



# Clean Cloud 2020

Tracking Renewable Energy Use  
in China's Tech Industry

**GREENPEACE**



华北电力大学  
NORTH CHINA ELECTRIC POWER UNIVERSITY

## Introduction

Over the next few years, energy use by China's internet industry is on track to skyrocket. Developments such as cloud computing, e-commerce and the Internet of Things have ushered in an age of big data, with a big carbon footprint. A September 2019 Greenpeace East Asia report found that electricity consumption from China's data center industry is on track to increase by 66% between 2019 and 2023.<sup>1</sup> Data centers in China are currently powered primarily by coal.

Yet at the same time that we're clicking through our carbon budget, opportunities have emerged for China's internet giants to procure clean energy. Wind and solar energy have already reached grid parity in parts of China,<sup>2</sup> and the arrival of power purchase agreements allows internet companies to buy clean energy direct from the market, encouraged by new government policies. Tech companies in China are taking note of the potential for clean energy development, and, over the past three years, a number of companies have begun to actively procure renewable energy on a limited scale. In December 2019, the first China-based data center company set a target for 100% renewable energy use.<sup>3</sup>

This report assesses the renewable energy record of China's 15 biggest internet and independent data center companies. Researchers used publicly available information to rate the companies on energy transparency, energy efficiency and carbon reduction, renewable energy performance, and government and industry influence. The report provides a roadmap for how China's tech industry can increase its reliance on clean energy and set the standard for corporate responsibility in China.

## Key Findings

Researchers analyzed China's 15 largest cloud and independent data center companies, comprising over 70%<sup>4</sup> of China's public cloud market and over 85%<sup>5</sup> of the independent data center market.

### 1. Renewable Energy Performance

- **More than 50% of Chinese internet companies analyzed have begun to actively procure renewable energy on a limited scale.** Alibaba, Chindata, GDS, and Baidu each operate one data center that is powered in significant part by wind and solar energy. Procurement mechanisms include rooftop solar, direct power purchase from markets and green power certificates.

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<sup>1</sup> Greenpeace East Asia. (2019). Electricity Consumption from China's Internet Industry to Increase by Two Thirds by 2023. Retrieved from <https://www.greenpeace.org/eastasia/press/1255/electricity-consumption-from-chinas-internet-industry-to-increase-by-two-thirds-by-2023-greenpeace-2/>

<sup>2</sup> China National Energy Administration. (2019). Announcement of First Batch of Wind and Solar Grid Parity Projects in 2019. Retrieved from [http://www.gov.cn/xinwen/2019-05/23/content\\_5393967.htm](http://www.gov.cn/xinwen/2019-05/23/content_5393967.htm)

<sup>3</sup> Chindata. (2019). Chindata Group Committed to 100% Renewable Energy Use as a Long-term Sustainability Goal. Retrieved from <http://www.chinanews.com/business/2019/12-27/9045115.shtml>

<sup>4</sup> IDC China. (2019). 2019Q1 China Public Cloud IaaS and PaaS Market Share. Retrieved from <https://www.idc.com/getdoc.jsp?containerId=prCHC45418919>

<sup>5</sup> Everbright Securities. (2019). China IDC Sector Insights and Analysis. Retrieved from [http://pdf.dfcfw.com/pdf/H3\\_AP201907181339501596\\_1.pdf](http://pdf.dfcfw.com/pdf/H3_AP201907181339501596_1.pdf)

- **During the first three quarters of 2019, Alibaba, Baidu, Huawei, Tencent, Chindata and GDS actively procured 400,000 MWh of renewable energy**, roughly equivalent to Beijing's total power consumption over a 24-hour period.<sup>6</sup> Given the scale of the climate crisis and rapidly growing electricity consumption by the internet data center sector, Chinese tech companies must dramatically scale up their procurement of clean energy.
- **On Dec. 27, 2019, Chindata became the first China-based data center operator to set a target for 100% renewable energy use.**<sup>7</sup> It is the only company analyzed that has done so, standing in stark contrast to the global sector. As of 2017, 16 global internet companies had set 100% renewable energy targets.<sup>8</sup>
- **Leading tech companies, including Alibaba, Tencent, Huawei, GDS, AtHub and Chindata, have begun to locate new data centers in or near areas with abundant renewable energy generation**, including in Hebei, Inner Mongolia, Guizhou and Sichuan.

## 2. Energy Transparency

- Since 2015, the portion of China's biggest tech companies that disclose overall electricity consumption and greenhouse gas emissions has increased from zero to 20%. Tencent has made the most progress on transparency and has disclosed energy consumption stats for data centers constructed over the last four years in mainland China.
- Yet four out of five companies analyzed have not publicly disclosed total electricity consumption or greenhouse gas emissions data. The companies that have not disclosed this information include Alibaba, Baidu, Jingdong, 21 Vianet, Sinnet, and others.

## 3. Energy Efficiency and Carbon Reduction

- Nearly all companies analyzed have disclosed information about energy efficiency optimization. This includes infrastructure improvements, IT equipment efficiency and code optimization. The majority of data center facilities owned by the companies analyzed run at an annual average PUE (power usage effectiveness) of less than 1.5.
- Huawei was the only company analyzed to set a greenhouse gas emission reduction target, exposing the lack of climate action and awareness within the sector.

## 4. Government and Industry Influence

- Leading companies have leveraged their influence to promote energy efficiency and renewable energy in various ways. For example, Alibaba and Chindata worked with the government of Zhangjiakou, Hebei province, to advocate for a "four party cooperation mechanism," which permits cloud companies and data center operators to procure renewable energy directly from wind and solar generators. Over 60% of companies analyzed have participated in national or third-party Green Data Center certification programs.

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<sup>6</sup> Sina Finance Headline. (2019). 2018 Power Generation and Consumption by Province. Retrieved from <https://cj.sina.com.cn/articles/view/6862376589/199078e8d00100mvg0>

<sup>7</sup> Chindata. (2019). Chindata Group Committed to 100% Renewable Energy Use as a Long-term Sustainability Goal. Retrieved from <http://www.chinanews.com/business/2019/12-27/9045115.shtml>

<sup>8</sup> Greenpeace. (2017). Clicking Clean: Who Is Winning the Race to Build a Green Internet? Retrieved from <https://www.greenpeace.org/usa/global-warming/click-clean/>

# Ranking

Companies were scored based on energy transparency, energy efficiency and carbon reduction, renewable energy performance, and government and industry influence.

Total Score (100)	Energy Transparency (20)	Energy Efficiency and Carbon Reduction (20)	Renewable Energy Performance (40)	Government and Industry Influence (20)	Energy Transparency (20)	Energy Efficiency and Carbon Reduction (20)	Renewable Energy Performance (40)	Government and Industry Influence (20)	Total Score (100)
<b>Cloud Companies</b>					<b>Independent Data Center Operators</b>				
<b>60</b>	4.80	10.29	27.43	17.14	<b>Chindata Group</b>				
<b>52</b>	16.80	10.29	13.71	11.43	9.60	10.29	40.00	20.00	<b>80</b>
<b>46</b>	2.40	10.29	27.43	5.71	<b>GDS</b>				
<b>46</b>	9.60	17.14	13.71	5.71	9.60	3.43	24.00	11.43	<b>48</b>
<b>12</b>	2.40	6.86	0.00	2.86	<b>AtHub</b>				
<b>12</b>	2.40	6.86	0.00	2.86	12.00	6.86	13.71	5.71	<b>38</b>
<b>9</b>	2.40	0.00	6.86	0.00	<b>21 Vianet</b>				
<b>5</b>	4.80	0.00	0.00	0.00	2.40	6.86	0.00	11.43	<b>21</b>
					<b>Dr. Peng</b>				
					2.40	3.43	10.29	2.86	<b>19</b>
					<b>Sinnet</b>				
					2.40	0.00	6.86	0.00	<b>9</b>
					<b>Baosight Software</b>				
					2.40	0.00	0.00	0.00	<b>2</b>

## Methodology

### Data Collection

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

### Scoring Criteria

Greenpeace East Asia created the following scorecard criteria, taking into consideration:

- 1) China's unique power market and its challenges
- 2) Consultation with local renewable energy and data center experts
- 3) Previous Greenpeace Click Clean reports.

### Energy Transparency 20%

Assessment of whether a company has disclosed the following information in external communications, media, or on third party information disclosure platforms, such as CDP.

- Data center electricity consumption
  - a. Total annual electricity consumption
  - b. Breakdown of electricity consumption by data center
- Data center electricity mix
  - a. Total electricity mix
  - b. Breakdown of electricity mix by data center
- Data center PUE
  - a. Total annual average PUE
  - b. PUE breakdown by data center
- Data center greenhouse gas emissions
  - a. Total greenhouse gas emissions
  - b. Breakdown of greenhouse gas emissions by data center
  - c. Methodology and guidelines (if any)

### Energy Efficiency and Carbon Reduction 20%

Assessment of whether a company has set carbon emission reduction goals and taken measures to reduce carbon emissions and improve energy efficiency.

- Carbon reduction goals
  - a. Absolute carbon reduction goals
  - b. Carbon intensity reduction goals
- Energy efficiency goals
  - a. Absolute energy reduction goals
  - b. Energy intensity goals
- Energy efficiency performance
  - a. Electricity saved (in absolute amount, percentage, or electricity cost reduction)
  - b. Energy efficiency improvement based on measurable targets and methodologies, such as PUE, carbon intensity or energy intensity.
  - c. Implementation of energy efficiency measures in data centers, including in buildings, IT equipment, cooling systems, power systems, etc.

## Renewable Energy Performance

40%

Assessment of whether a company has set renewable energy targets and taken measures to actively procure renewable energy.

- Commitment to 100% renewable energy use
  - Establishment of data center site selection policy that considers renewable energy supply.
  - Public disclosure of renewable energy procured, 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.]
  - Procurement of cloud and colocation services powered by renewables
  - Construction of data centers in areas with abundant renewable energy supply
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## Government and Industry Influence

20%

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 and power retailers to expand renewable energy procurement market mechanisms
  - Cooperation with cloud, CDN and colocation services providers to expand renewable-powered products
  - Sharing of renewable energy procurement and energy efficiency best practices with industry peers via conferences, white papers etc.
  - Participation in national or third-party Green Data Center certification programs
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## Renewable Energy Procurement Mechanisms

Cloud companies and independent data center operators in China can procure renewable energy via the following mechanisms:

### 1. Build or invest in renewable energy

- Companies can build on-site distributed solar and wind projects near data centers, using clean energy from these projects to power data centers.

Example: Tencent installed 3,000 square meters of rooftop solar panels at their Shanghai Qingpu data center, producing 300 MWh of electricity annually.<sup>9</sup>

- Companies can build or invest in off-site, utility-scale renewable projects, which offset electricity that data centers purchase from the local grid.

Example: In 2016, Apple and Goldwind co-invested in 285MW of wind projects in China, with Apple assuming 30% ownership of the projects.<sup>10</sup> In 2015, Apple co-invested in two 20MW solar farms in Sichuan in partnership with Leshan Electric Power Co., Sichuan Development Holding Co., Ltd, SunPower Corporation, etc.<sup>11</sup>

### 2. As power markets open up, companies can directly purchase renewable energy from generators in some provincial markets.

Examples:

- Alibaba and Chindata have both procured local wind and solar power in Zhangjiakou, Hebei province. During the first three quarters of 2019, Alibaba procured 140 GWh of renewable energy and Chindata procured 96 GWh in the area.<sup>12</sup> Chindata's Guangting Reservoir Data Center in Zhangjiakou ran at 56% renewable energy during the first half of 2019.<sup>13</sup>
- Baidu purchased a total of 55 GWh of local wind and solar energy from the power market at its Yangquan Data Center in Shanxi, which ran at 23% renewable energy in 2018.<sup>14</sup>

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<sup>9</sup> Tencent. (2017). 2015/16 Corporate Social Responsibility Report.

<sup>10</sup> China Daily. (2016). Apple Reaches Clean Energy Deal with Goldwind. Retrieved from [http://www.chinadaily.com.cn/business/tech/2016-12/09/content\\_27618014.htm](http://www.chinadaily.com.cn/business/tech/2016-12/09/content_27618014.htm)

<sup>11</sup> Apple. (2015). Apple Announces New Environmental Initiatives in China. Retrieved from <https://www.apple.com/hk/en/newsroom/2015/05/11Apple-Announces-New-Environmental-Initiatives-in-China/>

<sup>12</sup> Jibei Electricity Trading Platform. (2019). 2019Q1-Q3 Jibei Power Market Stats Report. Retrieved from <https://pmos.jibei.sgcc.com.cn/pmos/index/infoList.jsp?itemid=213000#>

<sup>13</sup> Chindata. (2019). Chindata Group Committed to 100% Renewable Energy Use as a Long-term Sustainability Goal. Retrieved from <http://www.chinanews.com/business/2019/12-27/9045115.shtml>

<sup>14</sup> Zhang Shuai. (2018). A Look into Baidu's 1st Hyperscale Data Center with PUE 1.1. Retrieved from <https://www.leiphone.com/news/201809/bM1fV7KR1I5SZIFh.html>

### 3. Purchase green power certificates

In July 2017, China launched a pilot program that permits voluntary trade of green power certificates from solar and wind power.<sup>15</sup> Each certificate represents 1 MWh of electricity. Buying green power certificates allows companies to claim environmental benefits associated with renewable energy generation, even if electricity from a renewable power plant does not feed directly into a data center facility.

Examples:

- a. Apple purchased 3,000 green power certificates in China in 2019.<sup>16</sup>
- b. Alibaba purchased green power certificates for its 20th anniversary in September 2019.<sup>17</sup>

Several government policies encourage internet companies in China to actively procure renewable energy.

- 1) The May 2019 renewable portfolio standard requires companies that procure power from the market to purchase a target percentage of renewable energy, effective January 1, 2020.<sup>18</sup>
- 2) The February 2019 update to the green data center guidelines encourages data center operators to buy renewable energy from the market and to purchase green power certificates, in addition to setting PUE targets.<sup>19</sup>

As China's power market reforms deepen, a number of pilot procurement markets have emerged, including distributed generation markets, interprovincial and spot markets for green energy, etc. These will likely be scaled up within the next few years, which will offer more diversified and cost-effective procurement options for cloud companies and data center operators.

## Recommendations

In the face of the global climate crisis, the internet industry must increase its reliance on clean energy sources. Greenpeace advocates for the following measures:

1. Internet companies and data center operators should set targets for 100% renewable energy use.
2. Companies must scale up renewable energy procurement and actively collaborate with local governments, grid companies and power retailers to expand renewable energy procurement market mechanisms.
3. Companies must actively disclose energy use data and greenhouse gas emissions.

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<sup>15</sup> China National Energy Administration. (2017). Notice on Green Power Certificate Voluntary Trading Pilot. Retrieved from [http://www.nea.gov.cn/2017-02/06/c\\_136035626.htm](http://www.nea.gov.cn/2017-02/06/c_136035626.htm)

<sup>16</sup> China Green Power Certificate Trading Platform. (2019). Honours. Retrieved from <http://www.greenenergy.org.cn/honor/honorList.jhtml?ordertype=2>

<sup>17</sup> GECCO. (2019). Recent Green Power Consumption Stats and Evaluation. Retrieved from <https://mp.weixin.qq.com/s/2ZGcNjrt0jHdUnG-dYTVdQ>

<sup>18</sup> China National Energy Administration. (2019). Notice on Establishing A Renewable Energy Portfolio Standard. Retrieved from [http://www.gov.cn/xinwen/2019-05/16/content\\_5392082.htm](http://www.gov.cn/xinwen/2019-05/16/content_5392082.htm)

<sup>19</sup> Ministry of Industry and Information Technology. (2019). Guideline on Strengthening the Construction of Green Data Centers. Retrieved from [http://www.gov.cn/xinwen/2019-02/14/content\\_5365516.htm](http://www.gov.cn/xinwen/2019-02/14/content_5365516.htm)



The Greenpeace logo is rendered in a bold, white, sans-serif font. The letters are slightly irregular and have a hand-drawn feel. The background of the entire page is a dark blue gradient with abstract geometric patterns: a network of white lines and dots in the upper left and right, and a grid of white hexagons in the lower half.

## GREENPEACE

For nearly 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](http://www.greenpeace.org.cn)