A Clear Call

America Unplugged-A Guide to the Wireless Issue

by B. Blake Levift

The following was presented by award winning author B Blake Levitt at the Berkshire-Litchfield Environmental Council: Environmental Tower Siting Conference, held in Connecticut on May 10, 1997.

As the author of a consumer-oriented book on electromagnetic fields, which has an inclusive section on the radio-frequencies, I get calls from all over the country from worried homeowners and parents with telecommunications towers going up in their communities. I also get calls about satellite uplinks and power lines, and radio and TV towers. But by far, the greatest number of calls are about cellular and PCS Systems, usually from extremely distraught people who have suddenly discovered that a cellular tower is planned near their homes, or on their children's school property.

Their driving concern is always the medical issues, with aesthetic concern s, and property devaluation following closely behind as part of the entire package. They are typically appalled to find out that their local governing agencies, as well as their boards of health, are not only uneducated on the health issues, but often apathetic and powerless to boot. And they are enraged that the telecommunications companies claim to have the ability to place towers in communities that don't want them. Most people at the local level, citizens and municipal agents alike, know nothing about the preemption moves by the telecommunications companies at the FCC over the last few years. But when they find out, they become angrier. The anger is often directed at the perceived apathy and incompetence of the planning and zoning officials. In Connecticut, it's often directed at the state siting council.

Every community across the country is facing what we are talking about here today. In fact, most communities have been involved with tower siting battles for several years now. Litchfield County has been very lucky so far. There are people in this audience from other states, and different areas of Connecticut, with war stories to tell us.

This is a serious business. An estimated 100,000 new cellular towers utilizing the 800 to 900 MHz frequencies (the so-called "old" Systems) are scheduled to go online across the country by the year 2000. An additional four new PCS carriers using the 1 to 3 GHz range were recently approved by the FCC for each area. That system will add many hundreds of thousands more. PCS antennas need to go every 2 to 8 miles apart. That's 2 to 8 miles apart, times the four carriers. The systems don't share

frequencies so they all need their own antennas. By law, we have to site all four. That's a lot of antennas. Litchfield County cannot remain unscathed much longer, especially with our substantial population of weekenders who bring high discretionary incomes, and who already own cellular phones which do not work out here.

Siting the antenna necessary for the technology is a planning and zoning nightmare, and a serious threat to our health and environment in ways that Congress simply did not understand when they passed the Telecommunications Act of 1996. Legislation moved so fast through the last Congress that most of the legislators in Washington, who were voting on the Telecommunications Act, didn't even know what the implications of those preemption clauses were to their constituents back home. Now everyone is finding out, and no one is happy about it. Legislators all over the country are getting flack for this, and major sections of the act are likely to be revisited by Congress.

FCC Cheerleading Squad for Industry

Many observers think that the FCC is a government agency run amok under the directorship of Chairman Reed Hundt, a man with a reputation as a rigid free-market ideologue and a technophile. He seems more interested in stimulating the economy, and auctioning off our air waves, than in monitoring the communications companies. Martin Nolan, the respected Boston Globe columnist recently called Hundt's FCC "a cheering squad for the industry it supposedly regulates." Many also think that the very limited frequencies of the electromagnetic spectrum, which belong to the U.S citizens like our national forests and other important resources, should not be sold off to private corporations without a public debate on the order of what occurs when logging or oil drilling rights are sold in our forests. But such a national debate about selling the spectrum hasn't occurred, probably because the very finite "real-estate" that is the spectrum is
invisible. It remains a monumental public policy issue that very few of us, as citizens, have had an opportunity to comment on before this telecommunications buildout occurred. The FCC is bending over backwards to help the industry, but no one is really protecting the best interests of the citizens, or the communities. And the subject seems so esoteric to most of us, that we are unaware of the fact that we should be concerned. Until, of course, a tower goes up in our back yard...

Before the Telecommunications Act became law, numerous communities across the country were simply banning cellular phone towers outright. Irate citizens who looked at the health issues, which are real, simply refused to take the risks and insisted their town governments back them up-- which many did. The industry's response back in 1993 was first to petition the FCC to preempt all state and local zoning. Very few people knew this was happening at the federal level. It was a major power-grab of local and states rights by the telecommunications giants. Not since the robber-baron days at the turn of the last century, and the building of railroads, has there been such contempt for local land-use authority. There was not a single press article on the preemption moves at the time, that I am aware of. The petitions were filed two days before Christmas, after government officials had left for the holidays, and at a time

when it was thought that most FCC observers would be otherwise occupied. There was only a 30-day public comment period. Nevertheless, a number of people, including several activists in this room, managed to get the word out quickly so that others, like the American Planning Association, the Connecticut Siting Council and Attorney General Richard Blumenthal, among others, had the opportunity to comment.

The FCC, by its own admission, is a licensing and engineering agency which defers to other agencies for research and standards setting. It wisely turned down the preemption requests because to do otherwise would have been flagrantly outside their authority, not to mention against the 1 Oth Amendment of the U.S. Constitution. Industry then went searching for a legislator to champion their cause at the legislative level and found one in Senator Klug from Wisconsin who introduced preemption clauses into the huge and complex telecommunications bill. Again, there was a mad scramble to educate concerned people and organizations about this new power-grab. Activists were frantically lobbying representatives and senators, who knew nothing about why these clauses were in there, or even what they meant. They certainly didn't know that there was a raging debate about the health effects of the radio-frequencies that had been going on for decades in scientific circles. A last ditch, bipartisan effort by Senator Diane Feinstein, a California Democrat, and Senator Kernpthorn, an Idaho Republican, tried to remove the clauses, but that effort was defeated by a narrow 56 to 44 margin on the
Senate floor. That will give you an idea of the kind of pressure that legislators have been under from their constituents to not allow this industry to have a clear, carte blanche shot at the country, as if there were no problems with this technology. But industry prevailed, due in large part to the pro-business, anti-environmental attitudes of the last Congress, a deal-making Clinton administration, and millions of dollars poured into re-election coffers by the telecommunications companies. Ask Senator Joseph Lieberman how he voted. And ask how much money the telecommunications companies donated to his campaign.

What became the law of the land in Section 704 of the Telecommunications Act was this: State and local governments preserve their authority over the placement, construction, and modification of personal wireless services. But they cannot discriminate among providers, nor prohibit -directly or indirectly the provision of such services. The section further preempts State and local regulation of such placement on the basis of the environmental effects of radio-frequency emissions, to the extent that such facilities comply with the FCC regulations for such emissions. That last statement goes directly to the heart of the problem. It's also like having an elephant in the room and trying to ignore it.

Local vs., Federal Control

Many people inside and outside of government know that all of this is on legal thin ice. Even the FCC admits they are surprised that no one has challenged this at the federal level yet, with an eye toward a Supreme Court case. Everyone seems to be waiting for that one tenacious community, with deep pockets, to draw the line, and just say no. There are significant legal issues regarding zoning and siting determinations;

challenges to health and public policy authority regarding radiation standards-setting; property-rights and illegal takings regarding real estate devaluation; and even free-speech issues regarding our ability to simply discuss the environmental effects of the radio frequencies at local planning and zoning meetings. These are a lot of rights that are in danger, and it's a classic battle of local vs. federal control.

The telecommunications industry is not a "nice" industry. The representatives who appear at the local level are usually great. More helpful people you won't find anywhere. They always want to "work with the towns." Offer to pay for fire, police and ambulance radio services on top of their own. That's an intentional strategy. They hold workshops to teach them this approach. And they teach them how to handle the media. But the industry behind the scenes is a multi-billion dollar conglomerate that plays big-time political hardball. Local zoning regulations are a major hassle to them and they want us out of the way, except as users and payers for their service.

Industry Moves to Ban Moratoriums

Among their most recent moves -- which, again, most people are unaware of, and about which the press is asleep - include a request that the FCC ban local communities' ability to set temporary moratoriums; and a request that the FCC declare it illegal for communities to make the providers prove that they are in compliance with the RF emissions regulations. They are also trying to get the FCC to forbid discussion of the RF health effects at zoning hearings. But the most ominous move is going on as we speak. Industry has asked the Senate Commerce Committee to preempt all state and local siting authority again, to consider telecommunications as an interstate commerce issue. That committee does have the authority to override state's rights. There's a two-week comment period that will start ticking around Wednesday. Consumers have been banned from commenting at the hearings. Industry is heavily represented. It's difficult to get any information about it' but I urge people to write. And Reed Hundt may declare moratoriums illegal as soon as next week. Well over 300 towns across the country have moratoriums in place. Industry doesn't want us to study this situation. The FCC is happy to oblige. Hopefully, there will be a public outcry that will include the voices of the people in this room.

All of this is by the way of political background. I'm a firm believer in understanding the big picture before getting to the nitty-gritty. But my real job here today is to talk about the medical and science issues. I hope to scare the planners and zoners in the room into doing the right thing to protect the towns. I hope to inspire the legislators in the room to re-think these laws and maintain local control. And I hope to encourage everyone to write their legislators who are not present, and say enough is enough.

Despite the preemptions, there's a great deal that we still can do. You just have to know why certain recommendations are being made in order to take them seriously. It's very tempting to consider the prospect of communications towers on scenic ridgelines or in neighborhoods as merely an aesthetic problem. And it's also very tempting to just hide them in church steeples, or on barn silos, or atop tall buildings, or to shield them in state forests. That's what you do to solve the aesthetics. But the

health and scientific problems associated with this technology are much more complicated than that -as the telecommunications industry well knows.

The Medical Issue

So what are these medical issues, and what research backs them up? First, let me emphasize that at its core, this is a medical issue. The aesthetics and property devaluation problems are a by-product of the main concerns and will fall into line when the medical consequences are better understood.

When the industry talks about "environmental" effects, they mean health effects in humans. They are so afraid to say "health effects" and "cellular phones" in the same sentence that they have made the language fuzzy. The research for the radio-frequencies is nowhere near as abundant as it is for the 60 Hz power line frequencies. Some would say this is not an accident; that you can't find what you're not looking for. But a substantial amount of research does exist, certainly enough to get the general lay-of-the-landscape.

One central problem exists with the RF research, though. Scientists are impatient humans like everyone else, and they want answers to their questions quickly. A lot of the studies used to determine human exposure standards are based on high-power, short-term test designs that are then used to extrapolate downward in order to arrive at presumed safety levels. But most exposures to the radio-frequencies in the real world, especially for those living near antennas, are of the long-term, low-level variety. These have very different biological parameters associated with them. So a lot of the research that's been done is of an inappropriate kind, and it's being used to reach inappropriate conclusions. The low-level, short-term studies are much fewer, but every one of them is disturbing.

Radiation is a natural part of the universe. We are bathed in a constant stream of electromagnetic radiation produced by the power of the sun's solar winds, which give off high-energy ionizing radiation like x-rays, infrared, ultraviolet, gamma and cosmic rays, and some radio/microwave frequencies too. These interact in a complex way with the magnetosphere, which protects the earth from this barrage otherwise we wouldn't exist on this planet; as well as the ionosphere and the atmosphere closer to the earth.

The earth itself is a giant dipole magnet (like those little bar magnets we all played with as kids) containing a north and a south pole. Micropulsations in the 1 0-hertz frequency range constantly emanate from the earth's core. Scientists used to think these micropulsations were an interesting but meaningless phenomenon. Today they think all living things are in a complex relationship with it; entrained by it, in fact. Entrainment phenomenon can be thought of as what occurs when a mother and child sleep together and their breathing rates synchronize.

Energy is what we respond to, like plants to light. Every living thing is in harmony with these subtle signals. It's been found to control our most basic circadian biorhythms,

our sleeping/waking cycles, important hormone production such as melatonin, and some crucial aspects of cell division itself. Human brain waves, in fact, function mostly around the 1 0 Hz frequency, just like these micropulsations. Other species also rely on this natural magnetic background. It is known to determine bird and butterfly migration patterns for example, among many other things.

Not All Energy Is Alike

But not all energy, which is expressed in wavelengths and frequencies, is alike. Nor is its properties, or effects. The electromagnetic spectrum is divided into ionizing and non-ionizing radiation. Ionizing radiation, like x-rays, is powerful enough to knock electrons off of their cellular orbits and therefore cause genetic mutations. The non-ionizing bands, like the microwave and radio frequencies, aren't powerful enough to do that, but can cause a range of other reactions such as tissue heating, like what occurs in a microwave oven. The dividing line between ionizing and non-ionizing radiation is in the visible light range, around the ultraviolet band, but no one can say precisely where one leaves off and the other begins. This is a concern for consumer products like color TVs and computer monitors which are multi-frequency products. A TV plugs into the wall at the extremely low frequency power line range of 60-hertz, and utilizes energy all the way up through the light frequencies. At the top end of the range, x-rays and UV particles are being given off. That's why it's a good idea to sit at least six feet from such screens.

Most medical doctors know nothing about this. What we're talking about are the sub specialties called bioelectromagnetics and biophysics -- arcane disciplines that are not taught in medical schools. But it has been known for years that the human anatomy is actually resonant -- in the strict physics sense of the term --with the FM-frequency bands, and that the brain reaches peak absorption in the UHF bands -- right where cellular telecommunications operate. Some researchers think that a worse frequency could not have been chosen for the emerging technology regarding the human anatomy. Resonance, by the way, is what happens when an opera singer hits high-C in the presence of a crystal glass for a sustained period, and it dramatically shatters.

Light Bulb Theory Burnt Out

Telecommunications representatives at public hearings and in the press routinely blur the distinctions between frequencies, likening their installations to 25 and 100 watt light bulbs in an attempt to confuse and placate concerned citizens What they leave out is that their systems operate at ultra high frequencies (UHF).in the microwave bands, which are maximally absorbed by human tissue. And they also don't specify that each channel is 1 00 watts. Channels can be split as user demand increases, and there can be hundreds of channels on some towers. This is no longer a low-powered transmitter suitable to sit on top of someone's barn silo, but rather something closer to the power output of a local AM-radio station. It is crucial that the towns be careful where they initially allow these installations to go. Any installation site will inevitably grow as others piggyback onto it. And because they are what's called "line-of-sight" technologies, the initial sites will also determine the placement of the others.

A regional plan is imperative if Litchfield County, ten years from now, is to look anything like it does today.

Not Safe At Any Level

But again, it's not just about aesthetics. Research exists to indicate that there are some frequencies which may be unsafe at any intensity, no matter how low the power is turned down. This is a critical point in siting considerations. The FCC standards are based on what's called a "thermal model", meaning the RF-frequencies ability to heat tissue like microwave ovens cook food. It is presumed, in thermal models, that if the power is turned down low enough, or if exposures are kept short enough, heating will not occur - which is true And so each time a tightening to this standard is attempted, either the length of the recommended exposure is reduced (which no one abides by anyway), or the power is turned down. But this is not enough.

Serious Nonthermal Effects

A range of non-thermal effects have been observed since the 1940's when the U.S. Bureau of Ships began studying health effects in Navy radar personnel during World War 11. In 1953, Dr. John T McLaughlin, a medical consultant at the Hughes Aircraft Corporation, noted for the first time in radar workers, internal bleeding, leukemia, cataracts, headaches, brain tumors, heart conditions, and liver involvement with jaundice, as effects from microwave/radar exposures. Other early research found disturbing blood abnormalities, cataract formation, and various cancers at non-thermal exposure levels.

Another early researcher, Dr. Allen Frey, reported in 1975 changes in the blood brain barrier in rats exposed to pulsed microwaves -- similar to what's used in today's new digital PCS systems. Increased blood brain barrier permeability has since been noted by several other researchers as well. The blood brain barrier is what protects the brain from access by any number of toxins, bacteria and viruses. It's not a good thing to tamper with its sentinel functions. Frey also noted in his early work -- which he recalled at an FDA conference -- that he and his laboratory assistants, as well as their test subjects, all developed severe headaches during the course of their microwave studies. He resolved back then not to use humans as test subjects after that.

The Body Electric

Frey's recent comments are in response to thousands of complaints about headaches in cellular phone users that are now surfacing around the world, much to the amazement of mainstream medicine. But anyone who knows anything about this subject is not surprised by these so-called "new" reports. Humans truly are "electrical" beings. The heartbeat is electrical. Brain waves are electrical. Most hormonal and neuronal activity is electrically regulated. Some crucial aspects of cell division itself are too. In humans, the eye was thought to be the only organ that had evolved to perceive a band of the electromagnetic spectrum --that of visible light. But recent research has found that the pineal gland, located deep within the center of the brain,

is probably a limagnetic" organ which determines our sense of direction, among other things. One could argue that not much happens in the human anatomy that isn't electromagnetic. So why wouldn't we react negatively to some frequencies, or, then again, positively to some others? In fact, many non-ionizing frequencies are used therapeutically, because of their deep penetration ability. Diathermy treatment is an example. And laser surgery, which is widely used today in surgical practices and a great improvement over traditional scalpel methods, uses highly concentrated light frequencies of different colors. Each color has its own properties. So how good an idea can it be to have a cellular phone transmitter placed against the head on a regular basis? Those transmissions go directly through brain tissue. Living near a cell tower does the same thing.

Most laypeople understand this on a powerfully intuitive level. We experience ourselves as whole "energetic" beings - as far more than the mere sum of our individual parts. It's easy to intuit that there could be a problem if we are subjected to an array of artificial energies. And that's why those who live near telecommunications installations are worried and threatened, and why parents across the country try to stop towers from being sited on school property. It isn't because they are hysterical NIMBYS, or anti-technology, as industry would have us believe. These become involuntary exposures when people are forced into them.

Without going through a long list of research findings, which usually bores everyone, let me point out just a few high spots... For those who want more detail, there's plenty in the book ...

Here's what's been recently observed that translates to this technology, and hopefully to your planning and zoning, and legislative decisions...

Adey Research

There's the window-effects work of Dr. William Ross Adey, a neuroscientist at the Veteran Administration Hospital in Loma Linda, California, and Dr. Carl Blackman, a biophysicist at the EPA Center at Research Triangle Park, in North Carolina. These two researchers have found in a series of studies that the human anatomy has critical "windows" which responded to some frequencies, but not to others. At set intervals in the non-ionizing bands, they observed changes in calcium ion flow. Calcium is the body's information "currency." Cells use it for any number of critical functions. It's not a good thing to tamper with. What they actually found was a kind of ion channel "dumping" of calcium that was quite dramatic. It could have effects on many cell functions, including cell division.

Szmigielski Findings

Then there's the on-going work of Dr. Stanislaw Szmigielski and his co-researchers at the Center for Radiobiology and Radioprotection in Warsaw, Poland. In microwave and radar personnel, they have noted sharp increases in cancer - including lymphomas, melanomas, leukemias, and brain tumors - high blood pressure, headaches, memory loss, and brain damage. They also noted immune system

abnormalities; first an over-stimulation, then later immune suppression after continued exposure to low levels of the microwave bands. That's an important observation with this work because sometimes researchers note immune system enhancement and conclude that some of these exposures are actually good for people. In fact, Ross Adey completed work this year for Motorola studying test animals for exposures like those of cellular phones, and found just such a probable immune enhancement -- at non-thermal levels. Some in the popular press extrapolated from this that cellular phones protect users from brain cancer. Researchers need to continue the tests beyond that initial phase to see what really occurs.

Guy Examination

In 1984, Dr. William Arthur Guy, at the University of Washington in Seattle, found an increase in malignant endocrine gland tumors, and in benign adrenal gland tumors in test animals. This was a five-year, $5-million dollar study of long-term, low-level exposures that was funded by the U.S. Air Force. The study also indicated immune system malfunctions in that nearly all of the initial test animals died from infections. The studies had to begin again from scratch.

Lai Singh Investigation

In 1994, Drs. Henry Lai and N.P. Singh, at the University of Washington, Seattle, found both single and double-strand DNA breaks in test animals exposed to cellular and PCS-frequency pulsed microwaves. Double-strand DNA breaks are thought not to repair themselves and can lead to mutations. Dr. Lai just announced at an FDA workshop on this subject that in recent follow-ups, they noted that such breaks were blocked by the hormone melatonin. Melatonin, in several studies, has been found to be suppressed in power line frequency exposures. Often, wireless technology is "modulated" with such ELF frequencies. There are complex synergistic relationships with many of the non-ionizing bands that fall well outside the range of thermal effects.

Repachoil Research

A recent Australian study hot off the presses that hasn't been reported in America yet, has found a significant increase in B-cell lymphomas in test mice exposed to long-term, low-level pulsed microwave frequencies in the cellular and PCS range. Changes in B-celis in the immune system are implicated in roughly 85% of all cancers. The study was funded by Telstra, the telecommunications conglomerate, and headed up by Dr. Michael Repacholi, an industry researcher widely known to espouse that cell phones are safe. Additional significance of this study is the fact that these changes occurred at what are called "far-field" exposures, not the near-field exposures such as would be experienced by cell phone users themselves. This has implications for those living near transmitter sites, as well as those in the immediate presence of people using cell phones. It's like the secondary smoke issue. Stand back from someone using a wireless device. Even the FDA recommends this, but few people know about it.

Kirschvink Findings

Another important body of work comes form Dr. Joseph Kirschvink, a geobiology professor at the California Institute of Technology. In 1992, Dr. Kirschvink discovered magnetite in human brain tissue in the blood brain barrier and the meninges which covers the brain. Magnetite interacts a million times more strongly with external magnetic fields than with other biological material. Although it has been known for years that bees, butterflies, birds and fish manufacture magnetite - often in thick clusters, or in long crystal chains, and use it as a navigational tool, it was thought that humans did not manufacture their own magnetic material. Any regulations for these technologies which surround us are based on a presumption that humans do not manufacture magnetite. This body of work has profound implications for the safety of MRI scans for instance, as well as wireless technologies.

Bise Research

Another study that I find haunting was conducted by Dr. William Bise in 1975, using ten human test subjects. Bise found severe alterations in human electroencephalograms at microwave and radio-frequency power levels that have now become common in many urban areas. The year-long study documented a kind of entrainment of test subjects brain waves with the external exposures, and radical changes in mood and behavior. That study alone should give us pause. Some frequencies are known to suppress serotonin production in the brain. Low serotonin is implicated in depression (that's what Prozac boosts), in increases in suicides and in violent aggressive behaviors.

Other researchers have noted significant increases in cancers of the liver, and breast cancers in RF/MW exposed groups -- all at levels thought to be safe, and which fall well within the FCC standards of today.

FCC Standards Inadequate

I trust everyone is getting the general theme... The research exists, and it is credible. It's a question of pulling it together and seeing it for what it is. I've only scratched the surface of it here. The FCC standards that are supposed to protect us, are inadequate. What's important to know, as planners, is that although you can't set more stringent standards at the moment, you can site installations in a way that accomplishes the same thing. It often takes decades for public policy to catch up with scientific research. We need to err on the side of caution as best we can in writing zoning by-laws. It's the one real handle we actually have.

An amazing paradox keeps popping up in this research. It's something that is usually ignored, probably because we just don't know what to make of it. The paradox is this: It is often observed that the most profound bioeffects occur at the lowest intensities... Researchers call it a "non-linear effect." It's probably due, in part, to entrainment phenomenon, and our relationship with the earth's natural fields. In the past, when an environmental "pollutant" has been identified, we've surmised a theoretical safe level and tried to regulate it there. But if the energy modalities turn out to be more bio-

reactive at the lowest levels, what does this do to our common regulatory wisdom? It turns it completely upside down.

It looks like we are dealing with a new scientific model with these energy modalities. The cutting edge of most medical research is quietly undergoing a paradigm shift that's so subtle, that most researchers and clinicians are unaware of it even as they incorporate it into their own practices. We are gradually shifting our understanding of the human anatomy from the familiar chemical-mechanistic model, to a much more refined, interesting, and complex emphasis on the human anatomy as a coherent electrical system.

With the wireless juggernaut now sweeping the country, however, an immense problem arises. Our standard regulatory approach is based on the conventional toxins model, such as chemical pollutants. But if we are dealing with a new model in which the most profound effects occur at the lower exposures, that toxins model is not only ineffective, but may actually be detrimental. We simply don't know. In the meanwhile, this technology is creating a seamless shield of new exposures in extremely close proximity to the population for the first time in our evolutionary history, often with characteristics -such as digital signaling and unusual wave forms, that are simply not found in nature. We are irrevocably altering the electromagnetic signature of the world. And we are doing this with no clear understanding of the implications to humans or other species.

Don't let anyone tell you that the addition of these wireless services is just a drop in the bucket given that "energy happens." It's just not so. And perhaps if more consumers understood the legitimate medical issues which underlie this, namely that it may not be a good idea to have a transmitter of any kind against one's head -- no matter how low-powered, that fewer people would be rushing to buy cordless and cellular phones. If consumers understood that when they use wireless products, they are not just irradiating themselves but everyone else around them too, they might re-think their use of such devices.

What To Do Now

So what would be helpful right now? Given the fact that the horse is already out of the barn, and we're probably going to have to site some towers... Others'will speak to these points but here's a fast glimpse:

1. Institute 6-month moratoriums while you study the options. Have something on the books, or at least ready to go in case applications come in.
2. Write effective planning and zoning bylaws that establish "by-right" zones where telecommunications facilities can be sited, but nowhere else. Keep these zones away from residences, schools, hospitals, and nursing homes. (New Zealand, by the way, bans them on school property.) Establish large set-backs near such areas. If the towns own the land, and I recommend that they do, they can control the area around the facilities, and reap the licensing fees to benefit the taxpayers.

3. Don't allow private entrepreneurs to start telecommunications installations -- especially in residential neighborhoods. Most of the time, such entrepreneurs don't have the vaguest idea what they are getting involved with. This has become a nightmare in some communities. As installations grow, which they inevitably do, they become extremely complex, hazardous electromagnetic environments that become impossible to measure. Farmers in particular are vulnerable to approaches from the industry. While everyone wants to see our farmers make a good living, this can actually devalue everyone's property including their own. It also opens them to liability suits for a number of claims. There is no statute of limitations for EMF suits for health damage. There is also a move by industry at the FCC to shift all liability onto the site owners. Most people who are approached, or who offer their own land, are not told any of this, and they rarely know about the health effects other than what industry literature tells them.
4. Don't be tempted to lease space on town-owned buildings if those buildings are near populated areas. Don't be tempted to hide them inside silos or church steeples. This is not just about the aesthetics.
5. Make sure you have tower-sharing regulations in your zoning laws. Make every tower or new antenna array justify its placement. if existing towers are present, make newcomers lease space there, rather than establish new sites. Make them prove from an engineering study that existing sites won't work. Economic reasons are not good enough to justify new tower sites. Get independent engineering reviews and make the companies pay for them. In cases where development has encroached on existing installations, either move the transmitters, or buy out the residents.
6. Establish regional transmitters, and group as many RF users together as possible. Create large setbacks near such facilities (miles, if possible - not just feet), and regularly monitor them. Measure the ambient backgrounds at different distances and heights. Pay particular attention near metal objects and structures like water towers and metal roofs. High RF concentrations can occur near them. Keep a log at zoning offices and health departments. We have an unusual opportunity in Litchfield County to explore a regional approach. That option has already been lost in more populated areas of Connecticut.
7. Establish regular emissions monitoring, using specific measurement protocols, or all transmitters by independent licensed RF engineers. Require that the companies pay for this monitoring on an annual basis. The state cannot, and will not do this. Neither will the siting council. Communities have been asking them for years. One engineer can be shared by several towns. If a facility is found in violation of the FCC standards -- either by single users or in the aggregate -- impose daily fines until compliance is reached. After a set time, shut them down if the problem is not fixed.
8. Require pre & post testing, according to specific measurement protocols. Measure before a transmitter goes online, and after it goes online. This is the only way to accurately assess what we are changing in the environment, and when. It is also the best way to provide medical researchers with a baseline

guide for future epidemiological studies. Such studies are often thwarted by the absence of this exact piece of information.

9. Restore and protect state and community rights in tower siting. Local communities know their typography much better than a distant engineer's computer model, or the siting council. And if a majority of people in a town want to live in a wireless dead spot -- that's their right. Let them.
10. Encourage satellite-based systems, such as Motorola's Iridium Network, which will greatly reduce the number of ground-based transmitters. For those who use cellular phones, inform them of the associated risks with the higher-powered handsets that would have to accompany such a distant system. At least these exposures would then be voluntary, and hopefully based on informed consent.
11. Declare in your regulations that wireless technologies are not public utilities. Public utilities can go into residential areas unchallenged. These are for-profit businesses, and their service is a discretionary use.
12. Keep all liability on the providers of the services. It's the only way to keep industry responsible and accountable. Do not allow liability to be shifted onto the site owners. Make the companies indemnify the towns and site owners with a blanket coverage. Make them post bonds in the event that facilities become obsolete and must be removed.
13. Keep the courts accessible to those who seek damages. It is the only recourse of fairness for consumers. Restore the ability of attorneys who are federally funded in community law offices to file class action suits on behalf of consumers. This is another right that was recently taken away without enough fanfare.
14. Tell your legislators not to consolidate so much power at the FCC. We have paradoxically given them vast new authorities, yet cut their budget. Nine FCC field offices were closed last year. They were never adept at policing the local level for RF safety. Now they've abandoned even the pretense of it, and have in fact shifted that responsibility entirely onto the states and local communities. The FCC cannot even provide a complete list of all the transmission facilities in the U.S. The Connecticut Siting Council, by the way, can't either. This whole situation has created gaps in consumer safety that are too big to bridge without regular monitoring at the local level. Also tell your legislators to pay attention to preemption moves where ever they come up.
15. And last but most importantly, lobby your legislators for a comprehensive government research program for the radio-frequencies. The only research being done today is by industry, which some liken to the fox guarding the chicken coop.

A government RF program should include -but not be dependent upon - matching funds from industry. Such a program should be protected from the political follies of changing administrations, as well as undue influence from industry, and great care should be taken to keep it unpoliticized. It should be housed at the EPA or the National Institutes of Health, but not at the Department of Defense. Such a program should fund the appropriate research --meaning long-term, low-level, continuous

exposures across a range of non-ionizing frequencies, with modulation and other common characteristics taken into consideration. And the research should have a focus on understanding the non-thermal bioeffects.

Congress called for such research over 20 years ago, but it never came to pass. It is suddenly imperative that we have the answers to the medical issues in the face of wireless America. This buildout should not be allowed to continue without that information. Only when the medical and environmental issues are better understood, will the side issues like siting, aesthetics, economics, and property devaluation, fall into line. In the meantime, we have what we've always had - the ability to write good, strong-zoning regulations to protect our communities.

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