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DNA OYJ:N LAUSUNTO EDUSKUNNAN LIIKENNE- JA VIESTINTÄVALIOKUNNALLE

DNA Oyj (DNA) kiittää mahdollisuudesta lausua Valtioneuvoston selvityksestä koskien komission valkoista kirjaa digitaalisen infrastruktuurin tarpeista ja lausuu kunnioittaen seuraavaa:

Keskeiset viestit:

- DNA ja Telenor Group tukevat komission valkoisen kirjan tavoitteita
- Erityisesti Euroopan telealan investointikykyä on parannettava
- Sääntelykehyksen uudistamisella voitaisiin tukea paremmin verkkojen rakentamista, teknologista muutosta ja kasvavia kyberturvallisuus- ja resilienssivaatimuksia
- Tärkeä elementti on rajat ylittävän yhteistyön helpottaminen
- Tulevan sääntelyn tulisi olla tasapuolista ja teknologianeutraalia.

Rajat ylittävä yhteistyö: Rajat ylittävä yhteistyö on keskeinen tekijä Euroopan digitaalisen infrastruktuurin kehittämisessä. DNA korostaa, että viranomaisyhteistyötä tulee tiivistää niin eri maiden viranomaisten välillä kuin yksityisen ja julkisen sektorin välillä. Rajat ylittävä yhteistyö mahdollistaa tehokkaamman resurssien käytön ja parantaa verkkojen turvallisuutta ja häiriönsietokykyä. Tällä hetkellä esimerkiksi Telenorin sisällä asiantuntijamme eivät voi jakaa tietoja ja parhaita käytäntöjä turvallisuuden edistämiseksi, sillä pohjoismaiden turvallisuusselvitysvaatimukset poikkeavat niin merkittävästi toisistaan. Sääntelyesteitä rajat ylittävältä yhteistyöltä tulisi purkaa ja sääntelyn tulisi kannustaa yhteistyöhön esimerkiksi Pohjoismaiden välillä, sillä se mahdollistaisi mm. asiantuntijahenkilöstön hyödyntämisen yli rajojen ja parantaisi siten verkkojemme ja palvelujemme laatua ja turvallisuutta. Skaalaetujen puuttumisella on myös merkittävä rooli DNA:n ja Telenorin investointikyvyssä.

Valkoisessa kirjassa esitetty kohdemaaperiaate on aloite oikeaan suuntaan huomioimaan niitä esteitä, joita tällä hetkellä on rajat ylittävälle yhteistyölle. Tämä aloite ei kuitenkaan sellaisenaan ratkaise käytännön ongelmia. Tulisi löytää malli, joka säilyttäisi kilpailuneutraliteetin toimijoiden välillä ja samaan aikaan tukisi tiiviimpää yhteistyötä.

Taajuudet ja markkinasääntely: Suomen tulisi säilyttää edistyksellinen ja erinomainen taajuuspolitiikka. Taajuudet on allokoitu toimijoille nopeasti ja huutokaupat on järjestetty niin, että operaattoreilla säilyisi investointikyky verkkoihin. Jatkossakin tulisi huomioida Suomen suuri kysyntä mobiilitaajuuksille.

Telemarkkinoita säännellään edelleen huomattavan markkinavoiman ennakkosääntelyllä. Kuitumarkkinoiden muuttuessa tämän sääntelyn ajanmukaisuutta tulisi pohtia. DNA:n mukaan

vastauksena ei tulisi olla EU:n laajuinen harmonisoitu minimisääntely, sillä maiden kuitumarkkinat eroavat huomattavasti toisistaan. HMV-sääntelyllä tuskin saavutetaan itse markkinoiden harmonisointia. Jatkossakin tulee pitää huolta siitä, että kilpailulliset markkinat varmistetaan kaikilla alueilla. HMV-sääntelystä luopuminen liian nopeasti voisi luoda erityisesti haja-asutusalueille paikallisia monopoleja.

Johtopäätökset: DNA ja Telenor Group esittävät, että sääntelyä tulee yksinkertaistaa, ja pyrkiä tasapuoliseen ja teknologianeutraaliin malliin. Lisäksi viranomaisyhteistyötä tulee tiivistää. Näillä toimenpiteillä voidaan parantaa Euroopan telealan investointikykyä ja kilpailukykyä sekä edistää digitaalisen infrastruktuurin kehittämistä.

Kunnioittavasti

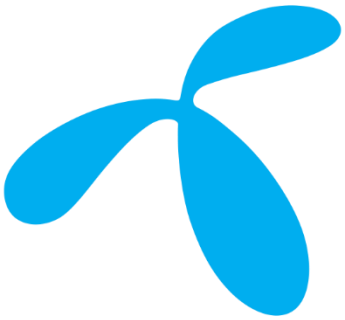
DNA OYJ

Heli Frosterus
Regulatory Manager

LIITE: Telenor Groupin lausunto komissiolle.

Telenor Group Position
on the European Commission's White Paper on Mastering Europe's Digital Infrastructure Needs

27 June 2024



telenor group

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Executive Summary

Telenor welcomes the European Commission's White Paper. We share the analysis of the challenges faced by the European telecom industry in making the investments necessary to meet increasingly complex societal expectations. **A very high-speed, secure and resilient connectivity infrastructure is key for Europe's economic security and competitiveness** in an increasingly volatile geopolitical environment. It **underpins the twin digital and green transition** of European society and industry.

We agree that, looking ahead, **considerable investments are required in Europe, including in the Nordics**, for network upgrades, technology transformation, cybersecurity and resilience enhancements. This requires the **urgent reform of the EU telecom regulatory framework** to improve telecom operators' incentives and ability to invest efficiently and to innovate. Actions at both national and European level are necessary to support these investments.

As a first step, the **policy objectives of the regulatory framework should include environmental sustainability, industrial competitiveness, and economic security**. It should be considered to extend these objectives also **to competition policy** as it applies to the electronic communications sector.

We agree with the White Paper's conclusion that **European telcos need to scale up to improve return on investment**. The introduction of the country-of-origin principle for authorisations could benefit improved cross-border scale, but only if it is coupled with the **removal of barriers set out in national regulation that prevent cross-border integration** and consolidation, along with the harmonisation of substantive regulations across Member States. The **Commission** has an important role in identifying these national barriers and in **encouraging Member States to find common solutions**, in consultation with telecom operators, in areas where the Commission lacks competence.

We call for stronger cooperation between Nordic countries on digital security, resilience, and emergency preparedness. A harmonized approach to security legislation, security clearance processes and the operationalisation of national autonomy requirements at a Nordic scale is necessary to enable cross-border utilisation of best-in-class facilities and expert personnel.

While cross-border scale is important, there could be greater immediate benefits from consolidation in markets with unsustainable market structures. **The Commission should realign its** merger control **practice regarding in-country mobile mergers** to support the Digital Decade targets and industrial competitiveness ambitions. Decisions have been driven almost exclusively by potential post-merger short-term price increases as the key determinant of consumer welfare. This static approach should be reconsidered as it is out of touch **with today's complex societal expectations vis-a-vis mobile networks**.

The EU telecom regulatory framework needs to change to **ensure fairness between telecom operators and other digital service providers of equivalent services**, fostering healthy competition and innovation (level playing field). We support a **horizontal regulatory approach** as opposed to a sector specific one, **to ensure consistent protection of user data** and equitable data usage. We also support the Commission's proposal to establish a binding mechanism that ensures the swift resolution of disputes between ISPs and large content and application providers.

Telenor supports **common deadlines and criteria for spectrum awards** based on socio-economic cost-benefit analysis, **considering** specific **market conditions** and demand in Member States. We support **efficient and flexible spectrum use** while ensuring protection and coexistence with other users. Enhanced coordination and information exchange on spectrum use should be emphasized to address cross-border interference and ensure efficient use of spectrum resources. **EU-level fora should act as complementary tools** to the existing bilateral and multilateral mechanisms dealing with cross-border interference.

Telenor welcomes the **rethinking of the regulatory framework for access** that focuses on addressing the remaining challenges in an agile and proportionate manner. **Increased focus should be given to creating the right deployment incentives for very high-capacity networks.** At the same time, a **safety net regulation** should focus on areas in which neither the duplication of networks is feasible in the long term, nor do commercial or other arrangements enable the provision of competitive services to end-users. We **do not support the introduction of an EU-wide wholesale access product** as proposed in the White Paper as it lacks clear definition, does not target market failure and fails to address investment incentives. European products should be created on a voluntary and commercial basis rather than through regulation.

The **transition from copper to fibre should be incentivised** and facilitated, but its **timing should remain at the** technical and commercial **discretion of the network operator**. The key to an economically sustainable and pro-competitive switchover is a well prepared and streamlined procedure by national regulators. **2G/3G mobile network switch-off** is well underway in Europe and should **remain within the remits of** operators' **commercial decisions**. To facilitate this, the **Commission should revise the eCall Regulation** and introduce a technology neutral and future proof solution for emergency communications from vehicles.

We welcome the **inclusion of environmental sustainability as a core policy objective** of the sector-specific regulatory framework. The Commission should build on the actions already taken by the European telecom industry when developing transparency measures on the environmental footprint of the sector. We expect the greatest positive impact in terms of emissions reductions from the sunset of energy-inefficient legacy technologies, in-market consolidation, increased use of passive and active network sharing and data optimisation especially of video streaming on mobile devices. The need to **adapt networks to withstand extreme weather events and climate change** is an important element of the investment challenge.

Telenor **welcomes** EU funding mechanisms and **actions to enhance the security** and maintenance **of submarine cables**. In our view, if a new EU governance model is introduced to improve security and efficiency, it should **avoid imposing unnecessary regulatory hurdles**.

We **support** the White Paper's vision to **create the "Connected Collaborative Computing" (3C) Network**, driven by the anticipated convergence of connectivity, compute, cloud, AI, IoT and enabled by 5G and beyond connectivity technologies. Beyond technology, the EU R&I strategy should put **strong focus on service innovation and ecosystem development**, including ambitious roadmaps for open and general access to advanced services. **Public-private partnerships should be leveraged** to further develop and coordinate funding for the vision of the 3C Network.

1. Introduction

Telenor welcomes the European Commission's White Paper on mastering Europe's digital infrastructure needs. In this position paper we summarize Telenor's views regarding the problem statement laid out in the White Paper and the necessary changes to the industrial and regulatory policy framework applied to the telecom sector. Our position follows the structure of the White Paper

We strongly agree with the White Paper's recognition that a world-class, secure and resilient European connectivity infrastructure and the related technology and service ecosystem are critical for Europe's economic security. The importance of high-speed digital networks for the competitiveness of the European economy has been widely recognized, as well as the enabling potential of digital solutions for the green transition.[1]

Moreover, secure and resilient digital networks are foundational for national and European security. Commercial telecom networks serve as critical infrastructure, used by citizens, businesses and the public sector for basic societal functions. They are also used for military and civil defence purposes and need to perform well during peace, crisis and war.
We share the White Paper's analysis of the challenges faced by the European telecom industry and the impact this has on operators' ability to make the investments necessary to meet the increasingly complex and demanding societal expectations of the future.

While in general the Nordic countries where Telenor operates performed well compared to the European average according to the Commission's State of the Digital Decade report in 2023, progress on 5G rollout is uneven in the Nordic region. Given that Sweden, Norway and Finland are among the largest countries in Europe by territory, coupled with the lowest population density, the economics of building and operating networks mobile networks profitably is especially challenging in these countries.

The investment challenge is very considerable. A 2023 study[2] commissioned by the European Commission highlights the substantial investment needs for the Nordic countries to meet digital connectivity targets. For example, Finland requires approximately €2.2 billion for Fiber to the Home (**FTTH**) coverage goals and an additional €3.0 billion for 5G upgrades. Sweden faces similar challenges, with €2.5 billion needed for FTTH and €4.2 billion for 5G expansion. Denmark requires significant investment as well, estimated at €0.4 billion for FTTH and €0.5 billion for 5G densification. Norway was not part of the study, but according to conservative estimates, even reaching a modest "100Mbit/s to all" target will require €1 billion in public subsidy.

Innovative 5G use cases in the B2B segment have yet to materialize at scale in the Nordics. On the one hand, this delay slows down investment in 5G stand-alone (**SA**) networks and edge cloud technologies. On the other hand, it reflects an ecosystem challenge where enterprises are slow to utilize and invest in the new capabilities that 5G and edge cloud technologies bring, and operators are hesitant to explore new technologies. Consequently, business cases lack sufficient confidence for both enterprises and operators. As noted in the first analysis of the

[1] Telenor and Carbon Trust joint report "Unlocking Green Opportunities: ICT's Role in Nordic Climate Action": https://iot.telenor.com/wp-content/uploads/2024/05/Telenor-IoT-Climate-Enablement-Report_2024_Summary.pdf
[2] https://digital-strategy.ec.europa.eu/en/library/investment-and-funding-needs-digital-decade-connectivity-targets

Nordic-Baltic 5G Monitoring Tool project launched by Nordic Council of Ministers, the true potential of 5G for innovation and competitiveness in the Nordics is yet to be realized.[3]

Hence, looking to 2030 and beyond, it is clear that significant investments will be necessary in several areas: network upgrades, including 5G SA networks, densification and 6G; technology transformation and innovation such as migration to software and cloud-based solutions, AI, edge cloud, Network as a Service (**NaaS**). In addition, in an increasingly adversarial geopolitical environment, sizeable investments will be needed to enhance the cybersecurity and resilience of networks, reflecting their role as critical infrastructure and the foundation of our digitized societies. Altogether this represents an unprecedented investment challenge.

Therefore, we support the Commission's action to urgently initiate the changes necessary to the European industrial and regulatory policy framework, as we discuss below, to significantly improve telecom operators' ability to invest and to do so efficiently. In our view, this must be coupled with similar reflections and actions at national level concerning national regulations applicable to electronic communications services and the potential for demand-side measures (e.g. public procurement that emphasizes 5G capabilities and Public-Private Partnerships (**PPP**) pilot projects to demonstrate the practical benefits of 5G.)

Hence, the investment challenge needs to be addressed at both European and national level to foster a robust and inclusive digital infrastructure for all Europeans.

2. Pillar 1: Connected Collaborative Computing

In Pillar 1, the White Paper introduces a vision of Creating the 3C - "Connected Collaborative Computing" - Network. This vision emphasizes efficient use of resources, establishment of a coordinated approach to the development of integrated connectivity and computing infrastructures and transforming today's connectivity providers into providers of collaborative connectivity and computing, capable of orchestrating the different computing elements that this ecosystem requires. The ambition is to deliver on the vast expectations of a variety of end customers, their sectors and stakeholders. The expectations result from visionary use cases and innovation in technology components and solutions that enable advanced applications and business transformations, improving the lives of citizens and addressing sustainability and societal challenges.

Telenor supports this vision, driven by the anticipated convergence across connectivity, compute, cloud, AI, and IoT, enabled by 5G and beyond connectivity technologies, solutions and advancements in compute, cloud, and virtualization technologies. In the midst of this vision, the risks and challenges facing the European industry are emphasized. We also observe the heavy focus on technology research, development and innovation while the ecosystem, new service concepts, and innovation system thinking receive less or little attention. There is a gap between the technology push and the anticipated market pull. These aspects require much stronger collective attention, with support from R&I activities and funding.

[3] This is confirmed by the first analytic report from the "Nordic-Baltic 5G Monitoring Tool" project: https://www.norden.org/en/publication/role-5g-transition-digital-and-green-economy-nordic-and-baltic-countries-analytic

While developing the above ambitions, the inherent properties of telecommunications should be recognized and acknowledged. The telecom industry relies on interconnected and interoperable networks and services rather than single stakeholder service platforms as characterized by proprietary hyperscaler platforms. Further, the telecommunication services industry relies on standards development and an open multi-stakeholder service provisioning ecosystem. The challenges in developing and evolving telecom ecosystems, in terms of collaboration, coordination, and creating incentive-compatible business models, must be addressed. These perspectives must be considered and aligned with the targets of developing end-to-end value chains and strengthening European supplier industries.

Telenor believes there are significant untapped opportunities aligned with the 3CN vision. To fully realize these opportunities, it is essential to emphasize service innovation, innovation system thinking and ecosystem development. This approach requires the development of ambitious roadmaps for open and general access to advanced services. These services range from advanced specialized connectivity services across public and private network domains, smart multi-level/multi-service internetworking, to a variety of specialized application services, supported and enabled by compute, cloud, AI, and IoT technologies and service enablers. However, as described in more detail in Section 2.3, we see challenges and stumbling blocks in the current Open Internet Regulation that hinder such service innovation. This is problematic not only for telecom providers, but even more so for SMEs that can benefit from and create new innovations based the above-mentioned service concepts.

Telenor also welcomes the proposal to leverage the Smart Networks and Services Joint Undertaking (**SNS JU**) and have this PPP further develop the vision, objectives, societal targets, Work Programmes and coordination of the funding instruments. Industry priorities should be given stronger weight and we encourage inviting the industry to take active part in these developments and collaboration. Moreover, we expect the 6G-SNS-IA to provide important input and direction to this process, including the necessary tools and instruments. We believe this will help mobilize stronger industry commitments.

Large Scale Trials and pilots are highlighted in the White Paper as a possible and important tool. While these are important as proof of technology-oriented concepts, Telenor proposes to develop instruments for such experimental capabilities and capacities at an even larger scale, for a more forceful Pan-European Experimental Platform (**PEEP**). This will require an evolved approach for support, even indirectly, financial instruments that drive an open PEEP for service innovation and technology evolution within a multi-stakeholder service provisioning ecosystem. This will boost service and business model innovation across Europe and should leverage and enable synergies with instruments such as the Digital Europe Programme, the Connecting Europe Facility, European Digital Innovation Hubs, and Important Projects of Common European Interest (**IPCEI**).

Overall, the vision of the “3C Network” is ambitious and has the potential to drive significant advancements in connectivity and computing. However, there is a need to address several critical areas more thoroughly, including a balanced focus on ecosystem and service innovation, industry collaboration, and regulatory adjustments to support service innovation. By addressing these points, the vision can be more realistically achieved, benefiting not only the telecom industry but also the broader European economy and society.

3. Pillar 2: Completing the Digital Single Market

3.1. The policy objectives of the EU regulatory framework

The public consultation launched by the White Paper provides an opportunity to consider how the geopolitical and market developments since the adoption of the European Electronic Communications Code (**EECC**) as well as the changing societal needs for connectivity should be reflected in the policy objectives of EU the regulatory framework to ensure that they are relevant for this decade and beyond.

First, the pandemic has demonstrated the extent to which citizens, businesses and governments are dependent on digital solutions, which all require ubiquitous high-speed connectivity. Commercial telecom networks serve as critical infrastructure providing the digital foundation for basic societal functions.

Second, the return of great power rivalry and the war in Ukraine have fundamentally transformed Europe's security threat picture. The capabilities of antagonistic actors, including state-sanctioned hacker groups have increased significantly. As digital tools are crucial for basic societal functions, network operators are making significant investments into the cybersecurity of networks and services. In addition, de-risking in the digital space due to geopolitical shifts leads to limited technology and vendor choices. This has significant cost implications for telecom operators and increases the risk of fragmentation of technology standards.

Third, the fight against climate change requires significant investments into energy efficiency and upgrading the resilience of networks against extreme weather events, as described in more detail in Section 3.9. In turn, this will enable all sectors of the economy and society to reduce their carbon emissions through digital solutions on top of an emission free connectivity infrastructure.

In summary, while in the past decade coverage and ever lower consumer prices of connectivity were the main policy priorities, today's expectations are much more complex: societies need not only ubiquitous, very high-speed connectivity at an affordable price but also green, secure and resilient networks with very high availability. This requires changes to the regulatory paradigm to ensure that European telecom operators are incentivized to deliver the networks that fulfil our societies' needs and that investments can be made efficiently.

Telenor therefore supports the Commission's proposal to broaden the list of policy objectives underpinning the regulatory framework with environmental sustainability, industrial competitiveness and economic security. It should be considered to extend those policy objectives to competition policy as well, in its application to the electronic communications sector.
In addition to broadening the policy objectives, it is important to recognize the implications of established policy objectives such as the promotion of investments and the completion of the single market for the security and resilience of networks. Reinforcing the investment and single market objectives has important implications for operators' ability to invest in the security and resilience of networks and to do so efficiently.

3.2. Market structure

The White Paper correctly identifies the low returns on investment made by European telecom operators as a key obstacle to increasing their capacity to invest and innovate. This is a key factor for investors when assessing the attractiveness of European telecom businesses, as evidenced by their input to the European Commission during the investor roundtable.

The White Paper suggests that creating scale across borders by establishing a single market for electronic communications networks and services could solve the investment challenges. However, Telenor's experience, built through consecutive rounds of cross-border acquisitions over the past 20 years (Denmark, Sweden, Finland) suggests that these cross-border scale effects are insufficient to improve returns and address the investment challenge. Nevertheless, we strongly support the Commission's objective to remove the obstacles preventing cross-border synergies. Achieving this would have a positive impact on multi-market operators like Telenor aiming to integrate their operations – see more on this in Section 3.3 – and enable the realisation of synergies from cross-border acquisitions. To adequately address the investment challenge, changes in market structure may be required through in-market consolidation.

Major synergies are created in-market, through optimizing market structure and maximising the use of assets such as networks, retail distribution and spectrum. Market consolidation leading to fewer operators can enhance efficiency and investment capacity. This means creating a more sustainable competitive environment where operators can invest more in quality of service and innovation. Studies by the GSMA[4] concluded that in the 4G era show that European markets with three mobile network operators delivered higher investments and better quality of service for customers than markets with more players. While this is partly explained by more efficient use of scarce resources, the study shows evidence that more concentrated markets yield greater investment per operator.

With the advent of 6G in 4-5 years and the constant traffic growth in mobile networks, operators' ability to cope will largely depend on having timely access to larger blocks of contiguous spectrum in all relevant bands. Without this, increasing network capacity will necessitate building more base stations, which is costly and would increase operators' environmental footprint.

Increased requirements regarding the resilience of mobile networks (i.e. ensuring very high availability, redundancy, battery back-up at base stations, etc.) also supports optimising the number of networks to recoup these investments. Having more networks does not increase resilience, as operators often rely on the same power sources and are impacted in the same way by external events such as power outages, extreme weather events or attacks.

We do not think that a one-size-fits-all approach is appropriate. Each market needs to be assessed on its own, applying the EU competition framework. Telenor has about 10 million mobile subscriptions in the four Nordic markets. Our mobile operations serve approximately 2.6 million customers in Norway, 3 million in Sweden, 2.6 million in Finland and 1.7 million in

[4] "Competition dynamics in mobile markets: An assessment of the effects on network investment and quality in Europe" Report (2022), https://www.gsma.com/solutions-and-impact/connectivity-for-good/public-policy/wp-content/uploads/2022/11/Competition-Dynamics-in-Mobile-Markets.pdf, and the GSMA "Mobile market structure and performance in Europe: Lessons from the 4G era" Report (2020), https://www.gsma.com/solutions-and-impact/connectivity-for-good/public-policy/wp-content/uploads/2020/01/GSMA-Mobile-Market-Structure-and-Performance-in-Europe_February20.pdf.

Denmark. In these countries, we find different market structures which are reflected in sizeable differences between the ARPU levels of Norway and Finland compared to Sweden and Denmark[5], with obvious impacts on the investment capacity of operators. The goal should be to arrive at market structures that are competitive while also incentivize the necessary investments to meet the above-described societal expectations vis-à-vis the connectivity infrastructure, including lower GHG emissions and reduced environmental footprint.

While the White Paper does not discuss EU competition policy, the debate on how to meet Europe's digital infrastructure needs requires a holistic perspective and should reflect on whether the Commission's merger control practice supports the Digital Decade ambitions agreed on by Member States. In our view, this is currently lacking. Over the past ten years, the Commission's approach to in-market, typically 4 to 3, mergers has aimed at maintaining the number of network players. Decisions have been driven almost exclusively by potential post-merger short-term price increases as the key determinant of consumer welfare. This static approach should be reconsidered as it is out of touch with today's complex societal expectations vis-a-vis mobile networks. A narrow focus on consumer prices does not ensure a proper balancing of other key parameters such as quality of service, innovation, future investment levels, as well as sustainability, security and resilience. Comparisons of "before and after" prices should account for the fact that prices under artificial competition can be unsustainable in the long run. In addition, the Commission should consider the competitive effects of in-country mergers over a longer period to capture their anticipated positive impact on e.g. investments that may not materialize in the short term.[6]

In summary, the Commission should take into account in its assessment the wide range of customer benefits stemming from increased investments. It should also consider benefits from increased business productivity and innovation potential which will support the overarching European political priorities such as improving competitiveness and economic security.

3.3. Convergence & level playing field

3.3.1. General observations

Telenor agrees with the White Paper's description of a rapidly converging and complex digital ecosystem that requires a new take on regulation for the sector. The relationship between different players and how these can be orchestrated is vital for ensuring well-functioning and efficient digital solutions. However, experience has shown that strict and detailed regulation of complex structures can be challenging to implement effectively. Therefore, alternatives to regulation must first be considered.

Standardization and EU harmonized and simplified security requirements, e.g. through standardization, should be applicable to all components of converged digital services. The supply chain of digital services is best governed by commercial agreements. Regulation in this area could stipulate minimum requirements for such agreements, to ensure that critical issues

[5] Average Revenue Per User in the Nordic markets: https://www.regjeringen.no/contentassets/2f8fabb35ccb4877a4d3ad94cd7a36d3/analysis-of-norwegian-mobile-revenue-data-usage-and-pricing-by-tefficient-for-kdd-26-sep-2023.pdf

[6] See more on this in "Efficiencies in telecommunication network cooperations and mergers" by the Brattle Group: https://etno.eu/library/reports/109-expert-study-by-brattle-group-on-efficiencies-in-telecommunication-network-cooperations-and-mergers.html

such as security, integrity and interoperability are adequately addressed in the negotiations between the relevant contributors.

To meet the increasing investment needs for the EU's connectivity industry, strong incentives for innovation and investments are essential. Harmonized regulation, if done correctly, can support such incentives, which includes ensuring a level playing field between relevant players and enhancing possibilities for economies of scale. Cross-border integration is currently hindered by fragmented regulation. For instance, national security concerns lead to closed borders preventing cross-border entities from taking advantage of efficiencies which reduce incentives for cross-border consolidation or integration. In-market consolidation and network cooperation (such as RAN sharing) are sometimes the only way to find scale and should be encouraged rather than restricted. There are no substantial benefits from cross-border consolidation without room for effective cross-border cooperation.

3.3.2. Ensuring competition neutrality in a converging market

To facilitate enhanced convergence and create a level playing field between telecom operators and other players in the value chain such as cloud providers, CDNs, submarine cables operators etc., we ask for regulatory changes designed to ensure fairness in the way digital networks and services are regulated. These changes should address issues such as network usage and market competition. Such regulatory adjustments are essential to foster an equitable environment that supports healthy competition and innovation across the sector.

Generally, we support deregulation of outdated sector-specific rules that hinder innovation and competitiveness, such as the overly restrictive rules on the use of traffic data in the ePrivacy Directive and the 2017 ePrivacy Regulation proposal. We also support the idea of a regulatory framework that applies to all providers of digital networks in a technology neutral manner, emphasizing that a thorough economic impact assessment is essential in order to create equal opportunities to innovate and to support the growth of European services and applications. Such measures will help ensure that new regulations do not disproportionately burden traditional telecom operators while holding newer digital service providers to the same standards. Thus, we support harmonizing regulations across different network segments to reduce complexity and allow for more efficient network management and investments. All in all, these steps will foster a more dynamic and innovative market environment.

In general, we support a regulatory approach that favours horizontal regulation as opposed to sector specific regulations as exemplified by the NIS2 Directive. The ePrivacy Directive is a good example of an outdated regulation that maintains an unlevel playing field by only applying to telecom operators. The application of horizontal regulations is crucial to ensure that user data is protected consistently across the board and enable equitable data usage. This would prevent scenarios where different standards apply to telecoms and digital service providers, creating a regulatory imbalance.

3.3.3. Dispute resolution between ISPs and large CAPs

We support the Commission's proposal to introduce policy measures that ensure the swift resolution of disputes between ISPs and large content and application providers (CAPs) by an independent dispute resolution body in case the parties are not able to reach a commercial agreement on IP interconnection within a reasonable period. Such a binding dispute resolution mechanism would help restore balanced bargaining power between the parties and ensure that negotiations do not result in stalemates that could negatively affect service quality.

Facilitating fair and reasonable commercial arrangements through dispute resolution would incentivize CAPs to use network resources efficiently. In our view, consideration should be given to requiring large content providers to disclose the load their data services impose on networks. This information should be made available to both regulators and the general public. Such increased transparency would help highlight the actual impact of data rich services on networks, leading to more informed policy decisions.

3.3.4. Rules on Traffic Management and Specialised Services

We request clear guidance from the Commission regarding existing rules on data traffic management. This guidance is essential to maintain network integrity and quality of service, ensuring increased security and fair access to network resources.

We believe it is also timely to provide more clarity on the interpretation and application of the Open Internet Regulation regarding new use cases requiring specific network configurations different from best effort, such as those possible through 5G network slicing. Legal certainty is essential to unleash the full innovative potential of 5G/6G connectivity (e.g. NaaS, Open Gateway) which will provide significant benefits to consumers and businesses.

3.4. Addressing barriers to cross-border scale

The White Paper rightly acknowledges that in achieving cross-border scale, telecom operators are currently constrained not only by the fragmentation of national rules that implement the EU telecom regulatory framework, but also by additional national regulations. These regulations, often motivated by public and national security concerns, prohibit telcos from implementing shared or uniform systems and functions or using personnel across borders. They not only increase operators' costs, but also prevent them from building best-in-class secure networks. Imposing restrictions on cross-border operations eliminates the possibility to create geographically distributed redundancies such as storing data in several data centres located in different countries and enabling networks to be run from a neighbouring country. It also hampers the use of scarce, highly qualified security personnel and state of the art facilities like security operations centres across borders. This makes it difficult in practice for Telenor – and others – to build, deploy and operate networks across borders, increase robustness, implement best practices and capture financial synergies.

In our experience, regulations of the latter kind, which may be set out in national regulations applicable to critical infrastructure or in spectrum licenses, constitute the primary barriers to achieving the desired cross-border synergies. This applies in the context of integration efforts of operators that are currently present in several Member States, as well as in prospective cross-border acquisition scenarios and its impact is hindering any cross-border efficiencies operators may wish to take advantage of.

The Commission's proposal to introduce the country-of-origin principle (**CoO**) to authorisations as per the Code, including all conditions that may be attached to national authorisations, is a welcome attempt to eliminate hurdles.

We invite the Commission to consider the following aspects in order to improve this concept:

1. Telecom operators aim to develop more efficient technology and IT architecture through sharing network functions and systems by their business units present in different Member States. This extends beyond a cloud native core network. Any network or IT system should be able to benefit from this.

2. The possible introduction of the CoO principle cannot be done without further significant harmonisation of substantive sector specific regulations. Otherwise, the CoO principle may lead to competitive distortions, depending on the level of regulatory burden in the country of establishment.
3. The CoO is an imperfect solution if cross-border barriers stemming from national regulatory restrictions based on public and/or national security grounds are not addressed at the same time. We understand that the EC will not have the legal basis to intervene in many of these matters. It will be the responsibility of Member States to recognise and address these restrictions, without which the EU telecom single market cannot be achieved. However, we believe that the Commission could have an important role in identifying, acknowledging, and raising these issues in discussions with Members States in various fora.
4. Actors that may benefit from the CoO, depending on how terms like "core network" or "provider of core network services" are defined, may be subject to an uneven regulatory framework at national level. As a result, the CoO may confer benefits on certain actors not subject to restrictive national security rules, while preventing others from taking advantage of these, thereby creating competitive distortions.

We also acknowledge some of the benefits that the CoO principle could have for IoT deployments based on permanent roaming. These are pan-European services that would benefit from one set of requirements as intended by applying the CoO principle. This is particularly relevant in the automotive segment, where rules on in-car internet services are applied differently across Europe, creating challenges for car manufacturers wishing to distribute vehicles across the continent. However, IoT is a global business and any intervention in the European context should be carefully considered to avoid creating disadvantages for European operators compared to those outside Europe, while also taking also into account the other considerations raised above.

In conclusion, while the introduction of the country-of-origin principle is a welcome suggestion to further the thinking on how to achieve the EU telecom single market, there are other restrictions that need tackling that are mainly in the remit of Member States. These need to be addressed simultaneously with a significant harmonisation of substantive rules both geographically and in respect of all actors subject to the new framework. Without these additional steps, the introduction of CoO in the telecom framework, if the scope is extended to a broader set of actors, could cause further competitive distortions in the value chain.

3.4.1. Common security conditions

The Commission rightly acknowledges the barriers to cross-border scale in areas such as incident reporting, security vetting, lawful interception and data retention regimes, privacy and reshoring requirements and cybersecurity obligations. We understand that these are also areas where the competence in many cases lies with the Member States.

We welcome the Commission's proposal to facilitate close cooperation between Member States to address these issues. We believe the Commission could play a role in identifying these barriers for Member States and encouraging them to find common solutions. We would also welcome the establishment of a public-private forum for critical digital infrastructure operators, the Commission and relevant Member State authorities to tackle the obstacles related to cross-border operations. Many of these areas require close cooperation between multiple stakeholders not only between but also within the Member States. The Commission

could play a key role in identifying the primary barriers and identifying existing or creating new fora to facilitate these discussions with the participation of industry.

When considering actions in this domain, such as the Commission's proposal for common security conditions for operators of cross-border core networks, due account should be taken of already adopted new EU regulations, e.g. the NIS2 Directive. Possible solutions should make use of the existing rules. When considering common security requirements, it is vital that they maintain competitive conditions and opportunities for companies, considering that not all actors are facing the same conditions as telecoms operators.
We would welcome the Commission's efforts to further streamline and harmonize regulation, where possible, and to promote a harmonised implementation of already adopted legislation (e.g. NIS2 Directive) in order to prevent the creation of further barriers.

In addition to EU level action, Member States have an important role in revising national regulations that create barriers to building scale across borders. Telenor supports further strengthening Nordic cooperation between public authorities and private enterprises in the digital domain, especially on security, resilience and emergency preparedness. A harmonised approach to security legislation and security clearance processes and the operationalisation of national autonomy requirements on a Nordic scale would enable cross-border utilisation of best-in-class facilities and expert personnel and thereby create improved conditions for effective and robust total defence.[7]

3.5. Radio spectrum

We support the main objectives of the White Paper on spectrum management, namely, to streamline spectrum assignment procedures, to promote timely availability of spectrum, to facilitate efficient and flexible spectrum use, and to address cross-border interference issues. We also agree with most of the proposed actions to achieve these objectives, such as setting common deadlines and criteria for spectrum awards and information exchange on cross-border issues. However, we would like to highlight some points that we believe are crucial to ensure the effectiveness and added value of the proposed measures.

Firstly, streamlining spectrum assignment procedures. We welcome the idea of setting common deadlines and criteria for spectrum awards, but we stress that these should be based on a thorough socio-economic cost-benefit analysis (**CBA**) that considers the specific market conditions and demand in each Member State. The CBA should also evaluate the trade-offs between different award objectives, such as ensuring efficient spectrum use and promoting competition. Awards should not be aimed at generating revenues for the state. We urge the Commission to provide clear, consistent guidance and support on the application of CBA in both national award processes and EU decisions concerning the allocation of new bands (e.g. upper 6 GHz, 3.8-4.2 GHz, lower UHF).

Secondly, on promoting timely availability of spectrum. We agree that spectrum should be made available as soon as possible to meet the growing demand for mobile services and to support the rollout of new technologies. However, we caution against setting rigid and arbitrary deadlines that do not reflect the actual needs and readiness of the market. We also emphasize the importance of ensuring adequate protection and coexistence of mobile services

[7] For more detailed policy recommendations see Chapter 7 of Telenor's Digital Security Report: https://www.telenor.com/about/our-companies/nordics/digitalsecurity/2023/

with other users of spectrum, especially in shared bands. We call for a balanced and evidence-based approach to spectrum sharing that recognizes the benefits and challenges of different sharing models and ensures a level playing field among spectrum users.

Thirdly, facilitating efficient and flexible spectrum use. We support the principle of technological and service neutrality, which allows mobile operators to choose the most suitable technology and service for their customers and adapt to changing market conditions. However, we note that this principle may not always be applicable or desirable in certain bands, where specific technical or regulatory constraints may limit the choice of technology or service. We therefore recommend a case-by-case assessment of the feasibility and appropriateness of applying technological and service neutrality in each band, based on a CBA and stakeholder consultation to ensure informed and balanced decisions.

Lastly, addressing cross-border interference issues. We acknowledge the need to enhance coordination and information exchange on cross-border issues, especially in light of the increasing demand and diversity of spectrum use in neighbouring countries. We recognize the value and effectiveness of the existing bilateral and multilateral mechanisms to deal with these issues, which take into account the specific band, geography, radio service, and demand at each border. We therefore suggest that the existing EU-level fora should act as complementary and supportive tools, rather than a substitute or an override, for the current coordination processes.

3.6. Market regulation

3.6.1. A safety net approach for fibre access regulation

The White Paper acknowledges that the regulatory approach to telecom operators requires rethinking. Technological developments and market realities have significantly evolved: Copper-based state network and service monopolies that the pro-competitive access regime was originally designed to address have been replaced by competing networks and offerings of competitive connectivity services. While some areas in Europe now experience competition both between service providers and different overlapping networks, in other areas there is still a lack of competition between networks.

Therefore, Telenor welcomes a process where policymakers find proper solutions for a regulatory framework for access that focus on addressing the remaining challenges in an agile and proportionate manner.

There are interdependencies between preventing bottlenecks, safeguarding competition and enabling investment and technological rollout and preserving qualitative, secure and resilient networks. In order to meet the 2030 EU connectivity targets, an increased focus should be given to creating the right deployment incentives for Very High Capacity Networks (**VHCN**s), which subsequently also enables a higher service quality for end-users.

Regarding the prevention of new bottlenecks, it is necessary to clearly define what constitutes a bottleneck in the current context. A safety net regulation should focus on areas where neither the duplication of networks is feasible in the long term, nor is the provision of competitive services to end-users enabled by commercial or other arrangements.

We support the view that a vicinity with at least two overlapping fixed broadband networks (homes passed) cannot be regarded as a bottleneck area. The application of this criterion

should be recommended to NRAs. In areas identified with non-replicable bottlenecks (less than two overlapping and competing networks) a modified 3-criteria test can be relevant, and geographical analysis becomes pivotal to focus residual regulation on the persistent bottleneck.

3.6.2. EU-wide wholesale access product

The European wholesale access product proposed in the White Paper as a possible safety net against the removal of relevant markets creates many uncertainties regarding its specific nature and objective. First, the concept lacks a clear definition that adequately describes the product and explains its implications and reach. Second, it does not target market failure and fails to address investment incentives for operators. Third, we are critical to artificial products created through regulation. European products should be created on voluntary and commercial basis.

Further, such a pan-European product might lead to imbalances between countries and markets. This is because it would facilitate foreign (non-EU) players that do not invest in networks, to compete more easily in the national markets across EU. In addition, different levels of fibre rollout and varying VHCN architectures, technologies and technical conditions across the EU will very likely increase complexity in defining the reach and specifications of the wholesale product, which in turn would delay investment decisions.

3.7. Network modernisation: copper and 2G/3G switch-off

Migration from legacy technologies are commercial decisions that need policy support, not regulatory “red tape”.

As regards copper switch-off, we agree with the Commission that the migration to gigabit-speed capable technologies is desirable for a multitude of reasons. We are convinced that this transition should be incentivised, supported and facilitated, but not enforced via a binding date. The timing and process needs to remain entirely at the technical and commercial discretion of the network’s operator/owner.

The credible path towards economically sustainable and pro-competitive switchover from copper to fibre lies in well prepared and streamlined procedures by NRAs. These should not make the switch-off burdensome and bureaucratic, which could hinder operators’ willingness to migrate (including preserving copper-based wholesale offers). Simple, effective and streamlined rules for network rollout and access to existing passive infrastructure are also critical and have not until now been adequately addressed through legislation.

Without well advanced FTTH coverage of the national territory, setting a target date for the migration would not be helpful for operators or end users as the state of switch-off and FTTH coverage varies immensely across EU Member States. Accordingly, we are of the opinion that setting a date for the definitive shutdown of copper networks in Europe would send the wrong signal to investors and possibly have an adverse effect, as such a measure would not favour operators’ incentives to invest.

Instead of setting deadlines, policymakers should incentivise operators to phase-out copper without hampering existing migration plans and facilitating a smooth transition of customers to the new services. The copper switch-off process in Norway, where Telenor used a combination of targeted new fibre deployment and FWA (mobile 4G/5G based) to sunset

legacy technologies and at the same time provide much improved customer solutions and performance provides a relevant example that could easily have been derailed by strict deadlines.

Telenor supports the EC's Gigabit Recommendation that provides for a notice period of 2-3 years. In addition, the start of the notice period should not be conditioned on additional constraints or conditions regarding coverage or even take-up that cannot be controlled by the SMP operator and may have the effect of delaying the implementation of its decommissioning plan.

As regards 2G/3G switch-off, Telenor would like to stress that this is already well under way across Europe according to operators' own timetables and should remain within the remits of operators' commercial decisions. The White Paper's suggestion that a coordinated switch-off of 2G and 3G networks is crucial undermines the fact that mobile network operators in Europe have no obligation to coordinate their individual sunset plans. In fact, such enforced coordination could potentially be considered anti-competitive. Going forward, it is essential to maintain the principle of technology neutrality at the heart of the regulatory framework for providers.
However, a key lever the Commission should use to facilitate 2G/3G switch-off is the decision on the long-term regulatory approach to eCall, including the assessment of alternatives to the continued use of eCall in the legacy fleet. The eCall Regulation must be revised as a matter of urgency. The revised regulation should lead to a technology neutral future proof solution for emergency communications from vehicles, uphold the technology neutrality of spectrum licenses and maintain the liberty of mobile operators to deploy new technologies for the benefit of end-users.

3.8. Universal service and affordability of digital infrastructure

3.8.1. In light of well-functioning markets removal of designation rules should be considered also in a full-VHCN context

Since the implementation of provisions on Universal Service Obligation (**USO**), the market for electronic communication services has evolved significantly and provided a wide variety of voice and broadband offers matching the needs of consumers with those of the USO objectives. It has also become apparent that specific providers are carrying this financial burden while others are not. Meanwhile, prices of electronic communications services have constantly been decreasing, which means that US obligations are no longer justifiable in terms of affordability.

Based on the current level of deployment and coverage of both fixed and mobile networks, the designation of an operator as a Universal Service provider does not seem to be justified neither from the point of view of supply nor demand (availability). On the supply side, private operators have already developed a sufficiently broad portfolio to meet user needs, with the exception, perhaps, of those areas where neither fibre nor 4G/5G are available. The rapid development of commercial satellite services may obviously alleviate the challenge with availability. In such areas state aid measures can and should be considered (GBER, etc).

Further, European consumers with disabilities now have access to a variety of communication options such as chat and video telephony which have replaced traditional text telephony i.e. devices and services designed for individuals who are deaf, hard of hearing, or have speech

impairments. In addition, the implementation of the European Accessibility Act ensures that digital services are accessible to all.

The White Paper recognizes the above and puts forward a new source of possible digital divide referring to availability and affordability of VHCN connectivity. It should be mentioned that prices for telecom services in the EU are relatively low, with households spending only a small percentage of their income on telecom services.[8] Further, end users with special social needs or low income are supported by the public welfare system and have access to services provided by the market.

For the limited number of consumers, who remain affected due to affordability across the EU, we consider that the most efficient way to address the issue is public intervention through the provision of direct subsidies such as vouchers, as also indicated in the White Paper. Using public funding instruments is both more justifiable and more efficient because general taxes motivate public bodies to maximize public economic welfare. Consumers who are eligible for a voucher will have the freedom to select the operator and services of their own choice.

In conclusion, we see no need for specific obligations regarding availability and affordability also in a full-VHCNs context and believe that the USO regime should be removed from future telecom regulation. Support for vulnerable users should instead be provided through the public welfare system.

3.9. Climate aspects of Europe's future digital infrastructure needs

We welcome the inclusion of environmental sustainability aspects in the reflection about the future regulatory framework for the sector.

Telenor, in line with the global mobile industry, has been working systematically on climate transition.[9] We have set and published science-based greenhouse gas (**GHG**) emission reduction targets. In Europe, we aim for 95% emissions reductions by 2030 from a 2019 baseline. We committed to achieving net-zero GHG emissions by 2040 in the Nordics upon joining the European Green Digital Coalition as a founding member in 2021. We have also set a Group wide net-zero target to reduce emissions by 90% across all three scopes within 2045.

Telenor invites the Commission to consider and build on the actions already taken by the European mobile industry as it develops the transparency measures on the environmental footprint of the electronic communications sector as outlined in the White Paper.

In our experience, today's regulatory framework governing electronic communications, including sector specific regulation and competition policy, insufficiently addresses the environmental sustainability perspective. This includes policy on consolidation, network sharing, network modernisation and switch-off of legacy networks. Therefore, we fully support the suggestion of the White Paper to include sustainability as a core policy objective governing sectoral regulation, on par with fostering investment, promoting the single market and

[8] Final consumption expenditure of households, by consumption purpose, Eurostat, 2024: https://ec.europa.eu/eurostat/web/products-datasets/-/tec00134

[9] For more details see the Telenor Group Climate Transition Plan: https://www.telenor.com/binaries/sustainability/climate-and-environment/climate-transition-plan/Telenor-Group-Climate-Transition-Plan.pdf

ensuring competition. In our view, the same reflection is necessary for competition policy and its application to electronic communications networks and services.

The greatest positive impact is expected from sunsetting energy-inefficient legacy technologies (such as 2G, 3G and later 4G) and the increased use of passive and active network sharing.

Telenor is well on track with network modernisation, aiming to be the first operator in Europe to completely decommission its legacy copper network in Norway by 2025. In Norway and Denmark Telenor has already completed 3G network shutdown and will do the same in Finland and Sweden by the end of 2024 and 2025 respectively. These actions have already resulted in significant emission reductions, such as avoiding 7000 tonnes of CO2 annually in Norway alone. 2G network shutdown is on track by the end of 2025 in Norway and Sweden. A facilitating policy environment at EU and national level, as described in Section 6, is key to swiftly move forward with legacy network switch-off.

Network sharing has important positive implications for energy efficiency, along with reduced e-waste, nature and biodiversity footprint. Having shared active networks in Denmark, Sweden and Finland for many years, we have ample evidence showing a major positive impact on emissions reduction both in the upstream supply chain and in our operations. Therefore, it is necessary to consider incorporating environmental sustainability aspects as a policy objective also in EU competition policy so that the aforementioned positive effects are duly reflected in investigations looking into horizontal network sharing agreements.

We welcome that the White Paper suggests increased policy focus on incentivising data optimisation in light of the significant mobile traffic data growth mainly due to video streaming on mobile devices. Mobile network operators and content and application providers (**CAP**s) both have a role to play in providing transparency vis-a-vis end-users regarding the emissions related to the usage of their services. Telenor supports the suggestion for CAPs to develop codecs performance labels. Further action could be taken by CAPs by promoting solutions that adapt video resolution to screen sizes.

The White Paper does not mention the need for climate adaptation and the expectations this entails for the resilience and robustness of networks that have become fundamental to support basic societal functions. As the climate warms, telecom operators need to adapt the construction of networks and ensure their resilience to safeguard against the damaging impact of more severe and frequent extreme weather events and chronic climate change. Telenor welcomes the White Paper's recognition that connectivity and digital solutions will drive greenhouse gas emissions reductions across various sectors. Telenor's recent Climate Enablement Report[10], developed jointly with The Carbon Trust, highlights the decarbonisation challenges in the Nordic energy, power, building, transport and manufacturing sectors – the biggest contributors of emissions globally. The report also identifies a blueprint for digitalisation opportunities. A prime example is the adoption of IoT technology, which employs sensor systems to optimise external value chains. Telenor Connexion, Telenor's IoT subsidiary, is at the forefront of providing enablement solutions across diverse industrial sectors with a portfolio spanning transportation, utilities, smart metering and water conservation.

[10] Climate Enablement Report by Telenor and The Carbon Trust: https://www.telenor.com/sustainability/climate-and-environment/telenor-launches-its-first-climate-enablement-report/

4. Pillar 3: Secure and resilient digital infrastructures for Europe

4.1. Secure and resilient digital infrastructure

While we acknowledge the focus on submarine cables and quantum computing in the White Paper, it is important to recognise that ensuring a secure and resilient digital infrastructure extends beyond these aspects.

With the geostrategic shifts, the ongoing conflict in Ukraine and the emergence of new technologies like AI/ML used by cybercriminals, the volume and diversity of cyberattacks is constantly growing. Telecom operators run infrastructure and have a special responsibility to safeguard their customers. Telenor, as the industry at large, is making significant investments to enhance its cybersecurity capabilities. The forthcoming implementation of the NIS2 Directive is key to this. As a horizontal instrument it will apply across various sectors and actors. Consistent implementation across providers of critical infrastructure will be essential to prevent competitive distortions and ensure fair conditions for all. In addition, Member States play a crucial role in revising national regulations, where telecom operators face specific security requirements that e.g. newer digital service providers do not. By further harmonizing the approach to security and removing any unnecessary barriers, we will create improved conditions for secure and resilient infrastructure in Europe, as described further in Section 3.4.1 on common security conditions.

The resilience of Europe's connectivity infrastructure must also be enhanced. Climate adaptation is one of the main drivers, as highlighted in Section 3.9, as networks must be robust against extreme weather events and climate change impacts. In addition, operators must improve service availability in light of customer requirements (SLAs) and/or regulatory obligations as more mission-critical services are delivered over 5G networks. Ensuring networks can perform well during crisis is especially crucial given the increasingly adversarial geopolitical environment. The adaptation is already ongoing and includes towers being strengthened, equipping more sites with battery backup power or increasing battery capacity, and/or providing redundant fibre or microwave backhaul connections.[11]

This is an important element of the investment challenge facing European telecom operators that the Commission should recognize, particularly regarding mobile networks that were not traditionally designed as critical infrastructure. Further, with public safety networks in some cases being transferred to mobile networks across Europe, and armed forces and NATO adopting 5G, governments should reflect on their role in funding certain aspects of network resilience such as investments necessary in case of heightened preparedness and war. Without sufficient investments in network infrastructure and cybersecurity, and without rapid progress in innovation, mission-critical European users may lack the robust and secure networks they require in emergencies.

[11] With the 5G network rollout, Telenor Norway is increasing network resilience by introducing dual homing at approx. 6100 (70%) of its mobile sites. This means that even if one of the transmission fibres to the base station is severed due to landslides, floods or other weather-related events, the network will remain operational. As a result, network availability is expected to increase, reducing downtime from 9 hours per year to just 1 hour on average.

4.2. Submarine cables

We welcome that the Commission has drawn attention to the importance of submarine cables in Europe. International connections, such as submarine cable connections to neighbouring countries are vital for basic societal functions. These connections must remain operational even in crisis situations.

We also welcome the Commission's proposal for EU funding mechanisms on submarine cables. The safety of submarine cables can be improved especially by building new cables with enhanced security features, ensuring redundancy and implementing advanced monitoring systems. In addition, we support the Commission's proposals on EU-wide actions regarding the reinforcement of maintenance and repair capacity, which would mitigate the impact of any attempts to sabotage the submarine cable infrastructure.

The Commission's proposal on governance models such as an EU wide certification of submarine cables should be pragmatic, reduce administrative burden and be carefully considered regarding their potential impact on the industry. Such measures should enhance the overall security and efficiency of submarine cable operations without imposing unnecessary regulatory hurdles. We believe that a balanced approach will foster a robust and resilient infrastructure capable of meeting Europe's connectivity needs even in times of crisis.