ETNO comments to Questionnaire of the Sub-group on Role of RSP to Help Combat Climate Change

January 2021

The European Telecommunication Network Operators' Association (ETNO) welcomes the opportunity to provide feedback to the Questionnaire of the Sub-group on Role of RSP to Help Combat Climate Change.

Q1. How can the wireless technologies contribute to the efforts to reduce the climate impact of your sector?

First of all, we believe digitalisation and connectivity are key instruments for dealing with the most pressing environmental challenges affecting society at large: for instance climate change, water shortage, circular economy, pollution, and loss of biodiversity. In fact, digital solutions are a critical pre-requisite for achieving the EU Green Deal's sustainability goals across different sectors of the economy and society.

The telecommunications industry is a substantial enabler of the transition to the EU Green Deal. High-capacity, stable, energy-efficient networks are key enablers for sustainable digitalisation. In terms of potential contribution to the achievement of the EU Green Deal Goals, the "greening by" aspect has a much broader impact across sectors of the economy and of the society.

Research indicates that the ICT sector stands for about 2% of the global CO2 footprint[1]. However, if properly utilized, the efficiency and saving potential is exponential. According to Exponential roadmap report, digital services have potential, tenfold their footprint, to reduce energy and materials across the economy and could directly enable a third of the emissions reductions needed by 2030[2]. Also, another recent report on the impact of mobile communication technologies on carbon emission reductions has shown that mobile technologies are helping to enable carbon reductions 10 times the emissions of the mobile sector across the wider economy[3].

Services based on the Internet of Things (IoT), Cloud or Big Data require a strong digital infrastructure and enable more efficient use of resources across a variety of sectors. This includes manufacturing, agriculture, mobility, transport/logistics, energy, healthcare, education, public administration and many more. There is clear scientific evidence that those sectors, through uptake of digital infrastructure and digital services, have the opportunity to become more productive, more modern and more service-oriented, while dramatically reducing their carbon footprint[4].

Besides this crucial role for the whole economy, and to take advantage of all the benefits of digitalization, telecom providers have taken decisive and continuous action to cut carbon emissions and increase energy efficiency in their own networks[5].
According to our State of Digital Communications Report, by 2019, almost 50% of the energy used by our companies came from renewable resources[6]. This reflects positively on the green performance of the sector, which in 2019 reduced its overall emissions by 8.5% with respect to the previous year.

[1] Malmodin, Lundén, The Energy and Carbon Footprint of the Global ICT and E&M Sectors 2010-2015, including forecast to 2020, August 2018, https://doi.org/10.3390/su10093027
[2] Exponential Roadmap, Scaling 36 solutions to halve emissions by 2030, ver. 1.5.1, 2020, www.exponentialroadmap.org
[3] The Enablement Effect, Mobile Technologies Enabling Huge Carbon Reductions in Response to Climate Emergency, GSMA, 2019. Downloadable here
[4] Deloitte for GeSI, Digital with Purpose, 2019
[5] ETNO's position paper on EU Green Deal. Downloadable here
[6] ETNO's The State of Digital Communications 2020. Downloadable here

Many ICT companies have set aggressive carbon reduction targets and ICT sector is the largest purchaser of renewable energy.

Further significant reductions can be reached by mobile networks' increasingly energy efficient operations, a sustainable deployment process, as well as the purchase of sustainable equipment. The latter also includes sustainable manufacturing processes (in mining, refinery, assembly, transportation, maintenance, dismantling and recycling).

Last but not least, the deployment of 5G technology will strongly improve energy efficiency of mobile networks. As traffic volumes continuously increase, 5G provides the required capacities while consuming the least energy in terms of "watt per byte"[7]. 3G networks, which have a low energy performance, will become redundant and will be gradually switched off, further increasing energy efficiency.

Q2. Which actions relating to radio spectrum issues and contributing to climate protection are taking place in or being planned for your sector(s)? These may be actions based on your own initiative, on the initiative of a group of stakeholders, or adopted as part of national or European policies.

Radio networks are required for enabling digital services with sufficient data speeds in areas where the services are needed (capacity and coverage). As already stated in answer to Question 1, the sector has been very active and is expected to remain very active to reduce its own emissions, especially through innovative energy efficiency measures and use of renewable energy.
The work on ensuring efficient network operation, in particular, is continuous and enables savings in the energy consumptions.
For example, the new mobile generations and equipment that are taken in use are more efficient than the old ones (e.g. active antennas and small cells that irradiate only where and when specifically necessary, can result in more efficient energy consumption). This has led to decommissioning of older wireless technologies such as 3G for many mobile operators.

Furthermore, 5G technology provides for last generation standards to be able to self-regulate functionalities and consumption, achieving up to 5x consumption savings compared to former technologies. There are ways to optimize operation based on the timely demand, e.g. switching off technologies and/or frequencies during low traffic hours, and applying AI solutions to manage this efficiently without manual intervention.
In addition to strongly improve energy efficiency of mobile networks, the deployment of 5G technology has also the possibility to reduce carbon footprint in a wide range of industries, such as manufacturing, healthcare, mobility, etc.

A broader service implementation of radio networks can provide solutions to potentially phase out energy intensive legacy networks, for example with the implementation of Fixed Wireless Access

[7] Evolving from 0,47-0,61 W/bit (for 4G 1800 MHz RBS powered with 4 x 20 W or 4 x 40 W, 20 MHz BW, 256 QAM, 4 x 4 MIMO) to 0,12-0,13 W/bit (for 5G 3700 MHz RBS powered with 100-200W, 80 MHz BW, 64 TX, MU-MIMO16, 8 users).

(FWA) solutions. This will be leading to reductions in aggregated network energy consumption, in combination with reduced operations and maintenance interventions.

Q3. How can radio spectrum administration help to reduce the climate impact of your sector?

In general, efficient spectrum policy also supports climate goals. With sufficient spectrum resources available and by avoiding unnecessary deployment, operation limitations and requirements, spectrum regulators can reduce climate impacts. More precisely:

- Availability of sufficient spectrum resources decreases the number of mobile sites needed, leading to smaller energy consumption, and smaller number of network equipment. Smaller number of network equipment leads to lower emissions caused by manufacturing.
- Availability of < 1GHz spectrum resources decreases the number of macro sites needed, leading to smaller energy consumption, and smaller number of network equipment.
- Availability of spectrum for 5G enables operators to develop and offer network solutions needed for IoT and big data. This also accounts for ultra-high bands above 26 GHz (such as 40 GHz and 66 GHz) which e.g. could be deployed in small cells scenarios. As already stated previously, services based on the Internet of Things (IoT), Cloud or Big Data enable new energy efficient and environmental solutions across several sectors such as transport, manufacturing, agriculture, building and energy.
- Large contiguous spectrum blocks, potentially in fewer bands, are more efficient to deploy, leading to smaller energy consumption, and smaller number of network equipment. This should be taken into account when studying new spectrum bands for IMT and when preparing for awards. Fragmenting spectrum bands e.g. with set-asides may not be climate friendly.
- Allowing operators to switch-off older mobile technologies leads to smaller amount of network equipment, enables more efficient spectrum use with newer technology, and thus smaller energy consumption.
- Allowing operators to deploy shared networks leads to smaller number of network equipment. Therefore, policy and regulatory support for network sharing agreements appears relevant also from the sustainability viewpoint, while also helping to accelerate network deployment investment. This could e.g. be relevant when operators start to deploy small cells at larger scale.
- Avoiding unnecessary deployment limitations (e.g. unnecessary restrictions to transmission power, stricter EMF limits than recommended by ICNIRP) leads to smaller number of network equipment, and enables energy savings.
- Avoiding excess coverage and data speed obligations enables optimizing network operations, energy consumption, and number of network equipment based on actual and timely demands. New coverage obligations should not be too restrictive and designated for a specific spectrum band or technology, which would limit the scope for operators to design networks most efficiently, financially and environmentally.
- When taking climate change related measures, spectrum policymakers should take a broad view and look not only at the energy use or GHG emissions of the spectrum licensees, but also at how the incentives they place on them impact the environmental behaviour of end users. Higher network deployment costs caused by stringent environmental restrictions in licences,

or by higher spectrum fees, could negatively impact end-user prices or coverage of wireless services, thereby reducing their "enablement effect".

- Some actors might advocate for reserved frequencies to provide services related in one way or another to the fight against climate change. They could range from private networks for use by verticals to digitise their supply chain and be more energy efficient, to frequencies for satellite services that monitor climate change and its impact. While these demands are legitimate, they should be evaluated against the value on alternative uses of the frequencies they request, and against the possibility of using public networks that could fulfil the same purpose at a potentially lower environmental cost.
- Spectrum regulators might wish to introduce climate change considerations in assignment processes, to favour bidders that are "greener" or to ensure a minimum level of "greenery" to be achieved by all licensees. As potential participants in future awards, we are concerned about open requirements that make it difficult to estimate compliance costs, and that may result in suboptimal outcomes, with overly optimistic bidders winning usage rights despite not providing the greatest value to society.
  To mitigate that risk, potential environmental requirements should be clear and designed to reduce unnecessary uncertainties in common values. For example, if the energy performance to be imposed on licensees is linked to an uncertain national overall energy use target to be defined by Public authorities in the future, simply mandating compliance with the target, whatever it will be, would force bidders to make an estimate. A better option is to mandate compliance but design a rebate mechanism with compensations that grow with the intensity of the future target.
- In line with the last point above, we would see value in exploring the possibility for the licences to embed financial incentives (e.g. reduction of spectrum fees, price of renewals of licences, partial redemption of price obligations). That would foster licensees to be more energy efficient during the duration of the usage right. For example, the licence could incorporate a discount on yearly licence fees contingent on meeting energy efficiency or GHG emission targets defined at the time of award.
  We would also like to highlight that, the incentive mechanisms should not in any case create a bias in favour of bidders that have devoted less efforts to the fight against climate change before the award. For example, a discount based on total energy use per bit would be preferable to a discount based on the reduction on energy use per bit during the life of the licence. The latter would indeed favour bidders that are less advanced, environmentally speaking, at the time of award, and can therefore reduce their energy use per bit at a lower cost.

In addition to reduce climate impacts with efficient spectrum policy, spectrum administrators should consider also other possibilities to reduce emissions. For example, by incentivising as a best practice also in the long term, a more frequent use of remote meeting tools.

Q4. Do you identify any issues involving radio spectrum administration which might prevent combat against climate change, decrease of carbon emissions and reducing energy consumption?

Inefficient spectrum policy would be harmful for reducing climate actions. Inefficient spectrum policy would be opposed to what was described in answer to Question 3.

Just to give some examples:

- Some countries have set-aside or are planning to set-aside key spectrum for "vertical applications" without clear justification on demand and benefits. This limits the bandwidth for multipurpose MNO networks and leads to higher number of network equipment to reach the same capacity than with larger bandwidths. Larger number of equipment leads to higher emissions in manufacturing and in operation.
- Some countries and municipalities require stricter EMF exposure limits than those recommended by ICNIRP. This also leads to higher number of network equipment and thus higher emissions in manufacturing and in operation.
- Some countries maintain and continuously specify too restrictive coverage obligations designated to a specific spectrum band or technology, which delimits the scope for MNOs to design mobile networks most efficiently over time. Ultimately, larger number of equipment is needed, which leads to higher emissions in manufacturing and in operation.

Furthermore, any regulatory policy unreasonably entailing an investment unfriendly environment for the sector (e.g. high spectrum awards prices, unjustified restrictions to co-investment, administrative complex procedures for deployment, stricter limits of EMF exposure than the ones European Council recommended) would be counterproductive for the ability of the operators to invest in upgrading the networks in compliance with more efficient and climate neutral standards.

Q5. Do you have any other comments that you would like to address to RSPG on this topic?

We overall support the RSPG's focus on sustainability and climate change as a key important horizontal principle and high-level priority. As described already in previous answers in this questionnaire, ETNO members are closely following the trends in energy consumption, exploring innovative ways in which the telecoms and digital sector at large can help mitigate the impact on climate change. This is where ETNO members have identified a primary duty, to enable the economy's climate neutrality and policy makers should support this, as described above.

Beyond this, we have already set ambitious climate goals for telecoms' own emissions, which are constantly reviewed. Spectrum policy should support these goals and provide sufficient flexibility for network operators to decide on how to best improve efficiency. Detailed regulation e.g. on prescribing specific actions, may not be efficient but result in unnecessary burdens, which eventually may not lead to best overall results.

Concerning requirements for equipment such as based on eco-design requirements, policymakers should address relevant manufacturers.

Finally, ETNO would like to express its willingness to contribute to the debate and support RSPG's activity on climate change and we are ready to engage in the debate and provide with our expertise.

ETNO (European Telecommunications Network Operators' Association) represents Europe's telecommunications network operators and is the principal policy group for European e-communications network operators. ETNO's primary purpose is to promote a positive policy environment allowing the EU telecommunications sector to deliver best quality services to consumers and businesses.

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