



Market Insight Report Reprint

Beijing strengthens energy efficiency review on datacenters

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As a key contribution to the battle for carbon-emission reduction and carbon neutrality, Beijing's local government released a regulation that aims to improve energy-saving reviews of datacenter projects in China's capital. It provides guidance and a standard to improve energy and carbon efficiency, and highlights energy-saving management throughout the lifecycle.

451 Research

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Introduction

Following its April 26 draft energy plan, Beijing's local government released a Notice on Further Strengthening Energy Efficiency Review on Datacenters, confirming the proposed requirement – that datacenters completed in 2021 and after will need to include renewable energy in their power sources, and incrementally increase the share of renewables by 10% each year to 100% by 2023.

Under the regulation, datacenter operators are also required to improve the operation efficiency and facility utilization rate. Existing datacenters that do not meet the efficiency standard will have higher power tariffs imposed. Facilities with a power utilization rate of less than 80% against their capacity two years after the facility has gone fully operational will have to file for a new energy consumption quota. Datacenter operators are also encouraged to close and consolidate old and inefficient datacenters, with half of the old facility's power allocation eligible to be used against the new construction as an incentive.

THE TAKE

Beijing's ambition to strengthen its energy review of datacenters is an integral part of the country's 3060 pledge: that its carbon emissions will peak in 2030 and reach neutrality in 2060. Interestingly, this regulation is far more progressive than anything else we have seen globally so far. As a result, the datacenter industry must now find a balanced and sustainable development path forward, all while meeting the ever-increasing demand in the market. We believe this new regulation will directly impact the Beijing market in a number of ways. The most immediate impact will likely be an accelerated upgrading and consolidation of smaller facilities inside Beijing to make way for new workloads that need to be within the city.

Context

Strict enforcement of the 3060 pledge should promote more efficiency and higher utilization rates – as well as the adoption of renewable energy sources, likely through green energy certificates. Precious little real estate exists to do any sort of meaningful on-site generation. Furthermore, these more stringent regulations will force a continuation of the spillover trend we've been seeing for the last several years to Beijing's neighboring provinces of Tianjin and Hebei, and farther afield to Shanxi and Inner Mongolia.

To date, Hebei – predominantly represented by Zhangbei, Huailai and Langfang – has seen the lion's share of this spillover activity. It is quickly catching up to the total capacity of Beijing itself, and is expected to surpass it soon. Sites in Tianjin and Hebei were originally leveraged primarily for disaster recovery; however, they are now critical to serving the entire Beijing-Tianjin-Hebei region, and to an extent, all of northern China.

Finally, the regulations will likely cause the city of Beijing's datacenter capacity to remain essentially flat from 2023 onward, as providers decommission older facilities to make way for newer facilities, with new capacity for lease being found by moving workloads out of the city center, as well as through marginal gains in efficiency. It is also worth noting that these new regulations only pertain to Beijing itself, and not the surrounding spillover areas (yet), making the space in the city even more of a premium.

Among China's major markets, Beijing has been at the forefront of datacenter regulations since as early as 2014, when the local government introduced a policy that banned the construction of all-new datacenters – only hyperscale facilities with PUE below 1.5 were given exemptions. In the years since, those regulations have continued to be updated and refined.

In 2015, the regulations named six districts – Dongcheng, Xicheng, Chaoyang, Haidian, Fengtai, Shijingshan – in downtown Beijing where construction of datacenters was banned. The local government upped the ante in 2018, lowering the PUE levels for the approved hyperscale facilities to 1.4, before the requirement was further tightened to 1.3 for hyperscale facilities.

These past regulations were preceded by a draft policy released in January that outlines measures to phase out datacenters in Beijing with a PUE above 2.0, with plans for the older datacenters in both the Dongcheng and Xicheng districts to be converted into edge facilities. In April, the local government continued with a sweeping energy plan draft to make it compulsory for newly built datacenters to adopt renewable energy while existing facilities must meet efficiency standards, all while seeking feedback from the industry.

Key points of the policy

The Notice on Further Strengthening Energy Efficiency Review on Datacenters was released by the Beijing local government on July 28, after a three-month period of soliciting opinion and feedback. It could potentially have a more tangible impact on the opex and capex of datacenter operators, speeding up the formation of the Beijing-Tianjin-Hebei datacenter hub.

Key items from the regulation can be summarized as follows:

- This regulation applies to newly built or retrofitted datacenters with annual energy consumption at or above 1,000 tons of standard coals or five million kWh (roughly a .5MW facility at 100% load).
- Datacenters should adopt free cooling and residual heat recirculation technologies. The energy-efficiency level of general-purpose, energy-consuming equipment for uses such as refrigeration, ventilation and transformers should meet or exceed the first-level energy-efficiency standards. New equipment and facilities that use ozone-depleting substances as working fluids are prohibited, and refrigeration using natural working fluids such as carbon dioxide as a medium is encouraged.
- Computing datacenters are prioritized for new and retrofitted builds. Operators should provide function and configuration descriptions to assure the ratio of total power for storage devices does not exceed 20% of the total power.
- Datacenters completed in 2021 and later should include a plan to use renewable energy, and incrementally increase the share of green energy by 10% each year to reach a 100% renewable energy target in 2030. To accomplish this, datacenter operators can improve renewable energy usage by implementing self-built renewable energy capacity on-site, or through the purchase of green certificates from the state-sanctioned platform. Authorities will perform an annual evaluation of the level of renewable energy usage by the end of June each year.
- A higher power tariff will be imposed on 'inefficient' datacenters. Datacenters with PUE levels exceeding 1.4 but lower than 1.8 will be hit with an increase of 0.20 yuan per kWh, while facilities with PUE levels exceeding 1.8 will face a hike of 0.50 yuan per kWh.
- Half of the power quota of a closed datacenter can be transferred to a new facility, provided it is run by the same provider.
- Newly built datacenters and those that are expanding must meet the following PUE requirements: Less than 1.3 for the project with annual energy consumption below 50 million kWh; less than 1.25 for annual energy consumption between 50 million kWh and 100 million kWh; less than 1.2 for annual energy consumption between 100 million and 150 million kWh; and less than 1.15 for annual energy consumption exceeding 150 million kWh.
- Existing datacenters with annual energy consumption exceeding the limit of 25 million kWh should install an online energy monitoring system that is connected to Beijing's energy conservation monitoring platform.
- Datacenters with a utilization rate of less than 80% (actual against design) after two years of operation must file for a new power allocation adjustment.
- All datacenter projects must start construction within two years after obtaining an Energy Review opinion from the authority.

The outlook under the green challenge

China is making a strong push into renewable energy. By any standard, mandating datacenters to use renewable energy and dictating stringent PUE and utilization regulations puts Beijing at the forefront of efforts to address sustainability issues of this sector. This will help improve the overall energy efficiency and operational efficiency of datacenters in Beijing, and increase renewable energy usage to a certain degree.

New facilities are still being launched between 2020 and 2021, but the supply pipeline will be constricted starting 2022, leading to almost no new datacenters in the projections for Beijing going forward. As a result, the total operational square footage in Beijing is expected to stay flat from 2023 onward. Instead, the annual added supply in the satellite provinces will surpass that of Beijing.

Notably, Hebei will be growing by large margins in 2021 and 2022. Providers have flocked to Hebei, particularly to areas such as Langfang and Huailai, prompted by regulations to ramp up renewable energy use in datacenters, while also purchasing green certificates to offset their carbon emissions. The Zhangbei and Huailai counties within Zhangjiakou are two key datacenter clusters that are home to datacenter providers and hyperscalers, including ChinData, Alibaba Cloud and Tencent Cloud. In comparison, coastal port city Tianjin must bear relatively high utility costs, and can offer few renewable energy sources.

As an example, GDS had only 22,472 square meters under construction in downtown Beijing as of August 2021, compared to 59,982 square meters in areas that the provider called 'edge of town' around Langfang and Tianjin. 21Vianet revealed plans to build a new campus in Hebei (N-HB Campus 02), where the company recently secured land and a power source, although it remains undecided how the development will be phased out from 2022 to 2024. ChinData, a relative newcomer to the business, is building most of its facilities in Huailai, followed by other new entrants such as GLP and Hoyinn.

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