

## Proposed guidance consultation

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Question	Your response
<b>Question 1: Do you consider the measures in the proposed guidance relating to the resilience of the physical infrastructure domains to be appropriate and proportionate?</b>	Redacted version has removed confidential content.  Please see additional supporting information for further details.
<b>Question 2: Do you consider the measures in the proposed guidance relating to the resilience at the Control Plane to be appropriate and proportionate?</b>	Regarding the proposed guidance relating to control plane resilience, we have no comments to add.
<b>Question 3: Do you consider the measures in the proposed guidance relating to the resilience of the Management Plane to be appropriate and proportionate?</b>	Regarding the proposed guidance relating to management plane resilience, we have no comments to add.
<b>Question 4: Do you consider the measures in the proposed guidance relating to communications providers' own managed services to be appropriate and proportionate?</b>	Redacted version has removed confidential content.  Regarding the proposed guidance relating to CP-managed services, we understand that this does not apply to [REDACTED] and therefore have no comments to add.
<b>Question 5: Do you consider the measures in the proposed guidance relating to communications providers' arrangements for preparing for adequate process, skills and training to be appropriate and proportionate?</b>	Regarding the proposed guidance relating to processes, tools and training we have no comments to add.

## Call for Input

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### Question

### Your response

**CFI question 1: Does this framework accurately capture the factors relevant to assessing what is an appropriate and proportionate measure for MNOs to take with regards to power resilience for RAN cell sites?**

Redacted version has removed confidential content.

Please see additional supporting information for further details.

**CFI question 2: Do you agree that at a minimum MNO's networks should be able to operationally withstand short term power-related incidents?**

**CFI question 3: What mobile services should consumers be able to expect during a power outage, what consumer harms should power backup up focus on mitigating and does this vary depending on the type or duration of the outage?**

**CFI question 4: What technical choices are available to MNOs to reduce power consumption, and should be considered as part of assessment of appropriate and proportionate measures?**

**CFI question 5: How many sites would it be feasible to upgrade and maintain and why?**

**CFI question 6: Do you consider that providing a minimum of 1 hr backup to all RAN cell sites would be proportionate to meet the security duties under s.105A to D of the Communications Act 2003?**

**CFI question 7: What cost effective solutions do you consider could meet consumers' needs during a power outage?**

**CFI question 8:**

**a) Is it more cost efficient to increase power backup up to any space, weight, or planning limitations, i.e., increasing power backup as much as is feasible provides the lowest £ per hour?**

**b) do the benefits of any power backup solution have diminishing returns, i.e., the benefit per hour decreases as you increase the amount of power backup?**

## Question

## Your response

**CFI question 9: Does the mobile market fail to capture the value or importance of power backup, and if so, why?**

**CFI question 10: Should improvements in power backup be focused on solutions at sites which are identified as higher risk of outages?**

**CFI question 11: Why would any requirement lower than a minimum of 1 hour be sufficient in future? What duration do you consider would be sufficient and why?**

**CFI question 12: 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?**

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Please complete this form in full and return to [resilience.team@ofcom.org.uk](mailto:resilience.team@ofcom.org.uk).

### Additional Supporting Information

**Question 1: Do you consider the measures in the proposed guidance relating to the resilience of the physical infrastructure domains to be appropriate and proportionate?**

Response:

█ has considered the proposed guidance relating to the resilience of physical infrastructure and whether it is appropriate and proportionate. Overall, we have some significant concerns about the proportionality of the proposals given the significant estimated capital expenditure it would take to deliver these. We consider that some solutions are likely to be extremely expensive to deliver and possibly not practicable to implement and maintain. Our view is that this is likely to be significant and disproportionate for all sizes of service provider although larger providers would be expected to have greater resources and customers over which to spread out the work load and costs.

We believe that the suggested guidelines place the responsibility on the telecommunications industry to ensure reliable connectivity, despite the fact that resilience in networks is influenced by factors from various markets and sectors. To ensure that this effort is balanced and effective, it should not be conducted in isolation but rather through a collaborative approach involving all sectors that contribute to Critical National Infrastructure and utility services. Consideration should also be made of the necessity of ensuring total resilience across both the mobile and fixed telecoms networks, especially in a world of increasing convergence. In some areas it may be considerably cheaper and more effective to back up the mobile networks and the fixed networks linking into the mobile network, rather than rendering it uneconomical to deliver fixed broadband services to remote locations due to the higher cost per customer of a network following the proposals as suggested.

In support of enhancing network resilience through a comprehensive, cross-sectoral strategy, the latest Telecare devices, designed for a future beyond copper networks, predominantly rely on mobile networks instead of fixed lines. This shift underscores the critical need for robust mobile network resilience, especially to support the large number of customers in vulnerable situations.

In 4.2.1 the proposed guidance indicates expectations for measures to be put in place to reduce single points of failure across networks by equipping mobile base-stations or cabinets with resilient connectivity to an additional 'parent' site. We understand that a factor to determine the need to do so is expected to be considered through risk-based assessments to determine where greater resilience is deemed to be appropriate. We welcome this assessment rather than a 'one size fits all' approach, however, this still carries concerns for us.

Our understanding is that we are required to implement dual-fed connections throughout our network in specified scenarios. While establishing these new connections might not exactly double the costs due to potential savings from synergies, upgrading current infrastructure is likely to cost nearly as much as the original installation expenses. The projected cost for implementing this at each location is roughly £7000. Given our existing infrastructure, the total estimated cost for our company to achieve the suggested resilience measures is about £140,000.

██████ business model focuses on providing broadband connectivity to areas that are typically hard to reach, often serving smaller communities where the cost per customer is significantly higher than in densely populated regions. Implementing dual-fed connections as required would considerably raise the cost of installations per customer. This could render the provision of full-fibre services to some poorly served areas unsustainable, potentially forcing us to discontinue offering high-speed broadband in these locations. This scenario is likely not unique to us but could affect other companies as well, reducing competition and limiting consumer choices due to the impracticality of installing services in these regions. This shift might divert the industry away from its goal of delivering fast, reliable broadband to rural areas. Adhering to the proposed guidelines could result in disproportionately high costs to maintain the desired level of network resilience. For larger communication providers with bigger customer bases, spreading out these costs might be more manageable and a more sustainable approach to achieving resilience.

The proposed resilience guidelines for street cabinets again present concerns around costs and practicality of implementation and maintenance. The proposed guidance sets expectations of a minimum of 4 hours of power back-up, including at the cabinet level. In addition, the guidance sets out expectations that as the number of customers served by a site increases, then the time period for power back-up is also expected to increase. In the guidance, however, it is unclear how Ofcom have come to the decision that a 4 hour back up is required as there is no evidence to support this requirement which we could see. By reducing the hours required for power back up, this is likely to reduce a proportion of the costs as it may be possible to purchase battery units which fit in existing cabinets.

To ensure a minimum of four hours of backup power throughout our network of cabinets, it will be necessary to install much larger battery backup units (BBUs) than those we currently use. The majority of our existing cabinets cannot accommodate these larger BBUs, implying that a comprehensive overhaul of our cabinet infrastructure is likely needed. With over 300 cabinets containing active components in need of upgrades, this process would entail the replacement of the current cabinets with bigger ones, reinstalling the equipment, and acquiring and fitting larger battery packs. The estimated expense for each cabinet's replacement and installation falls between £10,000 and £12,000, covering the cost of new equipment, batteries, labour for engineering, and

civil works. For [REDACTED], the total estimated cost to upgrade our powered cabinets is approximately £3.5 million.

In addition to the initial capital expenditure required to fulfil this requirement, ongoing operational costs must be considered, including the expense of replacing battery packs once they reach the end of their lifespan. It is expected that the batteries would last for a few years, but over time, they will degrade and eventually be unable to sustain the required four-hour operational period. Consequently, there will be recurring expenses for acquiring and installing new batteries. Additionally there will be a significant engineer resource requirement, for the testing and maintenance of the BBUs across our network, which comes with its own costs.

To support our calculations of the increased costs, please see below for examples of network costs we would expect to have to cover with the introduction of the proposed resilience measures of implementing dual-fed connections and increased battery back-up. In the examples below, we have also shown the potential additional costs of providing a resilient circuit which would increase the costs by an estimated £2K.

Please note that both these sites do not have active cabinets, hence the cabinet upgrade/ UPS costs are not included here. As advised, we would estimate these additional costs between £10-12K. Our calculations below also assume that there would be dual/resilient power supply from BT within the POP.

**Example 1: [REDACTED] (annual costs)**

[REDACTED] revenue from the customer	£11,489
Less, cost of circuits	£5,004
Profit/ Loss	<b>£6,485 (Profit)</b>

With proposed resilience measures

[REDACTED] revenue from the customer	£11,489
Less, cost of tail circuits, plus the cost of backhaul	£8,730
Less, estimate of POP rental and power used	£2,900
Less, total capex spend	£5,462
Profit/ Loss	<b>-£5,603 (Loss)</b>

Less, provision of a resilient circuit	£2,000
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Profit/ Loss	<b>-£7,603 (Loss)</b>
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**Example2: [REDACTED] (annual costs)**

[REDACTED] revenue from the customer	£19,175
Less, cost of circuits	£5,004
Profit/ Loss	<b>£6,485 (Profit)</b>

With proposed resilience measures

[REDACTED] revenue from the customer	£19,175
Less, cost of tail circuits, plus the cost of backhaul	£6,859
Less, estimate of POP rental and power used	£2,900

Less, total capex spend	£13,917
Profit/ Loss	<b>-£4,500 (Loss)</b>
Less, provision of a resilient circuit	£2,000
Profit/ Loss	<b>-£6,500 (Loss)</b>

These 2 examples conclude that with the costs of the additional measures required within the proposed guidance, it would be unlikely [REDACTED] would have chosen to install network at these locations due to the calculated loss to the business. This would be unsustainable and would negatively impact customers as well, as other potential service providers are possibly going to avoid similar hard to reach, rural locations due to the cost implications. Additionally, instead of upgrading our resilience in these locations, these requirements may lead to us pulling out of servicing these areas, as the payback period after carrying out these upgrades would be measured in the decades, or potentially would never be reached.

[REDACTED] appreciates the allowance to exempt legacy equipment, scheduled for replacement within the next five years, from the new requirements until they are upgraded. Implementing these requirements across our cabinet network, as acknowledged, will incur significant costs and impact our operations. A further extended timeline for compliance would help lessen these effects.

Providing detailed feedback on the suggestion to enhance power backup duration beyond four hours as customer numbers grow is challenging without specific benchmarks. The absence of clear thresholds for customer numbers makes the proposal unclear, complicating our ability to respond effectively. Additional details regarding these customer number thresholds would enable us to make a more comprehensive and evidence based evaluation of the proposals.

The proposal outlines the expectation for installing refuellable generators at specific sites. This task presents several potential challenges. First, the allocation of space for these generators must be carefully considered, as not all sites will have sufficient space available. Additionally, each generator's placement will likely require a risk assessment to ensure compliance with Health, Safety, and Environment (HSE) standards. In some cases, it might be concluded that installing a generator is not feasible under existing guidelines. To securely accommodate the generator, constructing a dedicated housing unit might be necessary, potentially requiring planning permission and incurring substantial costs.

We would like to emphasise an additional issue: the guidelines seem to overlook situations where a service provider has implemented adequate measures to secure their network, yet the customer has failed to do the same for their internal networking solution. For instance, a provider might supply the connection up to the boundary of the customer's property, but the customer lacks any backup systems for their premises and internal networking hardware. Consequently, in a power outage, connectivity would be disrupted.

Also, the current guidance may impact the future of the telecoms industry. It is expected in the current climate that there is likely to be some consolidation of service providers across the industry. However, with the proposed guidelines, it would seem likely that this may impact any potential purchases as it would make sense for purchasers to delay any acquisitions until the work is complete to deliver the resilience requirements. This could potentially cause a delay on purchases of up to 5 years given the current proposals.

In summary, after consideration, [REDACTED] concludes that the proposed guidance would not deliver proportionate measures. This can be summarised in the following points:

1. Clarity of risk level trigger points
  - a. To determine expectations of delivery, it would help to have clearer details of trigger points which if met would drive the expected different levels of resilience measures to be implemented e.g. customer numbers.
  - b. This would support consistency of solutions being applied as interpretation of criticality risk assessments would be clearer.
  - c. This could potentially reduce customer impact by region or service provider.
2. Consider solutions for combined mobile and fixed networks alignment
  - a. To deliver a more rounded, proportionate and appropriate solution to resilience, our view would be to consider addressing the requirements across mobile and fixed networks with a converged view, instead of requiring total resilience from both networks independently.
  - b. This has the potential to ensure all technologies are utilised to deliver a robust solution which could mitigate the needs of the highest risk areas across the UK.
  - c. This could also potentially avoid the unfortunate position of excessive resilience measures being applied to some areas whilst others are under resourced.
3. Root cause failures across another sector
  - a. Resilience requirement is expected to cost significant sums of money when the root cause of the failure is due to another sector, i.e. the energy network.
  - b. We would suggest that Ofcom should work closely with Ofgem and the energy sector, developing a joint, cross-sectoral approach.
4. Successfully ensuring resilience is secured where responsibilities are divided
  - a. Circumstances where service providers do not have full responsibilities of network/arrangements in customer premises should be considered. If they are not, power may still be lost if customer owned arrangements are not backed up.