reduction measures and targets, renewable energy procurement and targets, and government and industry influence.

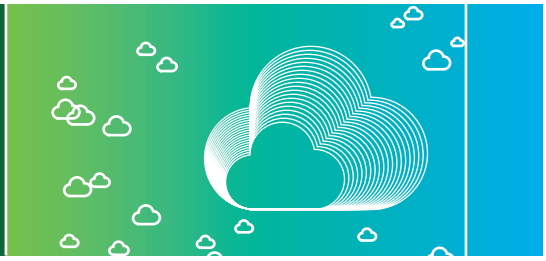
The selected cloud service companies collectively held over 52% of China's Infrastructure as a service (IaaS) public cloud market share in the first half of 2023, while the selected data center operators held more than 60% of the internet data center (IDC) market share in 2022.[7, 8]

Details about the methodology can be found at the end of the document.

7. IDC (2023). 'Post-Pandemic Growth Below Expectations: Growth in China's Public Cloud Service Market Continues to Slow in the First Half of 2023' Published online November 2, 2023. Accessed on June 29, 2024 from: https://www.idc.com/getdoc.jsp?containerId=prCHC51354423
Note: The combined market share of Alibaba Group, Huawei, and Tencent exceeds 52%.

8. IDC (2023). 'In 2022, China's data center service market is still in a phase of slow recovery' Published online August 14, 2023. Accessed on June 29, 2024 from: https://www.idc.com/getdoc.jsp?containerId=prCHC51148523
Note: The combined market share of China Mobile, China Mobile, China Telecom, and China Unicom exceeds 60%.

Key Findings



- **Climate target setting has become more common among Chinese tech companies, but it is essential that companies follow up on their commitments.** Of the 25 companies in the ranking, eight have committed to achieve 100% renewable energy by 2030, while six of these eight have also set carbon neutrality goals (Scope 1 and 2) for the same time frame.

- **Over the past two years, renewable energy procurement by top Chinese tech companies has increased significantly.** As of June 2024, five companies in the ranking had reported annual renewable energy ratios that exceeded 10%, compared to just one company in our June 2022 ranking. In 2023, the renewable energy ratio of the data center operator GDS exceeded 38%,[9] the highest of all companies in the ranking.[10]

- **Some top companies and many mid-level companies continue to lag behind on their adoption of renewable energy.** Notably, the reported renewable energy ratios of Baidu and VNET Group remained below 6% in 2023.[11, 12] In total, 56% of companies in the ranking have not committed to achieve 100% renewable energy or carbon neutrality (Scope 1 and 2) by 2030.

  As tech companies expand their AI-related activities, they will inevitably face further growth in electricity consumption. For this reason, it is essential that all companies in the ranking accelerate their rate of renewable energy procurement.

- **A growing number of companies in the ranking have disclosed their Scope 3 emissions, but only one company has included Scope 3 emissions in its carbon neutrality goals.** Since 2022, the number of companies in the ranking that have disclosed Scope 3 greenhouse gas emissions rose from five to nine. However, only Tencent has committed to achieving Scope 3 carbon neutrality by 2030.[13]

9. GDS (2024). 'GDS Annual report 2023' Published online April 29, 2024. Accessed on June 29, 2024 from: https://investors.gds-services.com/static-files/dbf98788-e2e7-4e36-8e4d-571c3eafc32f

10. Note: Only companies that disclosed their renewable energy ratios or both their annual energy/electricity consumption and renewable energy consumption were included; data for some companies is unknown.

11. Baidu (2024). 'Baidu 2023 Environmental, Social and Governance Report' Published online May 13, 2024. Accessed on June 29, 2024 from: https://esg.baidu.com/Uploads/File/2024/05/17/Baidu%202023%20Environmental,%20Social%20and%20Governance%20Report.20240517150706.pdf
    Note: Renewable energy usage rate = Renewable energy consumption disclosed by the company / Electricity consumption disclosed by the company

12. VNET Group (2024). '2023 Environmental, Social and Governance (ESG) Report' Published online April 26,2024. Accessed on June 29, 2024 from: https://www.vnet.com/upload/portal/PDF/2023esgreport.pdf
    Note: Renewable energy usage rate = Renewable energy consumption disclosed by the company / Electricity consumption disclosed by the company

13. Tencent (2022). 'Tencent Carbon Neutrality Target and Roadmap Report' Published online February 24, 2022. Accessed on June 29, 2024 from: https://static.www.tencent.com/attachments/TencentCarbonNeutralityTargetandRoadmapReport.pdf

Transparency

Eighteen out of 25 companies in the ranking have disclosed their electricity consumption and greenhouse gas (GHG) emissions within their operational scope. Thirteen companies disclosed their energy mix, and nine tracked a portion of their Scope 3 GHG emissions.[14] Of the companies that have targeted 100% renewable energy by 2030, ByteDance, the owner of TikTok, is the only one that has not disclosed data about its carbon emissions or energy usage.

Of the 18 companies that disclosed their GHG emissions data, ten have strengthened the reliability of the data through third-party assurance or GHG emissions verification statements.

Renewable energy procurement and targets

As of June 2024, eight ranked companies (Tencent, ByteDance, Kuaishou Technology, GDS, VNET Group, Chindata Group, Shanghai AtHub, and Bohao Internet Data Services) had announced plans to achieve 100% renewable energy by 2030. Alibaba Group had committed to using 100% clean energy for its cloud service, and Kuaishou Technology had set a target to achieve 100% renewable energy usage in its self-built data centers by 2030.[15, 16]

Some top companies have made significant breakthroughs in renewable energy procurement. Alibaba Group purchased 1.61 billion kWh of renewable energy in 2023,[17] and Tencent reported that its contracted renewable energy exceeded 1.3 billion kWh in 2024.[18]

The average renewable energy usage ratio of companies in the ranking has increased since 2022, particularly among top companies. GDS was the only company in the ranking that had reported a renewable energy usage rate that exceeded 30% in 2021.[19] In 2023, the renewable energy usage ratio for GDS exceeded 38%,[20] and Alibaba Group,[21] China Telecom, Chindata Group, and Tencent each utilized more than 10% renewable

14. Note: Companies that disclosed their relevant environmental data for 2022 or 2023 were included.
15. Alibaba Group (2021). 'Alibaba Group Carbon Neutrality Action Report' Published online December 17, 2021. Accessed on June 29, 2024 from: https://sustainability.alibabanews.com/download/Alibaba%20Group%20Carbon%20Neutrality%20Action%20Report_20211217_ENG_Final.pdf
16. Kuaishou Technology (2024). '2023 Environmental, Social and Governance Report' Published online April 22, 2024. Accessed on June 29, 2024 from: https://ir.kuaishou.com/system/files-encrypted/nasdaq_kms/assets/2024/04/22/17-00-32/893189%20E_KUAISHOU-W_ESG_0422_1617_book.pdf
17. Bloomberg NEF (2023). '2023 China Corporate Green Power Trading Rankings' Published online November 10, 2023. Accessed on June 29, 2024 from: https://mp.weixin.qq.com/s/e-jJaqOOmDJufu6ejeWZnw
Note: Since Alibaba Group has not disclosed its ESG report for FY2024, this article uses statistics from BloombergNEF. Statistics are based on the period up to November 10, 2023.
18. Tencent (2024). 'Photovoltaic power generation: Tencent data center becomes more "green"' Published online on January 19, 2024. Accessed on June 29, 2024 from: https://www.tencent.com/zh-cn/articles/2201784.html
19. GDS (2022). 'GDS Annual report 2021.' Published online April 28, 2022. Accessed on June 29, 2024 from: https://investors.gds-services.com/static-files/9f3cc722-27f2-430f-8b1f-cdcc1bfe3372
20. GDS (2024). 'GDS Annual report 2023' Published online April 29, 2024. Accessed on June 29, 2024 from: https://investors.gds-services.com/static-files/dbf98788-e2e7-4e36-8e4d-571c3eafc32f
21. Alibaba Group (2023). 'Environmental, Social and Governance Report 2023' Published online July 24, 2023. Accessed on June 29, 2024 from: https://data.alibabagroup.com/ecms-files/1509739361/fcaefa3d-0989-48fb-b003-fa96aa04880e/2023%20Alibaba%20ESG%20Report-Final.pdf
During Alibaba Group FY2023 (04/01/2022 - 03/31/2023), its renewable energy usage rate was 15.43%, calculated by Greenpeace.

energy in 2022 or 2023. [22, 23, 24, 25]

Nearly 90% of companies in the ranking have deployed distributed photovoltaic projects at their data centers or operational buildings. In total, 12 companies in the ranking have participated in green power trading.[26]

However, some top companies continue to lag behind on renewable energy procurement. While Baidu has made some progress in its renewable energy procurement since 2022, the company's renewable energy ratio remained at just 5.11% in 2023.[27] Likewise, VNET Group, which operates data centers for Microsoft 365, reported a renewable energy ratio of just 4.35% in 2023.[28, 29]

Carbon reduction measures and targets

As of June 2024, 12 major Chinese tech companies had set carbon neutrality goals for Scope 1 and 2 emissions. Of the 12 companies, nine had committed to achieving carbon neutrality by 2030 or earlier: Alibaba Group, Tencent, Baidu, ByteDance, GDS, Chindata Group, VNET Group, Bohao Internet Data Services, and Guangdong Aofei Data Technology.[30]

More than 90% of the ranked companies disclosed energy savings or emissions reduction progress from the application of energy-saving technology, including in cooling systems, power supply and distribution systems, and waste heat recovery.

Some ranked companies failed to align their carbon neutrality goals with the industry standard. For example, Kingsoft Cloud, Shanghai Baosight Software, and CNISP Group have set their carbon neutrality goals for 2040 or beyond.

22. CDP (2023). 'China Telecom Climate Change 2023' Accessed on June 29, 2024
23. Chindata Group (2024). Accessed on June 29, 2024 from: https://www.chindatagroup.com/sustainability/4/oid/4.html
24. Tencent (2024). 'Environmental, Social and Governance Report 2023' Published online April 8, 2024. Accessed on June 29, 2024 from: https://static.www.tencent.com/uploads/2024/05/29/045cba29b4153119f3cd17c406ac2433.pdf
25. Note: Only companies that disclosed their renewable energy ratios or both their annual energy/electricity consumption and renewable energy consumption were included; data for some companies is unknown; the renewable energy ratios of some companies were calculated by Greenpeace.
26. Note: Only companies that have disclosed detailed information about green power trading, such as electricity volume, timeline, market, etc., were included.
27. Baidu (2024). 'Baidu 2023 Environmental, Social and Governance Report' Published online May 13, 2024. Accessed on June 29, 2024 from: https://esg.baidu.com/Uploads/File/2024/05/17/Baidu%202023%20Environmental,%20Social%20and%20Governance%20Report.20240517150706.pdf
Note: Renewable energy usage rate = Renewable energy consumption disclosed by the company / Electricity consumption disclosed by the company
28. Microsoft 365 (2024). 'Microsoft 365 operated by 21Vianet' Published online February 27, 2024. Accessed on June 29, 2024 from: https://learn.microsoft.com/en-us/office365/servicedescriptions/office-365-platform-service-description/microsoft-365-operated-by-21vianet
29. VNET Group (2024). '2023 Environmental, Social and Governance (ESG) Report.' Published online April 26, 2024. Accessed on June 29, 2024 from: https://www.vnet.com/upload/portal/PDF/2023esgreport.pdf
Note: Renewable energy usage rate = Renewable energy consumption disclosed by the company / Electricity consumption disclosed by the company
30. Guangdong Aofei Data Technology achieved carbon neutrality in 2021 through the purchase of CCERs (China Certified Voluntary Emission Reduction) and I-RECs (International Green Certificates).

Most companies still do not recognize the importance of Scope 3 carbon neutrality. Only Tencent and AliCloud, a cloud service provider owned by Alibaba Group, have committed to achieving Scope 3 carbon neutrality by 2030.[31, 32]

Government and industry influence

China's leading tech companies actively explored ways to utilize renewable energy. More than 50% of companies have started exploring source-grid-load-storage programs, distributed power trading, load shifting, and other methods.

Recommendations

We recommend that all companies in the ranking:

1. **Target 100% renewable energy and carbon neutrality across Scopes 1, 2 and 3 by 2030.** Companies should disclose progress towards carbon neutrality and 100% renewable energy targets through official channels such as annual reports, environmental, social and governance (ESG) reports, and sustainability reports.

2. **Expand the scale and proportion of renewable energy consumption.** We encourage companies to prioritize mechanisms that directly support renewable energy development, such as construction of renewable energy power plants and green power trading. Companies should also actively collaborate with grid companies, power generation companies, and power retailers to develop innovative ways to obtain renewable energy.

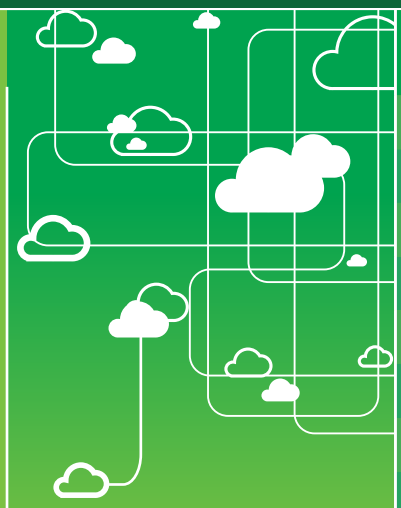
3. **Achieve carbon neutrality primarily through direct emissions reductions, including purchasing renewable energy and improving energy efficiency, rather than relying on carbon offsets to achieve carbon neutrality.** When other options are not available, companies should choose high-quality carbon offset projects based on additionality, sustainability, and traceability. Companies should openly report the source and volume of offset GHG emissions, the reasons why they are unable to reduce emissions directly, and information on offset programs used, etc.

4. **Continuously improve information transparency:** Companies should actively disclose key environmental information, including energy consumption, energy mix, and greenhouse gas (GHG) emissions within their operations and supply chain to demonstrate the latest progress in the company's climate actions to the public. Efforts should be made to enhance the traceability of green electricity, and companies should actively disclose information on renewable energy projects and Green Electricity Certificate (GECs), and avoid double-counting.

31. Tencent (2022). 'Tencent Carbon Neutrality Target and Roadmap Report' Published online February 24, 2022. Accessed on June 29, 2024 from: https://static.www.tencent.com/attachments/TencentCarbonNeutralityTargetandRoadmapReport.pdf

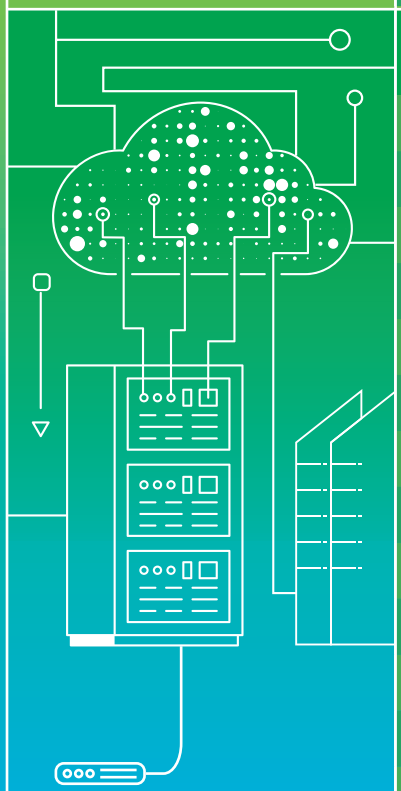
32. Alibaba Group (2021). 'Alibaba Group Carbon Neutrality Action Report' Published online December 17, 2021. Accessed on June 29, 2024 from: from: https://sustainability.alibabanews.com/download/Alibaba%20Group%20Carbon%20Neutrality%20Action%20Report_20211217_ENG_Final.pdf

Ranking



Cloud providers

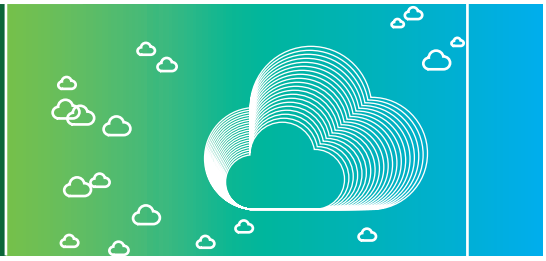
Cloud Providers	Transparency (20%)	Carbon Reduction Measures and Targets (30%)	Renewable Energy Procurement and Targets (40%)	Government and industry influence (10%)	Total(100%)
Alibaba Group	17.14	26.54	38.67	8.00	**90.35**
Tencent	17.62	27.69	36.00	8.00	**89.31**
Baidu	16.67	20.77	21.33	2.00	**60.77**
ByteDance	1.43	19.62	30.67	3.00	**54.72**
Huawei	16.67	15.00	14.67	6.00	**52.34**
Kuaishou Technology	10.95	9.23	26.67	2.00	**48.85**
JD.com	11.19	16.15	12.00	1.00	**40.34**
Kingsoft Cloud	12.38	11.54	10.67	1.00	**35.59**
Inspur	8.57	9.23	8.00	2.00	**27.80**
UCloud	0.95	8.08	4.00	2.00	**15.03**



Data center operators

Data center operators	Transparency (20%)	Carbon Reduction Measures and Targets (30%)	Renewable Energy Procurement and Targets (40%)	Government and industry influence (10%)	Total(100%)
GDS	16.67	23.08	37.33	6.00	**83.08**
Chindata Group	17.14	25.38	32.00	7.00	**81.52**
VNET Group	15.71	17.31	29.33	7.00	**69.35**
Bohao Internet Data Services	12.86	19.62	24.00	3.00	**59.48**
China Telecom	16.19	15.00	16.00	7.00	**54.19**
China Mobile	16.67	13.85	10.67	5.00	**46.19**
Shanghai AtHub	8.57	13.85	18.67	4.00	**45.09**
China Unicom	10.00	10.38	6.67	5.00	**32.05**
CNISP GROUP	0.95	11.54	14.67	4.00	**31.16**
Shanghai Baosight Software	11.90	6.92	9.33	3.00	**31.15**
Guangdong Aofei Data Technology	0.48	12.69	12.00	3.00	**28.17**
Shenzhen ESIN Technology	1.90	10.38	9.33	6.00	**27.61**
Beijing Sinnet Technology	0.00	10.38	12.00	2.00	**24.38**
Kehua Data	7.86	8.08	4.00	3.00	**22.94**
Hotwon Group	1.43	6.92	6.67	3.00	**18.02**

Methodology



Selected companies

Clean Cloud 2024 ranks 25 Chinese internet technology companies that provide cloud services or data center operational services and comprehensively considers factors such as industry influence, market competitiveness, user scale and other indicators. Kuaishou Technology has been added to the 2024 ranking.

Data

The ranking in this report is based on data from public sources, including corporate publications, news reports, government information platforms, and third-party voluntary information disclosure platforms.

Scoring reflects both short and long-term indicators. Short-term indicators consist of data for the period January 2022 to June 2024. Long-term indicators are not time-bound and include carbon neutrality commitments, renewable energy goals, data center siting and location, and corporate governance.

Scoring criteria

Building upon the evaluation criteria of Clean Cloud 2022, scoring criteria have been updated for Clean Cloud 2024, considering professional advice from experts in data centers, renewable energy, and environmental, social and governance (ESG) fields. The scoring criteria aims to comprehensively and objectively capture the industry practices of Chinese cloud services providers and data center operators on the path towards carbon neutrality.

Scoring criteria have been updated for Clean Cloud 2024 to include corporate R&D and investment in renewable-energy-supporting technologies (e.g., energy storage) under the 'government and industry influence' category.

Weight	Category	Criteria
20%	Transparency	**Assessment of whether a company has disclosed the following information in external communications, media, or on third party information disclosure platforms.**
		Data center and company electricity consumption: a. Total annual electricity consumption. b. Annual electricity consumption of data centers by geographic location.
		Data center and company electricity mix: a. Total annual electricity mix. b. Annual electricity mix of data centers by geographic location.
		Data center power usage effectiveness (PUE): a. Total annual average PUE. b. PUE of data centers by geographic location.
		Data center and company greenhouse gas (GHG) emissions: a. Total GHG emissions. b. Data center GHG emissions by geographic location. c. Total supply chain (Scope 3) GHG emissions (mainly includes Category 1 and Category 2).
		Data disclosure standards, assurance, and verification.
		Corporate Governance: Incorporation of ESG matters into the scope of corporate governance; establishment of a specialized committee reporting to and supervised by the CEO and/or board on a regular basis, and establishment of a strategy and risk management mechanism related to climate change; Analysis of the opportunities and challenges posed by climate change, and assessment of strategies and target mechanisms to address these risks.
30%	Carbon reduction measures and targets	**Assessment of whether a company has set carbon neutrality and emissions reduction goals and taken steps to reduce carbon emissions and improve energy efficiency.**
		Commitment to carbon neutrality across a company's own operations by 2030; Clear timeline for a Scope 3 carbon neutrality commitment.
		Set up a statement of principle for carbon offsets to avoid the use of carbon offsets as much as possible.
		Carbon reduction goals: a. Absolute carbon reduction goals. b. Scope 3 absolute carbon reduction goals.
		Energy efficiency goals: annual average PUE goals.
		Energy efficiency performance: a. Implementation of energy efficiency measures in data centers, including in buildings, IT equipment, cooling systems, and power systems. b. Energy efficiency improvement based on measurable targets and methodologies, such as energy saved (tonne coal equivalent), electricity saved (MWh), CO2e emission reduced (tonne) and PUE (breakdown by geographic region).
40%	Renewable energy procurement and targets	**Assessment of whether a company has set renewable energy targets and taken measures to actively procure or consume renewable energy.**
		Commitment to 100% renewable energy use by 2030.
		Establishment of data center site selection policy that considers renewable energy supply (reflected in corporate publications).
		Public disclosure of renewable energy procured or consumed, including amount and type of renewables, and percentage of the total energy mix. (Procurement mechanisms include distributed wind and solar, investment in large-scale renewables, direct power purchase from markets and green power certificates.)
		Efforts to encourage suppliers to use sustainable energy sources or select suppliers who generate electricity using renewable sources.
		Construction of data centers in areas with abundant renewable energy supply.
10%	Government and industry influence	**Assessment of whether a company has publicly leveraged their influence to build government and industry awareness about energy efficiency and renewable energy, including but not limited to the following forms**
		Cooperation with local governments, grid companies, power generation companies, and power retailers to expand renewable energy procurement market mechanisms.
		Sharing of renewable energy procurement and energy efficiency best practices with industry peers including through conferences, white papers and journal publications.
		Participation in Green Data Center certification programs.

GREENPEACE

For over 50 years, Greenpeace has been sailing the world's oceans protecting our planet and fighting for environmental justice.

Liangdian Creative Park Room 201, Dongsishitiao 94,
Dongcheng District, Beijing, China 100007
Tel : +86 (0)10 6554 6931
Fax : +86 (0)10 6408 7910

www.greenpeace.org.cn