

preliminary

Economic Impact Study

Property Value Declines Associated with the *Perceived Medical Harm* from a Proposed High Definition Television Broadcast Antenna

**Lookout Mountain
Jefferson County
Colorado**

by

Roger S. Hutchison, Ph.D.
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Overview

Microwave is a form of electromagnetic radiation having a wave-length of between 0.3 and 30 centimeters and corresponding frequencies of between 1-100 gigahertz. High Definition is a new form of a digital transmission broadcast signal corresponding to these higher frequencies and adopting digital, versus analog, as the means to broadcast information. This information includes both television, remote viewing of video information, and radio. The quality of high definition is between 2 and 4 times greater than its current analog counterpart.

In 1996, the Federal Communication Commission, FCC, ordered all analog TV transmitters be shut down and replaced by their digital equivalents by the year 2006. Congress will likely delay this federal mandate until most Americans replace their old analog television sets. However, the adoption and ubiquitous usage of high definition digital broadcast of both television and radio signals is imminent within the first decade of the next century.

The first stations to actually broadcast high definition television in the United States began these broadcasts three months ago—in November 1998. Within the next 5 years, many if not most television and radio stations will adopt this digital standard. Television and radio station owners need a place to put their digital antennas as now required by law.

The physical infrastructure for analog television and radio broadcast antennas is already in place. On Lookout Mountain in Jefferson County in the State of Colorado, the first broadcast antennas were put in place in 1956. The existing land and physical equipment used by the current analog transmitters is the logical first choice of the television and radio stations owners now required to upgrade their equipment to handle digital broadcasts. On Lookout Mountain, a group known as the Cedar Lake Group has proposed building a high definition broadcast antenna on land currently owned by the consortium of radio and primarily television interests whose business is to broadcast radio and television to the greater Denver, Colorado community located about 15 miles east of the current physical antennas. The idea of the Cedar group is simply to add a high definition broadcast antenna to meet the demands of the FCC, and to accommodate the growing public interest and demand for improved quality television and radio broadcasts.

Introduction

A problem has arisen in the community which lives adjacent to the current analog antennas which centers on the perceived medical harm associated with higher levels of microwave radiation than exists at this time using the older analog equipment. The perception of many of the residents on Lookout Mountain is that increases in background microwave radiation will lead to an increase in certain forms of cancer and other harmful medical conditions. A large elementary school called Ralston is located within the region of coverage of the new high definition broadcast antenna. Whether or not these perceptions of medical harm are based on proven medical science is debatable. The scientific community seems to have two major disciplines who has studied the problem. There is also a quasi-scientific interest group to be mentioned below.

The first scientific group to study the medical issues associated with microwave radiation levels and increases in disease is the physics community. By and large, and this is a gross oversimplification of expert opinions on this matter, the physics discipline does not believe that the high frequencies associated with microwave can cause biological tissue to be damaged except under extreme levels of exposure. The physics discipline does recognize that being in the path of microwave signals can cause malfunction in electronic equipment. This analysis centers on the fact that microwave radiation is a form of non-ionizing radiation. Ionizing radiation, like gamma rays or x-rays, can deposit energy in neighboring atoms resulting in the removal of electrons. Non-ionizing radiation does not have this physical effect.

The next discipline to address microwave radiation and its potential impact on humans is the science of biology. Again, this is a gross oversimplification but there seems to be wide spread disagreement as to whether or not microwave radiation exposure causes medically harmful results, and if so, at what level of microwave radiation exposure and what duration of exposure these effects can be induced. There are dozens if not hundreds of studies both supporting the proposition that radiation in the microwave spectrum is harmful to living animals, like humans, and as many if not more studies indicating that there is no causal linkage to biological harm. Since this implies statistical insignificance in studies, the jury is still out on the biological sciences and the question of medical harm.

The third "scientific" group which can be identified which address the issue of microwave radiation exposure and biological effects is loosely categorized as the esoteric sciences. This group of adherents is strongly opposed to any increases in artificial radiation believing that exposure to this radiation leads to both emotional and biological *dis-ease*, or distress. This group believe that we live in and are surrounded by an ocean of energy, a type of primordial soup, from which physical matter derives. By concentrating one form of this man-made energy, significant harm can be caused to any living things within this concentrated and artificially produced area.

Addressing the validity of these three schools of thought and supporting or disputing one over another is beyond the scope of this analysis. This analysis is concerned solely with the effects to property valuation within the region of effects of the microwave radiation. The analysis is preliminary and the results should not be used until real numbers are provided for the actual values of home property within the designated areas of coverage. The assumptions used in this analysis all should be refined by the appropriate experts who have actual, versus hypothetical, figures. However, the method and results of this study are sound.

Methodology

The method used in this study establishes a baseline for the value of the average property within two specific regions. The first region is the widely accepted zone of influence of radiation effects with the existing towers on Lookout Mountain. For the purposes of this study, this region of influence is set at 1.5 miles. The region is a circle whose epicenter is the geographic center of the current antenna cluster on Lookout Mountain. The study assumes that there are 1,500 homes within this zone with an average current property value of \$200,000.00. This is Zone 1.

The second region or zone is Zone 2. Zone 2 is the region of effects assumed to be relevant once the high definition television antenna is installed and operational. This zone two has a radius of effects moving from the geographic center of the antenna outwards in a circle for 5 miles. The study assumes that the average property value of homes within this expanded region is \$300,000.00 and that there are 5,000 homes within Zone 2. Zone 2 extends to the near-by region of Genessee, and the community known as Riva Chase.

Assuming that there are 1,500 homes with a current market value of \$200,000.00 each, that makes the property assets within Zone 1 in 1999 a market value of \$300 million dollars. At a tax rate of approximately 105 mills, this asset generates approximately \$300,000.00 of tax revenue to the County Government. If you extend this to Zone 2, the tax revenue is now increased to 5,000 homes with an average current market value of \$1.5 billion generating approximately \$1.5 million in tax revenue to the County.

For purposes of this study, it is assumed that the average property has doubled in value since 1989, and will double again in the next 10 years if all things remain equal.

If this assumption is correct, then Zone 1 property values increase to an asset taxable base of \$600 million by the year 2010. Zone 2 property values increase to \$3.0 billion by the year 2010. The corresponding tax revenue is doubled going to \$600,000 in Zone 1 and \$3.0 million in Zone 2 per year.

A final assumption in this study is that the perception of medical harm associated with high definition television microwave broadcast signals within the exposed region will

have a negative impact on the commercial valuation of residential homes within the effected zones. For the purposes of this study, this negative impact starts as a multiplier, or factor with a base year of 1998 as 0 and moves to a high of .15 or 15% within 10 years, and then declines over the next 10 years back to a base of zero in the year 2020.

Results

Using these figures and assumptions, the following are the economic impact results.

Economic Impact on Individual Home Values in the year 2010 in Zone 1. Average home price should be \$400,000.00. Average home price is \$360,000.00. Net loss to the County in foregone property tax revenue on declines in values totaling \$60 million or approximately \$600,000.00. This is an annual as opposed to one time loss.

Economic Impact on Individual Home Values in the year 2010 in Zone 2. Average home price should be \$600,000.00. Average home price is \$510,000.00. Net loss to the County in foregone property tax revenue on declines in value totaling approximately \$450 million per year or approximately \$4.5 million in foregone tax revenue. This is an annual loss as opposed to a one time loss.

Conclusion

The perception of reality is that living within a five mile radius and having a direct line of sight of a high definition television antenna can cause medical harm to human beings. This perception may not be based on medical or scientific fact but causes concerns within the affected community. This perception of reality makes property within the effected zones less attractive to both existing occupants as well as prospective new buyers. "Why should I move to Lookout Mountain and possibly expose myself and my family to danger when I can move elsewhere and not face this risk?" This perception of reality can have the same negative effect on the valuation of property as "real" effects. The overall result in this perception is a tangible decline in property values which has two fundamental and real impacts. The first impact is on the private property owner whose home is worth less money. The second impact is on the lost tax revenue generated due to property valuation declines.

Assumptions

The assumptions used in this preliminary analysis were the best ones available to me at the time of this report. The figures used are not accurate and the results of this study should not be presented as my opinion until corrected figures are used to replace the base figures assumptions here.

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Assumption #1: There are 1,500 homes with an average value of \$200,000.00 in 1999 within a 1.5 mile radius of the existing antenna farm on Lookout Mountain. Zone 1.

Assumption #2: There are 5,000 homes with an average value of \$300,000.00 in 1999 within a 5 mile radius of the proposed antenna farm on Lookout Mountain. Zone 2.

Assumption #3: The taxable mil rate is 105 mil.

Assumption #4: The average property values in both Zone 1 and Zone 2 will double in value in the next 10 years if all things remain the same.

Assumption #5: There will be some negative effect on the value of these homes due to the perception of reality, versus reality, and that this negative effect starts as zero in the base year 1998 and gradually increases to a high within 10 years of 15% to peak in the year 2010. This negative effect will thereafter decline returning to a base year of 2020 in which the effects will be zero once again.

Limitations

This study is done under significant time constraints. The results presented are for one year only. The study needs to use real figures provided by either the real estate community or the County Government. The study needs to add the cumulative 20 year effects of property declines in value and subsequent tax losses over this same 20 year period.