



# Analysis of China Telecom's 5G base station energy-saving path

Does China have a 5G network? Given that China currently has the largest 5G network in the world (~1.53 million base stations by the end of , Table S1) and that base station number was projected by up to 6-8 million by (CCID Consulting, ), concerns are being expressed regarding 5G mobile networks' environmental effects and sustainability. How much CO<sub>2</sub> will China's 5G network produce? Under the model predicted 5G base stations, China's 5G network could yield 0.15-0.29 GtCO<sub>2</sub> /yr emissions subject to the nation's BDDL from 40 to 80 % by . Both 5G base stations and CO<sub>2</sub> emissions are significantly lower than the previous estimates. How much electricity will China's 5G network consume in ? Under the scenario of business-estimated six million base stations in , the share of electricity consumed by China's 5G networks in could reach 8.4 % of the national total power generation, causing 0.44 GtCO<sub>2</sub> /yr CO<sub>2</sub> emissions. Could 5G help achieve China's Carbon Peak target? In the case of a 5G low power load (Fig. 5 b), the fraction reduces to 0.13 %, suggesting that power load from switching 4G to a 5G network could reduce about 6 % of CO<sub>2</sub> emission subject to the nation's carbon peak scenario. In light of this, replacing the 4G with a 5G network could help achieve China's carbon peak target. Does 5G affect climate? Some of our results agree with previous findings concerning how growing 5G base stations and data traffic enhance power consumption and, therefore, carbon emissions are often regarded as a side effect of 5G networks on climate, hindering their sustainable development. Can network energy saving technologies mitigate 5G energy consumption? This technical report explores how network energy saving technologies that have emerged since the 4G era, such as carrier shutdown, channel shutdown, symbol shutdown etc., can be leveraged to mitigate 5G energy consumption. Optimal energy-saving operation strategy of 5G base station with To further explore the energy-saving potential of 5 G base stations, this paper proposes an energy-saving operation model for 5 G base stations that incorporates communication caching Remake Green 5G China Telecom has been enhancing the urgency and practicality of promoting the Net Zero, building green new cloud networks, and building green 5G base stations. The new green Application of AI technology 5G base station When the symbol shut down function is turned on, when there is no user data transmission in the downlink symbol, the base station equipment can achieve the purpose of energy saving by Evaluation of the power-saving effect of 5G base station based The traditional power-saving effect evaluation scheme of Active Antenna Unit (AAU) is complicated, leading to errors in the final evaluation results possibly. This paper Research on Energy Saving Scene of 5G Base Stations The daily tidal phenomenon and energy-saving periods are further analyzed to identify the energy-saving scene, and then a differen-tiated energy-saving strategy is periodically adopted for the Research on Performance of Power Saving Technology for 5G Compared with the fourth generation (4G) technology, the fifth generation (5G) network possesses higher transmission rate, larger system capacity and lower tran The carbon footprint response to projected base stations of Although there have been increasing concerns and debates regarding the energy consumption of 5G networks in recent years (GSMA, ), our results shed light on the Research on Energy-saving Solutions for 5G+ Equipment Rooms This paper explores



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energy-saving solutions for 5G base station support systems, addressing the high energy consumption challenges of 5G base stations through measures. Final draft of deliverable D.WG3-02-Smart Energy Saving of Smart Energy Saving of 5G Base Station: Based on AI and other emerging technologies to forecast and optimize the management of 5G wireless network energy consumption.

5G????? Abstract: Driven by the global "dual-carbon" strategy, the high energy consumption of 5G base stations has become an urgent issue to address. This paper analyzes four key challenges in Optimal energy-saving operation strategy of 5G base station with To further explore the energy-saving potential of 5 G base stations, this paper proposes an energy-saving operation model for 5 G base stations that incorporates communication caching.

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