



Market Insight Report Reprint

Guangdong issues notice that will effectively slow datacenter development in the province

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Guangdong's provincial government has issued a new policy that seeks to slow datacenter development, facilitate rational distribution of datacenters and cultivate a healthy ecosystem amid the increasing pressure of energy consumption and carbon reduction as outlined in China's fourteenth five-year plan.

451 Research

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Introduction

The Guangdong Provincial Development and Reform Commission and Guangdong Provincial Energy Bureau have jointly issued a notice titled *Clarifying the relevant requirements for the energy consumption guarantee of datacenters in the province*. The purpose of this notice is to reinforce the execution of the *General layout plan of 5G base station and data center in Guangdong Province(2021-2025)*, which was published in September 2020, and what it revealed is the fact that datacenter construction in the province is substantially ahead of what it had planned for. Through this new notice, the provincial government hopes to strengthen planning and implementation guidance, use market and administrative means to promote green and low-carbon development, optimize the overall distribution of datacenters and reasonably control the overall scale of datacenters.

THE 451 TAKE

The announcement of 'New Infrastructure' as China's strategic priority in 2020 endorsed datacenters as the fundamental infrastructure to support the country's digital transformation and industrial upgrading, further boosting the datacenter market. Also in 2020, China pledged that its carbon emissions would peak around 2030 and it will reach carbon-neutral status by 2060, and then later announced that by 2030 its carbon emissions per unit of GDP will drop by more than 65% from 2005. At the same time, due to constrained land supply and restrictions on new builds, the three major economic hubs of Beijing, Shanghai and Guangzhou/Shenzhen have already seen hyperscale datacenter building spill over to surrounding areas. As a heavy energy consumer, the datacenter industry must find a balance between development and sustainability.

It is then no coincidence that Guangdong has issued guidelines to shape up its datacenter development blueprint, following Beijing and Shanghai. Even though there are differences in the details among the three areas, they all push for the use of green energy as well as sustainable and rational growth of the datacenter ecosystem at a higher level. The previously market-driven spillover trend is getting support at the policy level from the governments of Beijing, Shanghai and now Guangdong. But unlike Beijing and Shanghai, where spillover has already happened into adjacent provinces, spillover in Guangdong is mostly seen from the two tier-one cities of Guangzhou and Shenzhen to surrounding cities within the province. How Guangdong's ambition to push a certain number of datacenters out of the province will be accepted by the neighboring provinces of Guangxi, Hunan, Jiangxi and Fujian has yet to be seen.

Context

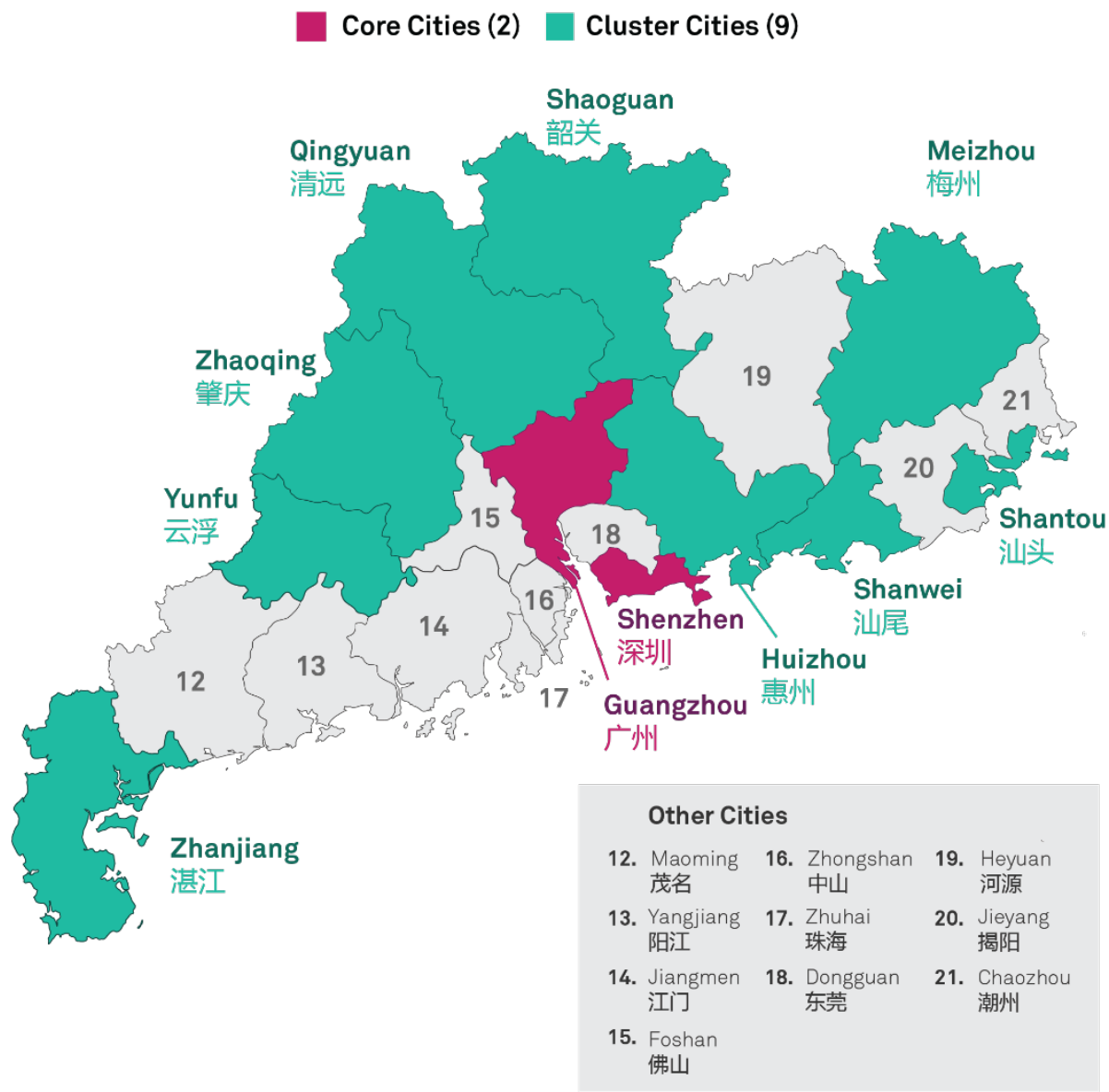
According to the notice, by the end of 2020, the total number of deployed standard racks had reached 485,000, which was already ahead of the 470,000 racks it had planned for by 2022. At the current pace of construction, the total number of IT racks could be as high as 1,500,000 by 2025, far exceeding its original plan for 1,000,000 racks (interestingly, for accounting purposes the Guangdong provincial government considers a standard rack to require 2.5kW of power, so a 5kW rack would count as two racks in the government's plan – this, as opposed to Shanghai's 6kW per rack accounting).

The new notice effectively puts the brakes on the booming pace, as the related government agency looks into ways to encourage a more sustainable growth trajectory for the datacenter industry. Projects with an already approved energy quota must start construction within two years, or the quota will be revoked. In principle, no more IT racks will be approved except for small datacenter projects of below 1,000 racks for consolidation and enterprise self-use edge computing applications. Datacenters are forced to adopt green technology transformation to lower PUE and optimize utilization. The authority reserves the possibility of lifting the restriction of new construction quota approval should the overall rack utilization rate reach 70%, to fulfill market demand during 2023-2025, provided it also meets the 'dual-control' target of carbon emission and energy consumption per unit of GDP.

The Pearl River Delta in Guangdong province is one of the three tier-one economic hubs in China. Datacenters certainly play a key role in supporting the booming economy and digital transformation, and according to the government report, as of the end of 2019, about 160 datacenters were currently active in the province. From a quantity perspective, and again according to the government report, hyperscale datacenters accounted for 1%, large datacenters accounted for 20%, and small and medium datacenters accounted for 79% of the total number of currently built-out datacenters. The total number of racks that have been deployed was about 116,000 (although because the government uses 2.5kW per rack as the standard for accounting purposes, this is equivalent to 218,000 standard racks), or a total capacity of 545MW IT power. The number of racks in use was about 72,000 (equivalent to 135,000 standard racks), or total power of 337MW IT load, which translates to 61.9% utilization from a power perspective.

The plan

Figure 1: Two Core + Nine Cluster Plan



Source: 451 Research

The Guangdong provincial government has defined an overall datacenter distribution layout that it is calling 'dual core plus nine clusters,' with the core areas being the major cities of Guangzhou and Shenzhen, while the nine datacenter clusters are Shantou, Shaoguan, Meizhou, Huizhou, Shanwei, Zhanjiang, Zhaoqing, Qingyuan and Yunfu. The idea is that workloads will be placed in different areas based on their latency requirements, thereby giving priority to datacenter space in the congested dual core to latency-sensitive applications, while less sensitive workloads and applications will be placed further out.

To ensure consistency, the plan has created the following categories of datacenters and workload latency requirements:

Figure 2: Datacenter Sizing

Size	Standard rack quantity	IT load (MW)
Hyperscale	10,000 or more	25 or more
Large	3,001 to 10,000	7.6 to 25
Medium	1,001 to 3,000	2.6 to 7.5
Small	up to 1,000	up to 2.5

Source: 451 Research

Figure 3: Datacenter Tier Based on Latency

Tier	Category	Latency (ms)	Sample applications
1	Extra low	Less than 10	Edge computing
2	Low	Less than or equal to 20	IoT (equipment control), internet of vehicles, network gaming, finance & stocks, telemedicine
3	Medium	20 to 200	Cloud computing, big data, blockchain, AI, video streaming
4	High	Above 200	Web browsing, storage, data backup

Source: 451 Research

In principle, the dual core of Guangzhou and Shenzhen can build only medium-sized and below datacenters to carry tier one and tier two services, while the nine datacenter clusters will accommodate hyperscale, large and medium datacenter buildouts. Tier three services will gradually migrate to the eastern and western parts of Guangdong and tier four services will be pushed outside the province.

Under the original guidelines of 'Utilization ahead of expansion,' each datacenter must increase its rack utilization rate to 60% before applying for expansion and new construction quotas. The five-year plan is divided into two stages: Stage one (2021-2022) – Overall PUE must be less than 1.3, rack utilization rate must reach 65%, the total number of standard IT racks should be about 470,000, or 1,175MW IT load. Stage two (2023-2025) – Overall PUE less than 1.25, rack utilization rate should reach 75%, the total number of standard IT racks should be about 1,000,000, or 2,500MW IT load. The three major telecom operators, China Telecom, China Unicom and China Mobile, are responsible for the construction of direct communication links across the province to ensure the low-latency and high-bandwidth requirements of datacenters.

The green challenge

Featuring 2,556 miles (4,114km) of coastline, Guangdong is not lacking offshore wind power resources. Its offshore wind power saw a jump start in 2018, and by 2020 was in full-scale production, reaching 10GW of built-out capacity by the end of that year. It is subsequently estimated that Guangdong's offshore wind power will account for 20% of China's total by the end of 2021. In addition, Guangdong's solar power and biomass power generation are expected to reach 10GW and 3GW, respectively. Overall, green energy accounts for more than 30% of Guangdong's total utility power, making the province a leader in China as of 2020, according to the government there. Even though Guangdong has enhanced its green energy development, until now there has been a lack of specific policies to encourage end users, including datacenters, to adopt green energy. So far, the cost structure of green energy has not been compelling enough to attract datacenter users.

To achieve the pledge of carbon emissions peak around 2030 and carbon neutral in 2060, China is facing an uphill challenge, especially the decade before 2030. Given the estimated GDP growth of about 5.5-6% until 2025, the next five years are critical for China to contain its emission growth and lower its energy consumption per unit of GDP (known as 'dual-control' in China's policies). In its fourteenth Five-Year Guideline (China's Five-Year Guidelines are a series of social and economic development initiatives issued every five years), China is committed to reducing its energy consumption per unit for GDP by another 14% based on 2020 by 2025, and each province is measured by a restricted quota. Because the datacenter industry is a high energy-consuming industry, it is easy to see why so many municipalities are now passing even more restrictions.

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