

Getting Informed About 5G - The Weston A. Price Foundation

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Most people consider mobile technologies necessary for school, work and household functioning. Arguing against the technologies' expansion or in favor of their regulation is, therefore, especially challenging. As telecommunications ("telecom") providers begin mapping their plans to deploy 5G—the fifth generation of wireless infrastructure—concerned citizens who do not want 5G "small cell" sites throughout neighborhoods seek constructive action.

In our zeal for electronic things (and now, wireless devices), we have nearly saturated our environment with man-made electromagnetic radiation (EMR). With the advent of 5G, small cell networks will emit microwave radiation around the clock at largely untested frequencies. Each site's electronic gear also poses fire and collapse hazards as well as liability, privacy and security issues. If getting informed is the first step toward constructive action, let's ask: *How did we get to 5G? Why do we need it? How will it affect our health? How (or can) we prevent it?*

ELECTRIFICATION AND TELECOMMUNICATIONS

People figured out how to generate, store and transmit electricity about two hundred years ago. After a Danish scientist discovered electromagnetism in 1819, electric developments progressed rapidly, radically changing domestic life, creating entertainment industries and allowing speedy international communication. The telegraph arrived in 1844, the telephone in 1875 and the first power plant in 1882. Radio became available in the 1890s. By 1904, you could buy an electric washing machine, and by 1913, a refrigerator.

Government agencies soon began protecting the new industries. In 1934, Congress created the Federal Communications Commission (FCC). FCC regulations clarify that manufacturers may sell electronic products as long as they do not create "harmful interference" with existing radio or TV broadcasts, a definition that has since broadened to include cellular and Internet services. However, the agency's pro-industry definition of "harmful interference" has never included biological harm, which may be why a 2015 Harvard report called the FCC a "captured agency."¹ Unashamedly, FCC regulations safeguard neither the public nor our environment.

In 1996, Congress passed the industry-friendly Telecommunications Act. Section 704 prohibits municipalities from denying permits to install cellular antennas based on health or environmental concerns. Also in the mid-1990s, to determine whether mobile devices were safe enough to market, engineers filled the head of a two-hundred-and-twenty-pound mannequin with salty fluid, took its temperature and gave it a cell phone for six minutes. Because this dummy's temperature did not change by two degrees Celsius after six minutes—call this a test of immediate, thermal effects of EMR exposure—the FCC has allowed consumers to buy increasingly powerful mobile devices ever since.²

NON-THERMAL BIOLOGICAL EFFECTS

Human organs—including our brains and hearts—function by intricate electrochemical signals. We depend on these signals to digest food, make decisions and know when to sleep. Even at rest, all of our cells have measurable voltage.

It is astonishing, therefore, that the FCC has never recognized or assessed the non-thermal effects of EMR exposure, including the effects of cumulative or combined exposures or potential effects on pregnant women, infants, children, people with medical implants and wildlife. Thousands of peer-reviewed, scientific studies conducted by other parties now point to adverse biological effects from EMR emitted by mobile devices and the infrastructure they require, including "single and double stranded DNA breaks, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction and brain tumors."³

One of the most recent studies was a twenty-five million dollar rodent study conducted by the National Institute of Health's

National Toxicology Program, which showed that cell phone radiation increases the risk of brain tumors, heart tumors and DNA damage—and those effects arose from 2G (second-generation) technology first introduced in the 1990s.⁴ Other new studies link heavy, long-term cell phone use (more than two hours per day for more than fifteen years) with elevated thyroid cancer risk.^{5,6,7} In the U.S., rates for new thyroid cancer cases have increased 3.1 percent per year over the last decade.⁷ New research also shows, cautiously, that maternal cell phone use may be associated with shorter pregnancy duration and increased risk for preterm birth.⁸

In children, screen-time exposure (different from EMR exposure) harms brain development and can lead to addiction, eye problems and aggressive behavior.⁹ This has not stopped schools from giving tablets to young children and replacing teachers with screens.¹⁰ Research also indicates that digital technologies are causing adult attention span to dwindle.¹¹

5G AND THE INTERNET OF THINGS

Alongside the ample evidence of biological harm from wireless technologies, there are mounting problems with security and privacy. Other downsides include the technologies' exponentially increasing and unsustainable energy demands, toxic waste from the manufacture of electronic devices and significant disruptions of the labor market due to artificial intelligence (AI), with machines making decisions.

Nonetheless, because services that include a wireless component are minimally taxed and regulated (compared to wired services), wireless services are extremely profitable to telecom corporations, and the deployment of more wireless technologies continues apace. Machine-to-machine communication is becoming more widespread as technologies operate via the Internet of Things (IoT). Entertainment, GPS and self-driving vehicles operate through the Cloud, as do a growing number of educational, medical and banking systems. Utilities have also deployed millions of "smart," wireless transmitting meters to track electricity use.

All of these developments are generating increased data traffic—and according to the telecom industry, more data traffic requires more infrastructure. Promoters of 5G and the IoT tell us that we "need" 5G so that we can download a video in less than ten seconds, receive a message on our phone from a chipped diaper letting us know that our baby needs changing or get messaged by a chipped orange juice carton telling us that it is time to replenish. With 5G and the IoT, a toilet will even be able to analyze stool samples and send the data to your doctor.

Let me unpack what this means for municipalities and households.

THE ROLE OF FIBER OPTICS

Until 2016, businesses and households considered "fiber optics to the premises" as the safest, fastest, most energy-efficient and most secure way to access the Internet. Often encased in protective conduit, fiber optic cables rely on pulsing light on thin strands of glass fiber and carry multiple frequencies for telecommunications. Effectively, fiber cables offer unlimited bandwidth.¹² They do not emit radiofrequency (RF) radiation. They also tend to withstand weather catastrophes better than wireless systems.

What the public may not realize is that wireless telecom infrastructure is not entirely wireless. For years, wireless providers have run fiber optic cables from their core network to the large towers that support cellular antennas. To deliver voice, Internet and data wirelessly, fiber optics' light waves convert data (via a digital electronic process) to RF waves. The system's "last hop" (from the cell tower to individual, mobile devices) is delivered wirelessly.

In the same way that radio stations pay the FCC a licensing fee for a frequency band on the electromagnetic spectrum, telecom corporations pay the FCC to lease frequencies that deliver their wireless services (voice, Internet and data). In the last few decades, however, the available spectrum has nearly filled up. In the iPhone's first three and a half years, AT&T alone claimed that its data traffic grew eighty-fold!¹² 5G technology (which, remember, provides wireless access) combines fiber optics and millimeter RF waves (a previously untapped portion of the spectrum) and cannot operate without fiber optics. The industry views this combination as the only way to create more usable frequencies for our increasing wireless data traffic.

STREAMLINING 5G INFRASTRUCTURE

Beginning in 2016, the American Legislative Exchange Council (ALEC), a Koch brothers-backed group that is an advocate for industry interests, wrote sample legislation to "streamline" (ease) the buildout of 5G. These bills promote installing fiber optic cables to densely deployed small cell sites on public rights-of-way—such as utility poles and school rooftops—and on federal and state lands (see Figure 1). At the same time, they severely restrict local zoning review requirements for installing telecom facilities, including the distributed antenna systems (DAS) used to provide coverage on campuses, inside large office buildings or in places with large crowds that expect wireless services.

By January 2019, over half of U.S. states had passed ALEC-inspired legislation to streamline 5G's buildout.¹³ Two federal Acts passed in 2017-2018—the MOBILE NOW Act and the DIGIT Act—also restrict local authority over installation of telecom infrastructure. Further, the FCC has enacted rules that restrict states' and municipalities' ability to use the 1970

National Environmental Policy Act (NEPA) and the 1966 National Historic Preservation Act in zoning and siting reviews for telecom facilities. Finally, the FCC shortened the time that municipalities have to respond to telecom permit applications from ninety to sixty days.

Taken together, these mandates prohibit municipalities from enacting a moratorium on 5G and small cell site infrastructure. At the same time, they severely restrict the amount of money that a municipality can charge telecom providers for accessing publicly owned rights-of-way. They effectively remove normal zoning requirements such as neighborhood notification and public hearings regarding installation of telecom facilities.¹⁴

PUSHBACK BY CITIZENS AND MUNICIPALITIES

A national coalition of nearly one hundred municipalities is suing the FCC, arguing that the FCC lacks the statutory authority to issue such restrictive regulations.¹⁵

In addition, California Congresswomen Anna Eshoo and Jackie Speier have introduced House Resolution 530, the Accelerating Wireless Broadband Development by Empowering Local Communities Act of 2019. This legislation would overturn FCC regulations that limit the ability of local governments to regulate the deployment of 5G wireless infrastructure. HR 530 would provide “that certain actions by the Federal Communications Commission shall have no force or effect.”¹⁶



FIGURE 1. Planned deployment of small cell sites on public rights-of-way This map shows Crown Castle’s plan to deploy distributed antenna sites (small cells) on public rights-of-way in a Maryland suburb. Other carriers are expected to deploy yet more cell sites.

HB 530 currently provides our best chance of voiding the FCC rules that prohibit municipalities from enacting moratoria on 5G. As of April 25, 2019, the bill, which protects state and municipal authority to make land use decisions and manage public rights-of-way, has forty-six co-sponsors.¹⁷

SIGNAGE ABOUT RF EMISSIONS

Antennas that emit RF radiation, including 5G small cell sites, must comply with Occupational Safety and Health Administration (OSHA) and FCC safety guidelines.^{18,19} However, several people familiar with federal regulations told me that telecom service providers’ obligations to follow OSHA and FCC regulations operate entirely by the honor system—there is no OSHA or FCC oversight.

Language in a recent agreement between a city and a telecom provider states that “Caution sign text must specify that a distance of nine feet must be kept from the antenna. . . .The sign will inform the person of the potential for high exposure levels and provide a phone number to call and arrange for power to be removed from the antennas for the duration of work.” There are two things to note with regard to this language. First, such a sign addresses electricians, tree pruners, roofers and others who might work near antennas, but it does not address children playing near a backyard utility pole, pregnant women, people with medical implants or individuals whose offices, bedrooms or kitchens might be within nine feet of said antenna. Second, there is no federal agency with a budget or a staff dedicated to monitoring RF emissions or enforcing protective signage.

Could municipalities “force” telecom corporations to post the notices that OSHA and FCC regulations require? Before telecoms deploy 5G small cell sites, concerned citizens might consider banding together with electricians, tree pruners, roofers and other workers to urge their municipality to insist that telecom providers post signs—readable from a distance—that advise workers to keep at least nine feet from the antenna(s); provide a phone number to call when workers need the antennas turned off so that they can work within levels deemed safe by OSHA; and note the antenna’s frequency and wattage. The goal here is to protect workers before they are exposed to EMR emissions at levels prohibited by OSHA and FCC. Signage might also increase public awareness of the antennas’ EMR emissions.

Even in the absence of any regulations to protect vulnerable groups such as children or pregnant women, requiring signage that alerts workers to EMR emissions should be within a municipality’s legal limits. If a municipality opts not to require signage to protect workers from a telecom provider, that’s an attention-grabbing story.

In 2013, well before 5G, the underwriter A.M. Best Company estimated that two hundred and fifty thousand workers come into close contact with cellular antennas every year. It warned other insurers that at close range, cellular antennas act

“essentially as open microwave ovens,” and that health effects in exposed workers “can include eye damage, sterility and cognitive impairments.”²⁰ The president of the International Brotherhood of Electrical Workers (IBEW), Edwin Hill, wrote in a September 11, 2013 comment to the FCC, “We believe that many of our members have been exposed to levels of RF radiation in excess of the FCC limits.” Hill further stated, “When there is a hazard, the hazard creator has a duty to warn others against the hazard.”²¹ He suggested that telecom corporations that are licensed to deploy transmitting antennas should be responsible for ensuring that IBEW members “know the unique physical boundaries at every work location so as not to exceed the referenced RF exposure limits.”

Concerned citizens might also urge their zoning and land use officers to insist that telecom service providers remeasure RF emissions if or when they change the antennas’ RF transmissions—as FCC regulations require—and post these measurements on municipal websites.

BEFORE ACTING, KNOW YOUR TERMS

Communities seeking the option of “fiber-to-the-premises” (FTTP) should be aware that the industry may use this term when they actually will only deliver “fiber-to-the-curb” (FTTC), “fiber-to-the-antenna” (FTTA) or “fiber-to-the-wireless” (FTTW). Telecom providers may also use the term “fixed wireless Internet” to describe connecting fiber to small cell sites.

For safer, more secure and more reliable telecommunications, we need wired infrastructure (fiber or copper) delivered to a wired connection in each premises. To move toward this end, we need to repeal the federal acts and municipal mandates that effectively eliminate local authority over telecom facilities. HB 530 may serve as a model.

BEFORE ACTING, KNOW YOUR LAWS

Recently passed FCC orders, federal acts and state laws that prohibit restrictions on fiber delivered to public rights-of-way and promote wireless service from public rights-of-way to individual users may have other impacts detrimental to community interests. For example, advocating municipally owned fiber-to-the-premises may unintentionally divert public funds to deliver fiber to small cells. Such diversions of public monies would reduce the industry’s costs to build 5G networks.

Some communities may have grants to install power lines, cables and fiber optics underground. If you access these grants, be sure that the fiber is delivered all the way to each building or home.

INTERNATIONAL ACTIONS TO HALT OR DELAY 5G

Internationally, some municipalities and political parties have called for proof of safety before deploying 5G small cell sites. Municipalities that have halted 5G development because of health concerns include Brussels, Belgium; Geneva, Switzerland; a municipality of Rome, Italy; and others.²²

In Australia, the Health Australia Party (HAP) has outlined an EMR pollution policy²³ that supports initiatives including:

- Adopting the precautionary approach regarding exposure to electromagnetic fields
- Designing, building and wiring buildings so as to reduce exposure to electromagnetic fields
- Requiring that new radiation-emitting technologies, including 5G, be shown to be safe for all members of society before their introduction to the market and rollout across the country
- Requiring all radiation-emitting devices to carry the notice: “This device emits radiofrequency radiation—use with caution”
- Carrying out a public education campaign informing people about safer technology use.

FEDERAL, STATE AND LOCAL ACTIONS

There are a number of actions that you can take right away. First, to prevent the telecom industry from hijacking fiber for 5G, we need to repeal the federal legislation—specifically, the 1996 Telecommunications Act—that deregulated wireless services and separated wireless and wired systems. In addition, petition members of Congress to pass HR 530, which would repeal FCC orders that deny local authority over 5G telecom facilities.

If your state has not yet passed a streamline bill, act quickly to prevent one from passing. If your state has passed a streamline bill, seek to repeal it. At both the state and municipal levels, HR 530 could serve as a model for repealing local legislation that has streamlined deployment of telecom facilities. Congress will also need to allow municipalities to enact moratoria on 5G deployment if they choose. We need legislation that requires firm precautionary due diligence on 4G and 5G engineering and that protects local authority, public health and our environment.

Locally, get your municipality to join the National League of Cities’ efforts to oppose bills that further decrease local authority over telecom facilities. Join with rooftop workers and urge your municipality to insist that telecom providers post warning signs about RF emissions.

At home, maintain (or restore) wired services as long as you can. If you stick with Wi-Fi, learn how to unplug and keep the Wi-Fi off at night for at least twelve hours (see “Get an on-off switch”). It would also be wise to wait at least four years to upgrade any new device or service. Finally, do not allow children access to electronic devices until they have mastered reading, writing and math on paper.

SIDEBARS

GET AN ON-OFF SWITCH

I have heard from many households that when they get Internet service, the provider installs an antenna on their roof that effectively makes it a Wi-Fi hotspot—without the customers' permission. I have also heard that in some areas, only wireless Internet service is available.

In some instances, if a family turns their Wi-Fi off while they sleep (as many physicians advise), only a repair person from the Internet provider can restore their Internet access. Certainly, every customer should be able to turn off the Wi-Fi at their own home and turn it back on at will. Service providers should be obliged to explain how to do this.

An electrical engineer with a medical implant told me that even when his Internet provider said that his Wi-Fi was shut off, his meters told him that it was on. "Every person deserves the right not to be exposed to EMR. Every household deserves the ability to shut off Wi-Fi with a simple switch," this engineer says, plainly. "Probably," he adds, "these rights need FCC and FDA [Food and Drug Administration] mandates."

Finally, telecom providers should also be obliged to explain how to encrypt Wi-Fi and cell service so that customers can protect their privacy and prevent others from using or eavesdropping on their Wi-Fi.

IMPACT OF ELECTRONIC TECHNOLOGIES ON AGRICULTURE

1. EFFECTS ON POLLINATORS: RF radiation emitted by cellular antennas and devices disrupts pollinators' cryptochrome-based navigation. Cryptochrome is a magnetically sensitive protein (used to determine magnetic north) located in pollinators' eyes. If it were only pesticides, the Varoa mite or harsh winters that were causing bee colony collapse, we would see ill or dead bees. A hive's disappearance signals a navigational issue.²⁴

2. TOXIC WASTE: The ores (such as cobalt, copper, lithium and quartz) used in electronics require washing that takes water from farms and generates toxic waste that further hinders farming.^{25,26} Cooling systems used by data centers also require water (that can't go to farmers). In 2014, the National Security Administration's Utah data center consumed 1.7 million gallons of water per day.

3. LOSS OF FARMLAND: To maintain our electricity-dependent lifestyles, solar and wind "farms" now cover what had been farmland.

4. LOSS OF KNOW-HOW: Using artificial intelligence (AI), computer-laden tractors now can determine a parcel of land's mineral and moisture content, expected weather and the seed, herbicide, pesticide and fungicide needed to yield the most lucrative harvest. Overreliance on AI for these metrics will ultimately deprive farmers of the innate and experience-driven know-how they have traditionally possessed.²⁷ In addition, the tractor's computers require electricity-reliant wireless access networks, which in turn transmit EMR that disrupts pollinators' navigation.

5. WEATHER: According to scientists from NASA and other agencies, 5G operations in the 24 gigahertz (GHz) band could interfere with weather forecasting. This is because scientists can only measure water vapor accurately in the 23.6–24 GHz band; adjacent commercial operations in this band "will result in a partial-to-complete loss of remotely sensed water vapor measurements."²⁸ By and large, weather forecasters welcome 5G, but not in the 24 GHz band.

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