



Ofcom Call for Inputs Mobile RAN Power Back up

Virgin Media O2 response to Ofcom's Call for Inputs into Mobile RAN Power back up

Introduction

Virgin Media O2 ("VMO2") welcomes the opportunity to respond to Ofcom's Call for Inputs ("CFI") into Mobile RAN Power back up, which forms part of Ofcom's Resilience Guidance Consultation ("Consultation").

As Ofcom notes, reliance upon the telecoms sector has grown significantly over the last two decades. The sector facilitates and supports economic growth across practically all sectors of the economy and must continue to invest in the roll out of full fibre and 5G technologies to support that growth, now and into the future. The sheer volume of data transferred across our fixed and mobile networks has grown significantly every year as customers consume and upload larger and larger data files at ever higher speeds.

However, the telecoms sector is facing multiple challenges and economic headwinds. Input costs have risen, particularly energy costs, and the cost of further investment has also increased. Capacity demand has significantly increased year on year, but at the same time the unit price of data paid by customers has reduced consistently. The climate to invest in next generation technology has become tougher (with higher interest rates) and due to high inflation and the cost-of-living crisis, consumers have less disposable income. Combined with robust competition in the UK marketplace, this has placed significant pressure on margins and makes it more difficult to cover increasing costs and pay for investment in next generation networks.

So, on the one hand, market growth has slowed down and customers are reducing their spending on services, while on the other hand, there is significantly more financial pressure on communications service providers (CSPs) due to increased input costs and higher demand for capital expenditure necessary to continually upgrade capacity (on fixed and mobile), roll out new full fibre and 5G networks and improve resilience.

We believe that energy supply is a key dependency of communications services that we cannot eliminate. It is not possible to provide communications services entirely independently of the energy supply industry, and as a communications provider and provider of Critical National Infrastructure (CNI), VMO2 receives no special treatment. All CNI – and our customers' own security of power

supply – is dependent on the electricity supply industry – and even mobile handsets must be charged and will have a limited lifespan in the event of a power cut at a customer’s home.

In the absence of public funding (which has been a model used in some other jurisdictions)¹, improvements to resilience need therefore to be carefully timed, and targeted to where they would have the best outcome for customers.

We believe that regulatory interventions aimed at improving resilience must be appropriate, proportionate, and executed to a clear, fixed and realistic timetable; all stakeholders need certainty and will need an appropriate amount of time in which to plan for and implement any changes, to ensure they can make efficient and effective investment in their networks.

VMO2 Response

We welcome Ofcom’s approach to Mobile RAN back up. We believe that a CFI is the right approach to considering what steps might be appropriate and proportionate, and we welcome the fact that Ofcom has not at this stage proposed specific regulatory requirements in draft Guidance. We agree that the potential costs involved to back up all MNO RAN sites for 1-hour would be very significant and this is a relevant factor in determining what is appropriate and proportionate.

However, we are concerned that Ofcom still appears to be making specific recommendations at this initial stage and is asking for further input based on these specific proposals. We would encourage Ofcom to be broad-minded about this topic and the responses it receives from stakeholders.

As Ofcom acknowledges, this is a ‘complex issue’² and forms part of a wider debate and cross industry challenge. What actions can be taken may lay outside the scope of current regulation, with a combination of solutions required over the coming years.

Ofcom states that it wants to *“start a discussion about what power backup MNOs can and should provide for their networks and services, with a view to implementing this in our guidance in the future, and/or working with industry and Government to identify and pursue other ways to address the issue.”*

We agree with this. However, as noted above, Ofcom appears to have jumped ahead to the solution in both the draft Resilience Guidance and this CFI. For example, we believe the appropriateness of battery backup in Mobile RAN and fixed cabinets should be considered holistically as part of a wider, cross sector discussion of how to address potential consumer harm as a result of power interruptions.

In addition, in relation to Mobile RAN power backup, Ofcom states:

“At a minimum, it is expected that mobile RAN sites should be able to operationally withstand short term power-related incidents”³ and

“In the case of mobile cell sites, in order to meet their duties, MNOs should take at least some measures to mitigate against the risks of power outages and support continued

¹ As highlighted by Ofcom at paragraphs 2.32, 2.34 and 5.17 of the Consultation.

² From Section 1 (Overview), page 4 of the Consultation, and paragraph 5.29 of the CFI

³ Paragraph 5.31 of the CFI

communications services during short term power outages and surges which might reasonably be expected to occur.”⁴

These statements, and the questions forming part of the CFI suggest that Ofcom is still minded to require a minimum of 1-hour battery backup for all cell sites and is asking for input based on this proposal.⁵ We do not agree that this measure is appropriate or proportionate for the reasons articulated below.

We believe that Ofcom should instead take a broader, cross industry/sector approach to power backup based on input to the Consultation and CFI. Initial estimates obtained through information requests to MNOs have confirmed that a minimum of 1-hour battery backup at all Mobile RAN sites will be disproportionately costly and given the limited nature of those cost estimates (which as Ofcom is aware were provided without a full audit of all VMO2 RAN sites to determine what is feasible at those sites), it is possible those costs are an underestimate. No similar exercise was carried out to understand the costs of imposing a minimum of 4-hour battery backup at active street cabinets for the fixed network. We believe, therefore, that a proper, comprehensive Impact Assessment, as required by Section 7 of the Communications Act 2003, must be undertaken, since the assessment set out at A1 of the Consultation is incomplete. This exercise must consider measures to improve the resilience across mobile and fixed infrastructure and must cover the proposals in both the Consultation and the CFI, since some aspects are interdependent.

Comments and Recommendations

Summary

We do not believe a ‘one size fits all’ approach is proportionate, feasible or necessary, based on cost and variations in potential customer harm, particularly given the limited length of power cuts under normal circumstances and the existence of overlapping cell site coverage for the majority of customers.

Instead of imposing a requirement for 1-hour battery backup for all Mobile RAN sites, we believe the solution lies in a more targeted approach. Those measures may not necessarily require additional battery backup to what is already present. For instance, one of the keys to improving customer outcomes is greater co-operation from the energy industry.

We set out our comments and recommendations in more detail below. Many of these comments are similar to the comments we made in response to the Consultation.

- **Issue of power interruption should be considered in the round**

We believe that any debate on power resilience of communications services to customers, needs to consider the role of Distribution Network Operators (DNOs) and both fixed and mobile power backup at the access layer together, rather than assessing and implementing obligations separately.

Secure energy supply is a key dependency of communications services, and the risk cannot entirely be eradicated. All CNI provided by CSPs is dependent in some form on secure power supplies, yet VMO2 receives no preferential treatment from energy suppliers, not even in

⁴ Paragraph 5.49 of the CFI

⁵ 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? [VMO2 emphasis]

relation to core sites. Although there are arrangements for providing increased resilience and redundant power feeds for certain CNI assets this does not benefit the majority of CSPs and it does not benefit our customers in their homes. Even with power backup at every level of a telecoms network (which would be prohibitively expensive), mobile handsets must be charged and will have a limited lifespan if there is no power supply to the home to charge devices.

In a hierarchy of CNI on which all others depend, electricity supply is at the apex. The regulations imposed on the energy supply industry should reflect this, as it clearly should play a vital role in strengthening the energy resilience of all the sectors it serves. There needs to be sufficient government and regulatory focus to ensure that power to CSPs and ideally to consumers is maintained. We need to be able to rely on electricity supply – and in most conditions, we can. The average customer lost minutes in 2022 varied per DNO but was below target for all and showing a reduction over time.⁶

We valued Ofcom’s assistance in facilitating co-operation from Ofgem and energy suppliers through the working group set up in winter 2022.⁷ We believe there should be stronger measures on energy suppliers to modernise and increase resilience of the power distribution network, both to CSPs and to consumers, and ensure their co-operation with other industries. We are encouraged by plans to pilot prioritisation of power restoration to phone masts and would like to see more such initiatives. We need more commitment from DNOs to prioritise restoration of power, particularly to key sites as identified by CSPs. We would welcome Ofcom’s assistance in helping engage DNOs and Ofgem and believe Ofcom can play a critical role in helping to safeguard and improve resilience of power supply and restoration of power to CSPs.

Most customers in the UK have access to, and are indeed customers, of both fixed and mobile operators. What is appropriate and proportionate in terms of fixed and mobile battery backup should be considered holistically and take into account improvements to average customer minutes lost and obligations placed on DNOs. We believe that decisions made by Ofcom regarding what additional power backup is appropriate and proportionate at mobile RAN sites and fixed cabinets should not be taken in isolation from each other.

- **No one size fits all – potential customer harm caused by power interruptions will vary**

The potential harm caused to customers as a result of power outages will vary – there is no one size fits all. Power reliability in normal conditions is high, and in most power interruptions, particularly those that occur in non-rural areas, the duration of power interruption is minimal, and customers will in any event have overlapping coverage from other cell sites. It is hard to see how a general requirement of a minimum of 1-hour Mobile RAN power backup would be appropriate and proportionate in those circumstances. The potential costs of implementing such a solution mean it would provide (at best) marginal benefit to these customers at very significant cost to communications providers.

However, in rural areas with no overlapping coverage, particularly those sites with a history of significant power outages (which may or may not be storm related), the potential impact on customers may be greater. Geographical variation in power outages and whether a site has overlapping coverage should therefore be a factor in determining what measures are appropriate and proportionate at that site.

⁶ RIIO ED1 Network Performance Summary from 2015-16 to 2021-22 (ofgem.gov.uk)

⁷ The working group addressed the risk of possible rota-based power cuts in the winter of 2022/23.

- **We believe there may be scope for targeting some cell sites for enhanced power backup, but the reality is that customer benefit is likely to be marginal when outages are caused by extreme weather events and other solutions will be needed in these cases; the role of energy companies will be critical.**

To improve customer outcomes, the regulatory priority ought to be increasing the resilience of the DNOs, which would reduce the number of power interruptions in normal circumstances and the associated potential impact on consumers.

However, this would not necessarily address potential consumer harm in the event of extreme events such as storms.

We believe that even in extreme weather events, the regulatory priority ought to be how energy companies are incentivised to improve resilience and restore power as soon as possible, particularly to communication provider infrastructure such as mobile RAN sites.

Once energy companies are sufficiently incentivised to improve resilience and restore power as soon as possible to Mobile RAN sites, including in the event of storms, we believe that the next step to address potential consumer harm could be for communications providers to identify and prioritise a subset of cell sites that might require enhanced power backup. We believe this would be relevant to those sites that suffer more (and longer) power related incidents (which may or may not be storm related) in rural areas without overlapping coverage, or where a site is a hub site supporting many other Mobile RAN sites.

However, the practical reality is that battery backup is unlikely to keep communications services operational for the many hours (and sometimes days) of storm-related power outages, and battery backup (either the suggested 1 hour for Mobile RAN sites or 4 hours for active street cabinets in the fixed network) will at best provide marginal benefit to customers in the event of extreme weather events. We need to find other solutions to protect customers in these circumstances. This is why prioritisation of power restoration by DNOs, particularly in areas with longer power outages and no overlapping coverage, is so important.

We are encouraged by trials taking place to prioritise restoration of power to Mobile infrastructure in the event of a power cut. As well as leading to quicker restoration of mobile services, this will enable energy companies to better communicate with customers and give updates by SMS relating to the broader restoration of power in the event of a power cut, so it is beneficial to communications providers, customers and to energy companies.

Despite improvements already in hand under the Ofgem programme, we need more commitment from DNOs to prioritise restoration of power, particularly to key sites as identified by providers. This could include rural sites supporting communities with no overlapping coverage, or hub sites supporting a number of other sites (potential community isolation being the key factor in both). We would welcome Ofcom's assistance in helping engage DNOs and Ofgem and believe Ofcom can play a critical role in helping to safeguard and improve power supply and restoration of power to communications providers.

- **Public v Private Funding is a factor – how to pay for improvements**

The role of DNOs should be factored into any consideration of measures to be taken by communications providers. Once this is done, we need to consider how to address funding of any power backup measures by communications providers. Ofcom cites examples of spending on improved resilience in other industries such as Rail and Water, however, these are funded through increases in customers' bills (Water) and Government funding (Rail)⁸. In the absence of any public funding scheme for battery back-up power, the sector would have to divert funds away from other essential investment including full fibre and 5G rollout. Customers may be unwilling to underpin the significant cost of these investments in a highly competitive market where multiple MNOs are facing below WAAC returns.⁹ Instead, we believe there is merit in considering whether a proportion of revenue raised through annual licence fees (ALF) for spectrum could be applied in some way to improved power backup at Mobile RAN sites. We recommend further consultation with government and industry to consider this approach.

- **Feasibility and cost are relevant factors.**

Any obligation imposed by Ofcom on communications providers should take into account the costs involved in implementing that measure, how long it will take communication providers to implement, the feasibility of taking those measures at particular sites and the potential harm to customers if measures were not implemented (and whether alternative measures might mitigate that potential harm). Some RAN sites may accommodate batteries without additional work, but others may have limited available space or capacity, which would require additional retrofit work such as additional cabinets, roof strengthening, new plinths etc. In those circumstances the cost is likely to be significantly more than £25k per site.¹⁰

Even where sites have some space for additional batteries, there is no one size fits all. Power requirements will vary per site and therefore the batteries necessary to provide the same duration of backup will vary between sites. As Ofcom have noted, there may also be planning and other restrictions on whether (and if so what size) batteries can be installed on any given site. This is also relevant for street cabinets where retrofitting is required under the draft Guidance. Ease of access will vary, and permissions will take time, and may not be forthcoming. These are some of the reasons why we do not believe a 'one size fits all' model requiring 1-hour battery backup at all Mobile RAN sites (or indeed 4-hour battery backup at existing street cabinets) is likely to be proportionate.

- **Time to plan and implement any measure will affect feasibility and costs.**

The length of time a CSP is given to plan and implement a measure will have a significant impact on feasibility and on the operational costs of a measure. Meeting new regulatory requirements is likely to be achieved for lower operational costs if the work necessary can be planned and spread out over time (for instance as part of build work for new sites, or through BAU maintenance work, planned work or planned site visits for existing sites). Although this will not reduce the costs of additional civils works, or obtaining additional permissions, in general, the longer the time period to implement, the lower the operational cost and the easier it is for CSPs to plan and implement. Tight implementation timescales mean implementation will cost more money – and may not be feasible at all within those timescales. There will be many practical issues to address, such as available resource (whether internal or obtainable via third parties), how to retrofit sites (and any associated

⁸ Paragraph 2.32 of the Consultation.

⁹ Weighted Average Cost of Capital.

¹⁰ Paragraph 5.45 of the CFI

planning and landowner consents). For larger estates like VMO2, upgrades to existing sites will take years to complete, and if all CSPs are trying to implement the same changes at the same time, competition for additional resource will increase costs and likely increase the time needed to implement. It is generally easier, quicker and less expensive to implement requirements for new build than it is to retrofit large numbers of existing sites.

- **What exactly is the customer harm to be addressed and how is that best achieved?**

If the regulatory priority is to ensure continued access to emergency services in the event of a power cut, then we believe there is merit in considering a cross MNO approach to power backup at Mobile RAN sites. By design, calls to emergency services will roam across all networks free of charge and by spreading the cost of battery backup to key sites across the footprints of all MNOs the likely cost of targeted battery backup for emergency calls will be reduced.

If the regulatory priority is non-emergency services calls and continued access to data, then this approach is unlikely to be feasible, and the associated costs to all MNOs will be that much greater.

- **We do not believe customers are willing to pay more for additional power backup**

Customer research has identified reliability as important to customers, although unlike speed and price it is not a primary factor in purchase decisions. We have no evidence to suggest customers will pay more for increased reliability/resilience of their mobile service, or specifically for additional power backup, which is only one element of resilience. CSPs have generally taken a more targeted, risk-based approach to minimise the risk to consumers and reduce the impact if that risk materialises. That risk and impact will vary by location and customer – and in the absence of public funding or the ability to charge more for power backup measures, we believe these should continue to be key considerations when determining where to target limited investment to meet the needs of our customers and meet our regulatory obligations.

- **The risks associated with battery backup – notably fire risk and theft risks – ought to be relevant factors in determining what measures are appropriate and proportionate.**

The introduction of a publicly documented mandated minimum battery life in cabinets and cell sites will make these cabinets and cell sites an increasingly well-known and attractive target for theft, as the batteries are valuable and popular for storing solar energy. Thefts and attempted thefts can cause significant damage and cause outages. They are also costly to rectify. Although we are continually striving to improve the security of cell sites, both street cabinets and cell sites have been targets for theft and vandalism in the past. Moreover, increasing security typically comes with significant additional cost. Better security can also sometimes result in greater site damage (and therefore greater risk to customer service).

Batteries also increase the fire risk – and precautions will be necessary which may be costly and impractical to implement at some sites, and simply not possible at others.

- **Mobile networks are not designed as networks of last resort.**

Mobile networks are designed to be resilient but were not designed to be networks of last resort, and the cost of retrofitting the mobile networks at the access layer to make them

networks of last resort, with associated levels of resilience at that layer, will be extremely large. As initial information requests have determined, a minimum of 1-hour battery backup for all sites would: (a) be extremely costly; (b) is unlikely to be necessary, feasible or proportionate across the whole estate; and (c) would not in any event provide power backup for the duration of power outages caused by extreme weather events.

Any minimum or baseline measure such as this, if applied to all sites, will inevitably influence decisions about whether to invest in further or improved coverage. It could render some sites too expensive, and battery backup might simply not be feasible at certain types of sites and rule out their future use if batteries are mandated at all sites.

- **Environmental factors should be relevant to considering what is appropriate and proportionate.**

In considering whether (and if so, what) additional measures ought to be imposed on CSPs, we believe environmental matters and commitments to net zero ought to be a factor.¹¹ Diesel generators, for example, cause CO₂ and noise pollution, and batteries are also not without their own environmental impact, for instance due to mining practices, sustainability of minerals and disposal of toxic components. Lithium is a finite resource and batteries are not an environmentally beneficial solution, particularly at scale. We need to find a balance between appropriate and proportionate power resilience and minimising environmental harm. We believe renewable energy sources may play an increasingly important role over time.

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?

Although it is a helpful start, the framework does not in our view accurately capture all the factors that might be relevant to assessing what is appropriate and proportionate measure for MNOs to take. What is appropriate and proportionate is likely to be fact specific, taking into account many factors which we believe ought to include the seriousness of the risk, the probability of this risk occurring, the impact to customers were the risk to materialise, what measures can be taken to mitigate any impact on customers and other factors such as:

- whether the infrastructure/component is new or part of an existing network (and may therefore need retrofitting);
- the commercial lifespan;
- the cost, feasibility and complexity of implementation of the measure in relation to that site or network (which may be different for new build and retrofit);
- how long it will take to implement; and
- whether alternative layers of resilience have been implemented.

Paragraph 5.39 of the 2022 resilience guidance included factors to consider in assessing single points of failure. We believe these and the considerations set out in our “Comments and Recommendations” section above should all be relevant factors in determining what is appropriate and proportionate.

¹¹ <https://news.virginmediaio2.co.uk/responsible-business/reaching-a-zero-carbon-future/>

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

This would depend on which layer in the network and what is meant by 'short-term'. We agree that MNO's core networks should be able to operationally withstand short term power-related incidents without impacting customer service. The scale is very different at the Mobile RAN site level, and Ofcom's initial information requests, looking at the costs of implementing 1 hour battery backup at all Mobile RAN sites has led Ofcom to state at Section 5.23 *"This high cost means that it is difficult to conclude that it is proportionate to the aim in this case, to include such a measure in our proposed guidance at this stage."*

Cell site equipment is designed to protect against power surges, but adding additional battery backup to substitute for mains power is not proportionate when applied across the whole estate, for the reasons we set out in the section above headed 'Comments and Recommendations'.

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?

We had no comment on this question.

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?

In the absence of a full audit of all VMO2 Mobile RAN sites, it is not possible to determine how many sites it would be feasible to upgrade and maintain, or the time it would take to carry out such work.

Initial estimates of costs (even for those sites it would be feasible to upgrade) are significant, as Ofcom has acknowledged¹² and upgrading even the most straightforward sites will take time.

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?

We do not for the reasons we articulate in this response.

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

We had no comments on this section.

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?

¹² Paragraph 5.23 of the CFI

Efforts to date have been focussed on upgrading power backup at sites which are straightforward to access and retrofit. This exercise does not give us sufficient insight to be able to answer this question.

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

Yes. The economic model in the UK is for low-cost services (compared to other markets) and generally high resilience, and the UK market is very competitive. Customers may be unwilling to underpin the significant cost of these investments in a highly competitive market where multiple MNOs are facing below WAAC returns. The costs of power back up would have to be absorbed by the Mobile operators –which would have an impact on other priorities that enhance the user experience, such as 5G and full fibre rollout. This is discussed in more detail above.

Public and political concern relating to power issues on the mobile network seems to focus on extreme weather events and in these circumstances, 1-hour battery backup would not be sufficient to ensure Mobile services remain available in areas without overlapping coverage for the many days that power cuts can last following events such as Storm Arwen. Battery backup in these circumstances would provide marginal benefit at best and other solutions need to be considered, including the role of DNOs to prioritise restoration of power to Mobile RAN sites.

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

A targeted approach should be considered, particularly rural sites with a higher risk of power interruptions and no overlapping coverage. New build/rebuild sites, particularly those sites which do not have overlapping coverage, could have appropriate battery backup installed at the time of commission. This is a much easier and more cost-effective proposition than retrofit.

However, in the absence of cross-sector co-operation these measures will not make a difference to customers who suffer storm related power outages, given the potential length of those outages. As we state above, it is critical that DNOs prioritise Mobile RAN in the event of power cuts of any kind, including those caused by extreme weather events.

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?

We are unclear why battery back-up of any length is an appropriate or proportionate measure when the majority of customers would not be affected by a power interruption due to overlapping coverage. We set out above our comments and recommendations in relation to power backup of Mobile RAN sites.

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?

In the absence of a full audit, this is not possible to answer, other than to say it will take several years and even then, there will be sites where it is not possible or feasible to upgrade, or which will take longer. The work required to upgrade those sites (even if upgrade is feasible) will vary significantly. We set out in more detail the factors that will influence the time it will take to upgrade sites (if upgrade is feasible) in the section headed “Comments and Recommendations” above.