

Huawei's PowerX will address MNOs' power needs for 5G, but sites must be carefully designed

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Mobile network operators (MNOs) need to upgrade their power supplies for both telecoms sites and data centers (DCs) in order to meet digitalization requirements and reduce opex. They should work with vendors to develop solutions that best meet the specific requirements for individual locations.

Huawei held its Better World Summit 2020 as an online event in late October 2020. During this event, it announced its latest offerings, 5G PowerX and DC PowerX, both of which are geared towards addressing the power and cost challenges of 5G and DCs.

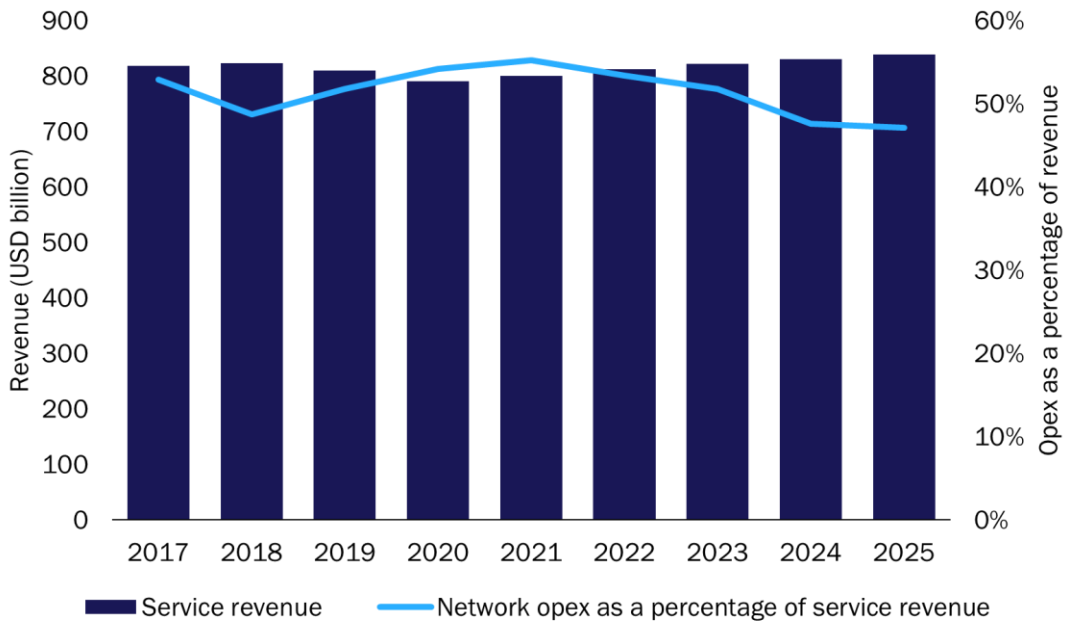
5G deployments will further challenge MNOs' opex budgets

MNOs' network opex has been growing more quickly than their service revenue since 2018, and they have consistently missed opex reduction targets. Nonetheless, total network opex is expected to decrease by 6% (USD24.4 billion) between 2019 and 2025 due to new efficiencies in many parts of the network. However, this is far from the consensus target of 30% by 2030 that was established in an operator survey conducted by Analysys Mason in 2018.¹

MNOs' opex as a percentage of revenue will peak in 2020–2021 (Figure 1). This is largely due to significant 5G deployments and further 4G expansion, but also reflects the pressure on revenue because of the COVID-19 pandemic. We forecast that network opex will have a CAGR of –1% between 2019 and 2025. In addition, MNOs' service revenue peaked in 2018 and will not return to growth until 2021 (Figure 1). We forecast that service revenue will grow at a CAGR of just 0.6% between 2019 and 2025.

¹ For more information, see Analysys Mason's [The impact of 5G and next-generation networks on mobile opex spending](#).

Figure 1: MNOs' service revenue and opex as a percentage of service revenue, worldwide, 2017-2025



Source: Analysys Mason, 2020

5G networks must deliver ubiquitous coverage and address a vast array of use cases beyond just mobile broadband. To do so, each network will need 3-4 times the number of sites required by earlier mobile generations. Faster data speeds will be achieved by using a combination of large spectral bandwidths (in the order of 100MHz or higher) and new active antennas, such as massive-MIMOs. As such, MNOs will struggle to significantly reduce their network opex in the next few years.

The trend to disaggregate and virtualize the radio access network (RAN) will also increase power consumption because more servers will be required. Delivering ultra-low-latency services for virtual reality/augmented reality (VR/AR) use cases calls for additional servers to be placed in DCs or at individual sites, which will further increase power consumption.

It is therefore essential for MNOs to adopt a radically different approach to planning and running their new next-generation networks in order to cut not just the cost per site, but the absolute opex levels.

Existing inefficient site power supplies will hamper MNOs' 5G deployments and opex reduction efforts

A site's power supply must deliver enough watts to service the three main components that are necessary for the base station to function adequately: the rectifier, the air conditioner (AC) and the back-up battery system. The existing equipment at most operator sites delivers sufficient power to service 4G and other legacy networks, but not enough to meet the additional power requirements of 5G networks.

The introduction of massive-MIMO antennas alone will require an additional 1000W per sector. Alongside this, additional power is also required for other new equipment such as the radio units, baseband and servers.

Furthermore, MNOs' existing AC units and back-up battery systems are old, bulky and inefficient, and require significant physical space. The battery systems are lead-acid-based, which makes them heavy and costly to maintain, necessitates frequent site visits and, importantly, means that temperature variations can negatively impact their performance.

There are voltage fluctuations in the national grid in many countries, which existing power equipment may not be able to handle adequately. Weather events such as thunderstorms exacerbate the situation and can lead to further equipment damage. As a result, there are a significant number of site outages per month in both urban and rural locations. Many of these failures cannot be resolved via remote operation and maintenance (O&M) activities and instead require site visits for repairs. This can add significant costs and can result in network black-outs, particularly for rural sites.

Site outages are likely to only affect a single area, but DC outages are likely to have a far greater impact on network quality and customer experience due to the aggregated services that DCs provide.

This all means that MNOs will need to invest in new equipment, together with AC units and back-up battery systems, in order to provide a high-quality 5G network. However, this equipment will require additional physical space, and MNOs will need to expand their existing buildings if this extra space is not available.

Huawei's PowerX solutions will help to address MNOs' power challenges, but co-operation is required to ensure that all requirements are met

MNOs should work with their vendor partners to redesign and upgrade the power equipment for their RAN and their DC sites. Each site will have its own constraints, which should be taken into consideration. Modern AC units and lithium batteries are much smaller than their older counterparts, which will lower MNOs' site rental fees, and the improved efficiencies and lower battery weights mean that MNOs will no longer need to invest significantly in rooftop structural reinforcements.

Huawei's 5G PowerX product uses a single outdoor cabinet per site and has a reduced form factor, meaning that more components can fit into a single blade, thereby reducing tower rental fees. The vendor's DC PowerX product uses modularisation to shorten the construction time, digitalization-based predictive maintenance to reduce outages and save power consumption and improved cooling systems to increase energy efficiency.

MNOs' requirements will continue to evolve, and vendors' power systems will continue to improve as a result of co-operation with MNOs. 5G networks are migrating towards virtualization and software-defined networking, and vendors should therefore ensure that their new power solutions use similar principles, for example. New intelligent algorithms will help to keep electricity costs down by enabling switching between mains supply and batteries during peak electricity cost and traffic load times, while digitalization will improve automation and self-healing.