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Sustainable connectivity futures: a new era for infrastructure, investment and competition

Prof. Konstantinos Masselos
EETT President & BEREC Vice Chair 2024

The recently published by the EC White paper **"How to master Europe's digital infrastructure needs?"** includes two main parts.

The first part discusses challenges and developments in the field including:

- EU connectivity infrastructure challenges (current status against DDPP objectives for 2030 and technological challenges) and relevant investment needs as well as the financial situation of the EU electronic communications sector (also the ability to invest and to attract investments)
- The creation of a single market
- The convergence of electronic communications networks and services and cloud infrastructures does not only concern the infrastructure layer, but also the service operations.
- Sustainability challenges
- Need for security in the supply and in the operation of networks

The second part of the white paper discusses ideas of actions for the transition to the digital networks of the future organized in **three pillars**:

The first pillar discusses the creation of an innovation ecosystem to address the "3C Network" ("Connected Collaborative Computing" Network). It is worth considering the interplay between innovation and regulation. Innovation and technology advance faster than regulation and we need to make sure that regulation does not introduce barriers to innovation. The approach should be to monitor the technology developments and to identify issues that might require regulatory interventions in the future while avoiding the introduction of early regulations thus allowing the technology to develop. Regulators are still part of the innovation ecosystem with tools such as collaborative regulation and regulatory sandboxes.

The second pillar focuses on the Digital Single Market and discusses several issues including authorization, barriers to core networks centralization, spectrum issues, copper switch-off, access policy in a full fibre environment, universal service and sustainability. **Let's focus on two points**:

1. **Consolidation – market structure:**

- We would all agree that those expected to invest also rightly expect to have reasonable returns for their investments. On the other hand, we need to keep prices competitive, especially in economic

environments of high inflation, to fuel and support uptake. This is a tough exercise to solve, and one that historically has been solved with mergers and acquisitions to create economies of scale.

- According to BEREC's position in the Public Consultation of 2023, *VHCN being rolled out at supra-national scale is not expected to bring any significant cost savings and efficiencies determined, inter alia, by the scale of their operation. Economies of scale can be largely reached at subnational level for fixed networks, while at national scale for mobile networks.* Consolidation at national level requires careful analysis given its potential negative impact on competition.

2. Access policy in full fiber environment, copper switch-off and environmental sustainability:

- FTTH/FTTP networks offer several advantages compared to other network technologies such as higher speeds, lower latencies and smaller cost/speed ratios, as well as increased reliability and scalability. Fiber-based access networks are also the most technologically secure and in-the-field validated solution we have, with a clear future/technology roadmap for further development (towards 25/50 Gbps GPON). On top of these advantages, fiber networks are also the most energy efficient ones because of the reduced role played by active equipment compared with legacy technologies.

- FTTH/FTTP networks are also however the most expensive to deploy, so accelerating their deployment requires significant policy and regulatory interventions. What our top priorities need to be?

I. Copper switch off - we need simple and transparent procedures to avoid copper networks competing with FTTH/FTTP investments.

II. Open Access in the first phase of deployment - we need to promote retailer's fair-term access to FTTH networks in order to avoid commercially interesting parts of the network covered in parallel/multiple times, and less commercially interesting ones left uncovered.

III. Fiber optic development in buildings and not in the streets. Address the homes passed vs homes connected gap. Converting millions of homes passed to homes connected will be an unprecedented challenge. The key reasons for this are:

   a. civil engineering costs,
   b. availability of personnel to install/deploy FTTH/B, and
   c. subscriber reluctance (typically due to technician intervention in subscriber's space).

   As regards the last point we need to promote adding some flexibility in the way we perceive and define Fiber-based access networks and start thinking in hybrid deployments terms where fiber gets to the most Cost-Efficient Point and then any technology that may achieve 1Gbps speeds can be used to connect the end user (including technologies that may use legacy in building cabling infrastructure).

The third pillar focuses on secure and resilient digital infrastructures for Europe with emphasis on submarine cables infrastructure. BEREC has done work on Cybersecurity since 2019 (with emphasis on 5G networks infrastructure) and on submarine cables that have been part of BEREC Workprogramme 2023 and 2024.

Looking at the Digital Networks of the Future we need to consider another important issue as regards cybersecurity. Software-defined, new-services carrying (requiring security, resilience and other qualities of service except from speed), future networks will need to get hardware-level supply-chain traceability to avoid having our ultra-flexible ICT infrastructure from getting 'poisoned' in its very own 'silicon roots', compromising all concepts of cyber-security we consider. Semiconductors (Integrated Circuits) are the foundation technology on which telecommunications networks and digital infrastructure are built. There is no room for rethinking cybersecurity in semiconductor scale. No cybersecurity measures really make sense if the hardware we use is compromised.

The future role of Electronic Communications Regulators

The electronic communications sector is changing fast and the European digital policy framework is adapting to this ever-changing environment.

BEREC has identified five strategic orientations that will determine its future role in the run-up to 2030:

I. Fostering national and international connectivity to reach the objectives of Europe's Digital Decade by 2030.
II. Facilitating an open and sustainable internet ecosystem and supervising the evolution of the digital landscape.
III. Providing for the security and resilience of the networks and services.
IV. Contributing to the achievement of environmental sustainability goals.
V. Strengthening BEREC's agility, independence, inclusiveness, and efficiency as a centre of expertise.

The technological developments are changing the landscape from electronic communication networks and services to internet communications. New digital services and platforms are replacing traditional electronic communication services, some of which are located in adjacent markets, and offered by new players. Those market developments are impacting the responsibilities – and thus the role – of the telecom regulators, which are now positioning themselves as regulators of the broader internet.

Taking account of the Digital Decade Policy Programme (DDPP), the extended definition of electronic communications in the EECC, and the recent legislative initiatives in relation to digital services and markets (e.g., Digital Markets Act, Digital services Act, Data governance act, and Data Act), BEREC has to adapt its approach to regulation to include (new) digital services and platforms and their providers in its portfolio to reflect the changing remit and the broader scope of activities of the NRAs. It can rely to do so on its long experience in ex ante regulation.