



Call For Input: Mobile RAN Power Back Up

Cellnex UK Response

March 2024

Overview of Cellnex UK

Cellnex Group

This response is submitted by Cellnex UK ([link](#)), part of Cellnex Group ([link](#)) which:

- Supports over 420 million mobile connections across Europe
- Operates >100,000 mobile sites today, which will grow to >130,000 by 2030
- Is Europe's leading neutral host mobile infrastructure provider, covering 12 countries: Austria, Denmark, France, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland and the UK
- Provides mobile infrastructure services, private and mission-critical networks, distributed antenna systems and small cells, and smart/IoT and innovative services
- Operates sixteen mission critical networks in Spain for emergency bodies to ensure public safety
- Has deployed forty private networks across Europe for enterprise applications
- Had an annual turnover of €3.5bn in 2022
- Is listed on the main sustainability indices, and evaluated by highly reputable international analysts such as CDP, Sustainalytics, FTSE4Good, MSCI and Standard Ethics

Where possible, we have sought to provide international examples from the wider Cellnex Group in our response.

Cellnex UK

We are the trusted partner of all the major UK mobile network operators, hundreds of private businesses, the emergency services, as well as the UK Government, specifically Cellnex UK:

- Is the UK's leading independent wireless connectivity infrastructure company
- Operates >8,000 mobile sites today, which will grow to >13,000 by 2031
- Has deployed over 1,000 small cells to date
- Is a provider of private networks in campus and indoor environments
- Is an indoor mobile coverage provider, most notably in the Etihad stadium in Manchester
- Is deploying contiguous mobile coverage and capacity along the 81km Brighton to London Mainline and three major stations
- Has won three DCMS 5G competitions, working collaboratively with universities and start-ups to deliver 5G innovation
- Has office presence across four major UK locations – Reading, Manchester, Scotland and Leamington Spa
- Has invested £6.1bn in the UK since 2016

Basis of Response

Cellnex UK is primarily a neutral host infrastructure and service business that serves the UK mobile network operators ('MNOs') and other communications providers. Consequently, we have focused our response to this consultation within our domains of business to business expertise – namely passive macro infrastructure and neutral host active RAN.

Our responses are limited to power solutions that could be deployed and deployment timelines. This relates to services that Cellnex currently provides and innovates with MNOs across Europe. Queries relating to MNO outage types, customer impact and MNO existing approaches will be best provided by the MNOs themselves.

Q7: What cost effective solutions do you consider could meet consumers' needs during a power outage?

Backup power solutions need to be quick to deploy, cost effective with low ongoing maintenance. Cellnex has explored power backup solutions with customers and some options for Ofcom to consider are detailed below.

2.1. Solution Options

Examples of power resilience options:

a. Battery Backup

Battery backup is a solution already used in MNO networks and improving battery technology makes this solution more compelling for wider deployment. Batteries are relatively easy to install and can be recharged directly from the mains power supply and maintenance is typically easier than diesel generators. It's a solution which is easy to scale; the number of batteries used depends on the level of back-up required. Battery technology is improving rapidly to increase capacity and lifetime although global demand for batteries is forecast to increase significantly. A significant challenge in cellular networks is battery theft, especially from remote cell sites. There will be additional costs to provide adequate security and insurance to protect these assets.

b. Backup Generators

Generators are common power backup solutions currently deployed and provide a tried and tested solution. They are usually diesel powered but newer variants are available that use bio-fuels to reduce environmental impact. The main challenges are generators require regular maintenance and refuelling to ensure they are available when needed and space at the site to locate them. Diesel generators also require switching time for the generators to power up so may require some limited battery backup in the interim. When used infrequently, the stored fuel degrades over time, and needs to be replaced. Generators are unlikely to be suitable for rooftop locations in urban areas.

c. 'Tow-to-site' Generators

Generators can be towed to site upon request, which helps to protect against longer outages. With proper set up and planning, most sites in the UK can be serviced within a small number of hours. For example, Cellnex UK offers such a service with a 4-hour response time for mainland sites, excluding the Highlands. For continuous operation, sufficient battery back-up is required.

d. Innovation

Innovations areas include hydrogen fuel cells and bio-methanol fuel cells. Cellnex and other tower operators have also tested wind and solar power on sites, however, their performance depends on the weather and time of year (i.e. daylight hours) so cannot be guaranteed without battery backup. Renewable energy sources will typically be most effectively generated at scale generation plants (e.g. solar panel farm) rather than on-site micro-generation.

e. Shared solutions

Shared solutions across MNOs i.e. larger capacity batteries will offer the most economical solution for MNOs. This will avoid duplication of costs, minimise additional footprint, and leverage economies of scale. Whilst configuration detail will need to be worked through, a single cabinet to house batteries, can be dimensioned for all MNOs on a shared site. Further, a single maintenance regime will minimise ongoing costs.

2.2. Optimisation of power costs

A number of MNOs have discussed with Cellnex how they can address peak power costs in their networks. MNO powers costs may increase during peak power consumption periods where the cost per kWh can increase. The addition of 5G services and additional equipment increases power consumption for cellular services making the MNO cost base more susceptible to electricity price changes.

Solutions that can reduce peak power costs may partly offset the cost of providing power resilience and form part of a wider overall business case for batter deployment. Batteries could be charged at night when power demand is low and per kWh pricing is lower and then utilised during peak power demand to reduce consumption costs for the MNO i.e. the batteries can reduce overall power costs.

For example an MNO site consuming 6 kW of power could save c.£870 per annum¹ if 2 hours of peak power consumption per day can be supplied with batteries recharged at night when power costs are lower. Over a 15 year term the NPV of this saving would be c.£10,000² which would offset part of the cost of installing a battery back-up solution. The economics of the savings versus cost to deploy requires further investigation and more detailed financial modelling.

Another optimisation could be to deploy solar panels alongside the batteries which can provide additional power at peak times – perhaps removing the need for a power supply upgrade. Additional innovations that can leverage the investment in back-up batteries on each cell site will help MNOs justify the capital investment and can provide benefits to consumers and MNOs.

Battery backup provides the most easily deployable solutions but costs require further investigation. Ofcom should explore how battery backup could be extended to address MNO peak power consumption costs.

¹ Based on 6 kW power supply for 2 hours peak use per day. Energy price saving of £0.20 per kWh from using battery backup at peak times

² Calculated over a 15 year term with an 8% discount rate

Q12: Over what time period could industry make upgrades to provide a minimum of 1 hour at every cell site or other cost-effective solutions to address potential consumer harm?

The deployment of power resilience solutions will be dependent on the number of sites and approach to delivery. We note Ofcom's assessment of 40k to 70k sites needing backup at a cost £20-£25k per site providing a total cost of £0.9-£1.8bn.

a. Number of locations

In total all MNOs in the UK combined have [redacted] PoPs³ with each MNO operating between 16k-20k PoPs for their networks. We estimate there are [redacted] physical sites used to provide mobile services in the UK with varying levels of sharing. For example, MBNL facilitates passive sharing for BT and 3UK and Cornerstone facilitates passive sharing for Vodafone and VMO2. Vodafone and VMO2 also operate a RAN share utilising a single set of radio equipment for both MNOs. Third party providers like Cellnex and Wireless Infrastructure Group also provide shared sites for multi-MNO use.

We believe there are relatively low levels of power backup currently deployed in MNO networks. The exception is BT/EE which operates Emergency Services Network (ESN) sites where we understand there may be additional power resilience installed in line with service requirements.

The power reliance requirement could initially focus on 'hub' sites which are critical site locations that serve one or more 'tail' sites. If the 'hub' site goes down all the 'tail' sites will also lose service because their backhaul routes via the 'hub' site using microwave links. We estimate there may be up circa 10-20% of the network that are 'hub' sites i.e. [redacted] locations which could be prioritised for backup power to optimise power resilience expenditure.

b. Shared solutions economies

There would be efficiencies in cost and timescales if MNOs utilise shared power backup solutions for all the tenants on site.

- Installation savings: Only one visit to a site to cover all MNOs rather than multiple visits to provide separate resilience solutions. Managing a programme with fewer visits to site will optimise the efficiency of the supply chain and speed up delivery.
- Hardware savings: Purchasing a single higher capacity power backup solution may be cheaper than 4 x smaller scale individual MNO solutions. Ofcom notes in the consultation "*Investing in greater power backup at mobile RAN sites would benefit from economies of scale, i.e., the cost per hour reduces as the number of hours increases*".
- Environmental benefits: For example, reduced visits to site saving on truck rolls; and a reduction in materials for install e.g. 1 x Cabinet vs. 4 x smaller cabinets and associated concrete requirement.

We estimate that approximately [redacted]% of sites have two or more MNO tenants⁴ so could benefit from shared power solutions. Cellnex and other neutral hosts invest in infrastructure beyond the tower and maybe ideally placed to fund and deploy shared power backup solutions

c. Technical Solution

Deploying tried and tested technologies will be fastest way to provide resilience on all sites. The simplest option will be to deploy battery backup on each site. Further exploration is required regarding supply chain capacity and unit prices to confirm the economic feasibility of delivery given high demand for batteries from other sectors e.g. electric vehicles, renewable power generation. Critical sites (such as 'hub' sites) may justify the deployment of a permanently installed generator or an increased level of battery back-up supported by a 'tow-to-site' generator service.

d. Timeframe for deployment

A power backup installation could feasibly be undertaken in two days. In some cases it may be quicker where existing cabins are available to host the batteries e.g. legacy 2G/3G cabins that may still be operational. These works could also be aligned with

³ [redacted]

⁴ [redacted]

existing site upgrade activity to optimise the delivery programme. A well planned programme for battery backup will optimise site visits to speed up deployment and manage the costs.

Comparable programmes could include High Risk Vendor equipment removal from the RAN. Government requirements to remove Huawei equipment came into force in 2020 and requires all MNOs to achieve this target by 2027 i.e. a 7 year time-frame. The time taken to deploy battery back-up will depend on supply chain capacity and hardware availability. If there are sufficient teams to parallel track multiple programmes we expect a similar time frame would to deploy power backup solutions across all cell sites. Deployment to all hub sites may be feasible within 1-2 years.

Ofcom should encourage MNOs to deploy shared power backup solutions to maximise savings and optimise the delivery programme. In addition, 'hub' sites or other critical sites should be prioritised in the first 24 months.