

# TOWN OF CORNWALL

## NOTICE

### CORNWALL CONNECTIVITY MEETING

Thursday, July 11, 2019 - 7:00 p.m.

Cornwall Town Hall, 24 Pine Street, Cornwall, CT

### TOPICS

- Fiber optics Options
- Broadband
- 5 G
- Microcells
- Municipal Gain
- Health Effects of Communication Technology
- State and Regional Plans
- and More

### SPEAKERS

- Maria Horn, Representative 64<sup>th</sup> District
- Kim Maxwell, President Northwest Connect
- David O. Carpenter, M.D. Director, Institute for Health and the Environment University at Albany
- Dan Reese, NWCT Comprehensive Economic Development Strategy (CEDS) Implementation Director
- Bill Vallee, State Broadband Policy Coordinator, Connecticut Broadband Office, Office of Consumer Counsel

Questions and Comments are Welcome





## LEGAL SITUATION IN CONNECTICUT RELATIVE TO BROADBAND

Connecticut currently has four legal ways to become a broadband carrier using wiring on public utility poles. One requires being an *Incumbent Local Exchange Carrier* (ILEC) such as Frontier or Comcast. One requires becoming a *Competitive Local Exchange Carrier* (CLEC), a private company registered with the state and entitled to compete with ILECs. The third arises from Connecticut Statute §16-233 that enables a municipality in Connecticut to use a reserved space on any utility pole “for any purpose.” Finally, Connecticut Statute §7-213ff, whose subject is municipal electric plants, allows a municipal electric utility to install cabling on poles for broadband networks.

We of course cannot become an ILEC, and forming a CLEC, while not impossible, has enough problems associated with its rules and the need for all communities to agree on its shape, costs, and financial distributions that it feels impractical. So we are left with the two options granted municipalities directly to build municipal broadband networks.

### **The Fate of §16-233**

Statute §16-233 was written in 1948 to give municipalities the right to free use of utility poles for “signal wire,” then meant for safety communications. The power was expanded to municipal networks used for municipal purposes through an initiative in Manchester in 1998 by which a Manchester fiber optic network connected telephone and Internet access in municipal buildings. AT&T sued and lost, setting a precedent called the “Manchester Decision,” but only for municipal uses. After several frustrating attempts to get §16-233 expanded so municipalities were clearly entitled to use its space on the pole for commercial broadband networks, Representative Roberta Willis and Senator Beth Bye managed to horn an amendment into §16-233 inside the 2013 legislative package that changed “signal wire” to “for any purpose.” After a series of maneuvers and counter maneuvers by proponents of the new language and incumbent carriers, principally Frontier, our Public Utilities Regulatory Agency (PURA) ruled in favor of Frontier, declaring in May of 2018 that §16-233 could not be used for commercial broadband networks because free pole access was discriminatory, giving municipalities a competitive advantage over Frontier, Comcast, and other incumbents.

Three entities sued PURA last summer: the Office of Consumer Counsel (OCC), with Manchester, New Haven, and West Hartford; the Connecticut Conference of Municipalities (CCM) that represents about 100 of the 169 towns in Connecticut; and the town of Sharon, in combination with Northwest Connect. It was the people against the incumbents. Briefs and hearings blew around, with oral arguments to be heard in August or September. A decision will be made before the end of the year, but whoever loses will appeal to the state supreme court. At least another two years will elapse before they

decide, and even then it will almost certainly have to go back to PURA for reconsideration given the nature of PURA's ruling.

Meanwhile the state legislature this year attempted, through Senate Bill 846, to make the statute's language clear and compelling regarding municipal rights to build a commercial broadband network. However, that bill was never brought to the floor for a vote. The effort will no doubt be reprised next year, with some better language informed by this year's experience and a better understanding of community capacities and requirements. However, that outcome is now just speculation and cannot be relied upon for community decision making.

### **Connecticut Statute §7-213ff**

Statute §7-213 enables any municipality in Connecticut to form a municipally owned and operated electric utility. This section and subsequent sections lay out the rules by which a municipality may approve such a utility and how it should be managed and controlled. Section §7-233ii gives municipalities the authority to provide "telecommunications services, as defined in section 16-247a." Section 16-247a clearly incorporates broadband networks into "telecommunications." This may seem strange, but many broadband networks have been installed by electric utilities in America, in part to service their own needs for a *smart grid*, in part to recognize that an existing electric utility probably already owns the poles and has all the equipment and processes to install and operate a wireline digital network. A similar law in Massachusetts has enabled a large number of rural municipalities in the western part of the state to install municipal fiber optic networks without even creating the electric utility (that will not work here).

The trouble with this law is that it has never been put into effect as a means of actually establishing an electric utility in Connecticut. We have six municipal electric utilities in the state, all clustered around Groton and the Thames River in the south-east corner. But they were formed between 1898 and 1904, way before the law itself. Whoever tries this first will be paving new ground. A central question will concern how much of an electric utility does one have to be to be an electric utility. Can a field of solar cells feeding electricity into the grid qualify? The law itself imposes no lower bound, although the law is clear that an electric utility may be in production *or* distribution, suggesting that a solar field by itself would qualify. But PURA will decide, at first at least, on what constitutes an electric utility.

One very good outcome accompanies the formation of an electric utility as a foundation for a municipal broadband network. Connecticut law allows and provides regulations for electric utility cooperatives. The six utilities including Groton have just such a cooperative that basically administers the networks for the six member towns. If a number of municipalities in our region formed electric utilities and established broadband networks thereby, they could be fused together into a single regional operating body without all the fuss and barriers of community agreements before hand. All that work will have been done. Thus the regional end game, of a regional broadband network, will be built into the process.



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## **SMALL CELL MOBILE ANTENNAS ARE COMING. ARE THEY DANGEROUS? CAN WE DO SOMETHING ABOUT THEM?**

*The general answer to the first question is “unlikely but not absolutely no.” The second question should be answered in the affirmative and lead to municipal rules for controlling antenna siting and power levels.*

### **The Move To Small Cell Antennas**

The four major mobile carriers are now “densifying” their 4G networks to grow capacity with *small cell antennas*, cylindrical radio transceivers about a foot in diameter and four feet tall that are mounted on telephone poles, street lights, or other structures. They have ranges from a quarter to half a mile. Current trials for the new 5G network use antennas that look the same, and often include a combination of 4G and 5G radios. The end game for 5G includes millions of similar antennas spaced perhaps as little as 300 feet apart.

Small cell antennas have caused alarm in many communities as they radiate electromagnetic waves (EM) which, at very high power levels (way beyond what the antennas produce) are certain to cause harm, even death, to human beings subjected to the radiation. The questions these antennas raise for communities being asked to allow their installation at sites very near homes and businesses are whether the power levels produced by them may also cause human harm, and can we do something about it?

### **Summary**

Small cell antennas, while physically closer to us, emit much lower EM levels than comparable antennas mounted on macro cell towers with ranges up to 20 miles. They are designed to provide the same power levels *at the mobile phone* as their more powerful cousins. These *received* power levels *at a human being* are hundred of times lower than the power *transmitted* by the mobile phone back to the public antenna, which originate often next to the human head. The principal concern regarding mobile phones then is not power radiated from antennas but power radiated by the phone. In fact, mobile phones transmit less power when the received signal is greater to conserve battery life, meaning that we absorb less EM energy the closer we are to the antenna.

However, small cell antennas still emit considerable power immediately at the antenna—much higher than the cell phone transmits; it must because signals suffer such rapid loss as they pass through the air. There is some suggestive evidence that persistent exposure to such power levels could be harmful. It therefore behooves any municipality to form explicit rules for siting small cell antennas to insure enough distance between them and people in their common habits of movement in the municipality, and that these power levels will be monitored and maintained by the owner of the antenna.

We would not last long fifty feet from the sun—microseconds to incineration. But we live more-or-less happily 98 million miles from the sun even though it bathes us with electromagnetic radiation (EM) over an enormous range of frequencies every day. The same is true for the EM radiation in the frequencies used for mobile telephone networks, microwave ovens, WiFi, Bluetooth, over-the-air television, cordless telephones, garage door openers, television remotes, and sleep monitors. They occupy the range from 700 MHz (television) to 2.4 GHz (microwave ovens, Bluetooth, Wifi, etc.), with current mobile phone systems from 900 MHz to 1.9 GHz. If you are inside a microwave oven at 1000 watts, you will die. The weakest power level that still activates a home WiFi receiver from the nearby router, several million times smaller than 1000 watts, is almost certainly benign. The same is as surely the case for power levels typically received at a mobile phone from the nearest antenna. They are not only measured in microwatts, they are thousands of times below the power transmitted by the mobile phone back to the antenna. In a properly designed and maintained mobile network, the danger, if there is any, comes from the phone itself, not signals from the remote antenna. Indeed, to conserve battery power most mobile phones reduce transmit power with higher levels of receive power, meaning you are safer closer to an antenna than farther away.

But only up to a point. Because signals from a remote antenna lose power so rapidly, they transmit *at the antenna* levels much greater than the mobile phone. Macrocell antennas transmit greater than 100 watts to get ranges up to 20 miles. Small cell antennas intended for ranges around half a mile may transmit as much as 12 watts. The loss is so great that mobile phones assume the top signal received is 0.1 microwatt. But there is some evidence that continuous or persistent subjection to these frequencies at 12 watts could cause various forms of human harm, all induced by the fact that such frequencies at such levels heat up human tissue.

It must be said that these studies are not definitive, are not on human beings except in some statistical sense, are often not repeatable, and co-exist with many other studies which show no harm from normal use of cell phones. “Scientists” who argue that you should not sleep next to your cordless phone at night have no real evidence for their claims. But there is also no science we are willing to apply that would let us affirm that mobile phone EM radiation is not harmful, particularly over the long term. So caution is strongly advised. In particular, there are no studies which can establish with any degree of precision the lower bound of power levels that are harmful, the upper bound of those that are clearly not harmful, and the range between where we might want to be cautious.

So municipalities should adopt siting rules for small cell antennas that create some minimum distance between the antenna and any human being in usual traffic patterns (if someone climbs a pole it is their problem). The patterns of signal loss are predictable; 12 watts at the antenna becomes a bit less than 0.12 watts 30 feet from the antenna. So sensible rules can be constructed. This said, they should be constructed with future antennas in mind. Beam forming almost certainly to be used in next generation antennas have different loss patterns, and should be anticipated. Therefore municipalities would be well advised to get some independent technical expertise to assist their efforts rather than rely upon current FCC limits.





## **WE MUST TREAT BROADBAND AS A MUNICIPAL UTILITY**

*Broadband* refers to the networks we use to connect smart phones, tablets, laptops, televisions, security systems, and many other devices to the Internet. *Broadband* has become as necessary as water, roads, and electricity. We have to start thinking about broadband like we think about water, roads, and electricity, as a utility. In particular, we should require of ourselves that *everyone have access to broadband at affordable rates*. Unlike electricity, we cannot force our private carriers to perform to such a standard. In our region, with houses so thinly distributed, our private telephone and cable television companies cannot afford to connect everyone; there is not enough incremental revenue to justify the incremental costs. Universal broadband will require public funding. This condition is now admitted openly by USTelecom, the top lobbying firm for Verizon, AT&T, and other major telephone companies, and NTCA, the top lobbying firm for cable television. However, they are fishing for federal subsidies for rural communities. We have too many homes connected with broadband now to qualify for federal grants, and there are no state grants in Connecticut. We have to do it ourselves.

### **Amazing Growth of Smart Phones and Internet Access**

The Internet was not part of *everyone's* life until the last decade. Apple introduced the iPhone in 2007; Samsung followed a year later to create the Smartphone market. Seven billion have been sold since—*seven billion*—nearly 400 million in the United States alone. Related companies, themselves often very new, have skyrocketed: Apple (1978), Amazon (1994), Google (1998), and Facebook (2004) number among the top eight companies on earth by market capitalization, and Twitter (2006), Uber (2009), and Instagram (2010) have become household names over night. All require almost ubiquitous broadband networks. But it has happened so fast that broadband networks have not been able to keep up.

### **Our Region Suffers a Broadband Deficit**

In our region we have high speed *broadband* from cable television companies, and much slower networks from Frontier, satellite companies, and mobile carriers. Some 65% of homes in our region connect to a cable television network, but these companies refuse to connect thousands of homes. The rest suffer along with slow and unreliable networks; over 6000 homes have no Internet access at all. Our mobile networks are not only slow and traffic sensitive, they do not cover 25% of our homes and roads. Furthermore, networks must get faster to keep up with devices needing more speed. Our incumbent carriers will upgrade us last if at all, just as 4G mobile happen in most places in 2010 and in our region in 2018. Our region definitely has a broadband deficit.

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## **Municipal Networks Are Required**

We will only realize in our region *universal access to broadband networks* through some form of municipal intervention and funding, much as some 3000 American municipalities built their own electric utilities a hundred years ago. Our municipal leaders, reflecting their constituents, are naturally cautious about the implications of such a condition. We are already taxed too much; adding more to the mill rate feels like civic betrayal. This sense is the major impediment to universal broadband access in our region. The technology and laws required to build out a network in any Connecticut town exist. Furthermore, municipal fiber optic networks potentially connecting everyone will be much less expensive than roads (by factors of 10 or more) or sewer systems measured on a per-mile-of-road basis. But municipal funding in some form will be required.

## **What Do We Gain?**

It is fair to ask what connecting 35% of our region currently without real broadband access to a fiber optic network and offering to all others the next (and last needed) generation of network technology with fiber optic lines to the home would accomplish. For many, actual costs will come down as a new network will provide real competition for our monopoly cable television companies. But there are huge community benefits, the largest involving economic development. A universal fiber optic network would be a magnet for young people and a basis for creating high tech businesses in our region. We could finally address the digital divide in education. Next generation telemedicine would be available for everyone as we grow inevitably older. Real estate prices would grow. If we move quickly, we would also be the first in Connecticut to join the modern communications world.

## **What Are the Costs?**

Hundreds of municipalities in America have constructed or are constructing municipal fiber optic networks. The costs of such networks are now well known. The technology is stable. We are proposing a somewhat unique model in which municipalities own the fiber optic wiring on the poles, a private party installs drop wire to the home and all electronics. Such an arrangement will provide very favorable terms for borrowing, with debt stretched out as much as forty years. In Cornwall the per home cost per month under such terms for the trunk wiring would be under \$20 assuming every home was passed. This would add 3% to the town of Cornwall budget. In return it would provide every resident—and potential new homeowners—with the tools to build a new economy and improved quality of life that protects the town's future.