

In September 2016, the European Commission published an ambitious action plan for a general use of the 5G — 5th generation of mobile telephone standards, a technology that is presented as an unprecedented progress for all. It is said to be a decisive step forward and an obvious economic opportunity (*5G for Europe : an action plan*, 2017, ec.europa.eu).

From that moment onward official statements all aim at convincing us that what is at stake is being part of the dominant group in the global economic competition thanks to this new telecommunication technology that will ensure pervasive interconnection among humans as well as with everyday objects and pets (Internet of Things).

The propaganda of the 5G-PPP.eu, i.e. the public-private partnership between the European Commission and the telecommunication industry, claims that using the 5G will mean a 1,000 increase in the capacity of the wireless telecommunication network, connecting 7 thousand billion of objects serving over 7 billion humans with a connection delay amounting to nothing. To top it all, providing those services would result in 90% energy saving.

We are at the threshold of some sort of Brave New World: the 5G involves a radical break with the world as we know it. We only have to be aware that in order to implement the 5G, we will have to

- multiply by five the number of base stations (antenna or group of antennae) to achieve the Internet of Things and make all sectors of society ‘smart’, such as cities and towns, farming, or health care;
- use a new kind of antennae, antennae that can scan electronically, capable of targeting smartphones and other connected objects (beamforming). Some of them are very small, the size of a shoe box, and can be easily placed everywhere, every 100 meters in an urban environment: on public benches and even inside buildings;
- increase exposure limits to those of the ICNIRP where this is not already the case (the ICNIRP limit values are thousands of times higher than those recommended by independent experts such as those of the BioInitiative Group and the European Academy of Environmental Medicine - so the exact opposite should be done to protect the population, namely lower those values). In Brussels, for instance, it would mean multiplying by almost 50 the current limits and go from 0.095 to 4.5 W/m² (at 900 MHz).
- Multiplying antennae and focused wave beams will mean that the level of exposure at some points at certain times will be over the prescribed limits.
- The 5G uses the frequencies of former standards (4G, etc.), but also high frequency millimeter waves that have hardly been used so far, and mainly in the armament industry and for weather forecast satellites. Those high frequency waves (over 5 GHz and up to 100 GHz) are weakened by obstacles such as leaves or rain, so there must be more antennae and the levels of emission power must be raised.

An increasing and pervasive electromagnetic pollution

An obvious consequence of the deployment of the 5G will be a high electromagnetic pollution added to the sharp increase in

electromagnetic pollution over the past 25 years as a result of the landslide arrival of new wireless technologies; it is already a public health issue that is largely ignored by health authorities.

Limit values adopted in all legislations on the basis of ICNIRP recommendations take only the heating of human tissue into account, whereas thousands of studiesⁱ show biological effects at much lower levels than the aforementioned limit values (from one thousands to one hundred thousand times lower).

In case of regular exposure or, even worse, of permanent exposure, those biological effects are likely to result in serious health consequences, particularly with children and embryos.

New health hazards have been identified:

- cellular DNA damage;
- cellular stress;
- gene alteration;
- cancer;
- infertility and alteration in the quality of semen;
- sleep trouble;
- heart problems, including tachycardia, arrhythmia and cardiac arrest;
- neurological disturbances, including depression and autism.

With the 5G, we are moving into an age in which this electromagnetic pollution will become pervasive and more significant. No living creature will be able to escape.

The unknown factor of millimeter waves

With the use of millimeter waves and of the 5G, we dive into an unknown dimension. So far very few studies have examined the biological effects of exposure to this kind of radiation.

The fact that millimeter waves are easily stopped by solid obstacles lead their promoters to downplay their destructive nuisance potential. There is no scientific evidence on which we could conclude that they are safe. Recent publications have contributed new data that weigh heavily in the case against millimeter waves:

- Temperature peaks occurred in the skin of exposed people as a result of millisecond bursts transmitted by wireless devicesⁱⁱ.
- The sweat glands in the upper layers of the skin act as an antenna, which significantly increases the specific absorption of millimeter waves.ⁱⁱⁱ
- A study carried out on four insect populations showed that the absorption of radiation is highly dependent on its frequency and the size of the species. The authors believe that permanent exposure to millimeter waves could lead to changes in insect behaviour, physiology and morphology over time.^{iv}

On the other hand, a British report indicates a 90% loss of radiation power over the entire frequency range above 6 GHz for large foliage in urban areas. From there to eliminating trees in cities is only one short step some will easily take.

A disturbed global environment

The 5G was devised to be able to connect up to one million objects per km² 24 hours a day. To make sure that each square cm of the planet is covered, communications through satellites in low orbits have been integrated into the 5G standard, to the difference of the 4G, as a complement to millions of ground antennae. US, Russian and European private companies as well as a group of State-run Chinese companies have already scheduled the launching of some 50,000 new satellites, i.e. 25 times more than is actually the case. The first launchings occurred in 2019 and were carried out by SpaceX and One Web.

This massive deployment of telecommunication satellites generates a permanent electromagnetic cloud and thus is akin to a geoengineering technique. It will pollute the ionosphere through millions of pulsed signals and is likely to disturb the natural electromagnetic environment of the Earth, an environment in which living creatures have developed for millions of years and on which they are dependent.

Many scientists have tried in vain to alert governments and international institutions

In September 2017, over 170 scientists and doctors from 37 countries voiced their serious concerns about an increased exposure to electromagnetic fields radiating from wireless technologies. They asked the European Union to suspend the deployment of the 5G as long as there is no evidence that this technology is not dangerous for the European population, especially babies, children, pregnant women, or for the environment (5gappeal.eu): 'exposure to radiofrequency electromagnetic fields RF-EMF has been proven to be harmful for humans and the environment.'

In April 2018, the *International Society of Doctors for Environment* called for a similar moratorium, based on the precautionary principle (isde.org).

In an international appeal launched in 2018, scientists, doctors and environmental organizations urgently called for a halt to the deployment of the 5G on earth and in space. The appeal was addressed to the UN, the WHO, the EU, the Council of Europe and governments of all countries (5gspaceappeal.org).

So far institutions that were appealed to have not responded.

Other questions

Beyond fundamental issues relating to public health, which governments choose to ignore, many questions remain as to the future outlined in this headlong rush to some 'Brave New World'. The negative impact of 'digital proliferation' on personal well-being — particularly psychosocial hazards for children — and on collective 'good life' is now well documented, not to mention new possibilities now open to monitoring, policing, intruding into private lives, and hacking.

Even industrialists wonder whether such deployment is at all economically possible, involving as it does huge investments, the profitability of which is far from certain as testified by analyses carried out by the McKinsey cabinet and by the Utilities Technology Council.^v

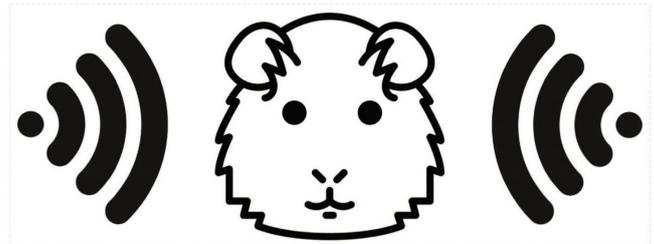
The 5G's climate and energy balance promises to be a disaster. The energy needed for the emission of antennae and connected objects on its own will result in an increase of over 2% in power consumption in European countries. This is only the tip of the iceberg compared with the energy needed to make billions of connected objects, with the infrastructure required by dozens of millions of antennae and the optical fiber network to which they must be connected, satellites and their launching as well as a correct functioning of data centres, the processing capacities of which would need to be strongly increased.

Energy consumption by new technologies such as the 5G is only one aspect of their environmental impact. The amount

and number of various metals used in the electronic components are steadily increasing as these perform better. Our smartphones consist of some forty different metals including precious rare-earth elements, compared with less than twenty ten years ago. Moreover, as things stand, recycling electronic components is difficult if not impossible, and can have a negative impact on the environment.

Extracting and refining ore pollutes streams and soils. Consequences are hardly perceived in our Western countries since those operations were delocalized in the 1980s, notably to China (where 80% of rare earth elements are to be found).

The other unseen impact of those technologies are the terrible working conditions imposed on men and women in far distant countries who work for this 'digital revolution'.



1G, 2G, 3G, 4G, 5G : all guinea pigs!

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Conclusion

The 5G, which is requested by leaders of the digital and telecom industries and promoted by our governments, is an unaccountable threat on our health and that of all living beings. It is in contradiction with ecologically responsible policies and the objectives defined by the European Union and the signatories of the COP21 agreement in 2015 in terms of fighting climate change. It also contravenes the 2010 Nagoya agreement on protection of biodiversity, which was signed by 190 countries.

ⁱ See for instance the 2012 BioInitiative Report, bioinitiative.org.

ⁱⁱ Neufeld and Kuster, *Systematic Derivation of Safety Limits for Time-Varying 5G Radiofrequency*. Health Physics, 2018.

ⁱⁱⁱ Betzalal et al., *The human skin as a sub-THz receiver – Does 5G pose a danger to it or not?* Environmental Research, 2018.

^{iv} Thielens et al., *Exposure of insects to Radio-Frequency Electromagnetic fields from 2 to 120 GHz*. Scientific Reports, 2018.

^v *The road to 5G : the inevitable growth of infrastructure cost*, mckinsey.com, 2018. *Cutting through the Hype : 5G and its potential impacts on Electric Utilities*, utc.org, 2019.