

High Electricity Bills and Cell Phone Antennas: Is there a Connection?

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Introduction

Larry and Susan Stankavich have been experiencing ill health since a cell phone tower was first erected in their Duanesburg NY neighborhood in the late 1990s (Curtis 1998; Alexander 1999). Three companies now have cell phone antennas within 1700 feet (~570 m) of the Stankavich home, which is located on a hill in direct line with the antennas. The latest antennas were activated on December 20, 2003.

Health

Radio frequency radiation in the Stankavich home fluctuates and relates to poor health, severe headaches, and elevated blood sugar levels for Susan, who has type 2 diabetes. Both Larry and Susan have difficulty sleeping. Both have symptoms consistent with electromagnetic hypersensitivity (EHS) or radio wave sickness as summarized by Firstenberg (2001). For a detailed description of their symptoms refer to Curtis (1998) and Alexander (1999).

Electricity Costs

Shortly after the most recent cell phone antennas were activated the Stankavich's noticed their electricity bills were higher than normal. Because of their electrical sensitivity they minimize their use of electricity, whenever possible, and do not have an air conditioner or a computer. They could not account for the increase in their monthly electricity bills, so they contacted their public utility, and were told that-while the increase seemed anomalous-the utility was not responsible.

The Stankavich's monthly electrical bills are summarized in [Table 1](#) and [Fig. 1](#) for 2002 to 2005. Billing date was for the 20th to 22nd of each month.

Table 1. Monthly electricity bills for the Stankavich residence from 2002 to 2005.

	Monthly electricity expenses			
	2002	2003	2004	2005
Jan	\$ 117.76	\$ 114.43	\$ 220.49	\$ 208.17
Feb	\$ 96.82	\$ 88.54	\$ 179.34	\$ 193.16
Mar	\$ 95.06	\$ 95.68	\$ 187.00	\$ 186.80
Apr	\$ 95.41	\$ 106.44	\$ 244.87	\$ 187.81
May	\$ 95.56	\$ 110.72	\$ 231.90	\$ 174.29
Jun	\$ 115.82	\$ 115.81	\$ 204.82	\$ 178.16
Jul	\$ 161.38	\$ 179.87	\$ 204.82	\$ 156.66
Aug	\$ 144.23	\$ 132.26	\$ 211.10	\$ 147.42
Sep	\$ 175.51	\$ 133.68	\$ 197.34	\$ 114.95
Oct	\$ 127.25	\$ 112.09	\$ 173.80	\$ 97.26
Nov	\$ 100.18	\$ 106.06	\$ 175.19	\$ 94.99
Dec	\$ 104.85	\$ 149.06	\$ 198.11	\$ 104.64
min	\$ 95.06	\$ 88.54	\$ 173.80	\$ 94.99
mean	\$ 119.15	\$ 120.39	\$ 202.40	\$ 153.69
max	\$ 175.51	\$ 179.87	\$ 244.87	\$ 208.17
total	\$ 1,429.83	\$ 1,444.64	\$ 2,428.78	\$ 1,844.31
diff 2002	\$ -	\$ 14.81	\$ 998.95	\$ 414.48

In 2002 and 2003 the annual electricity expenses were similar, around \$1,400.

New Cell Phone Antenna

In 2004 the annual electrical bill increased by \$1,000 to \$2,400 (70% increase). The increase in the monthly utility expenses began in December 2003 and coincided with the installation of cell phone antennas within 600 meters of the Stankavich home (Table 2). No major changes in electricity use during 2004 could explain this increase.

Table 2. The difference in monthly electricity bills for the Stankavich residence (Duanesburg, NY) based on 2002 as a reference year. Note: An RF watt-hour meter for remote readings was installed from July 2003 to March 2004; additional cell phone antennas were activated December 2003; GS filters were installed August 2004 and chokes were installed March 2005.

	Percent change in monthly electricity costs compared with 2002			
	2002	2003	2004	2005
Jan	\$ 117.76	-3%	87%	77%
Feb	\$ 96.82	-9%	85%	100%
Mar	\$ 95.06	1%	97%	97%
Apr	\$ 95.41	12%	157%	97%
May	\$ 95.56	16%	143%	82%
Jun	\$ 115.82	0%	77%	54%
Jul	\$ 161.38	11%	27%	-3%
Aug	\$ 144.23	-8%	46%	2%
Sep	\$ 175.51	-24%	12%	-35%
Oct	\$ 127.25	-12%	37%	-24%
Nov	\$ 100.18	6%	75%	-5%
Dec	\$ 104.85	42%	89%	0%

Legend

% of 2002

- > 100% higher
- 40 to 99% higher
- 10 to 39% higher
- within 10% of 2002 monthly bill
- 10 to 39% lower

Weather Patterns

It is unlikely that changes in weather could account for the changes in electricity costs since the home is heated with forced air-oil during the winter and only fans are used in the summer. However, to determine if there were temperature anomalies during this period, data for monthly temperature were obtained from a nearby weather station at the Albany, NY airport ([www. Weather.gov/climate/index.php?wfo-aly](http://www.Weather.gov/climate/index.php?wfo-aly)).

According to Raymond O’Keefe (NOAA, Gov), Albany has one of the closest weather stations with similar conditions to Duanesburg. If differences exist, Albany is likely to be slightly warmer with less precipitation.

From January 2002 to December 2005, the mean monthly temperatures were similar except for January and February of 2002, which were much warmer than the other years for the same months (Fig. 2). Changes in temperature cannot explain the higher electricity costs that began in December 2003 and extended until June 2005 (compare Fig. 1 and 2).

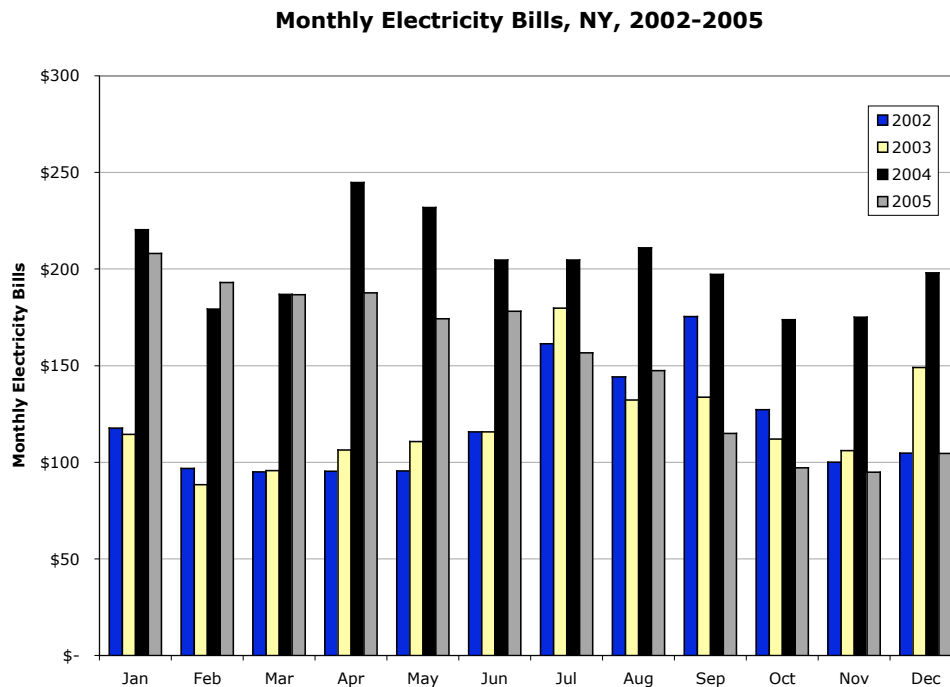


Figure 1. Monthly electricity costs for the Stankavich residence from 2002 until 2005.

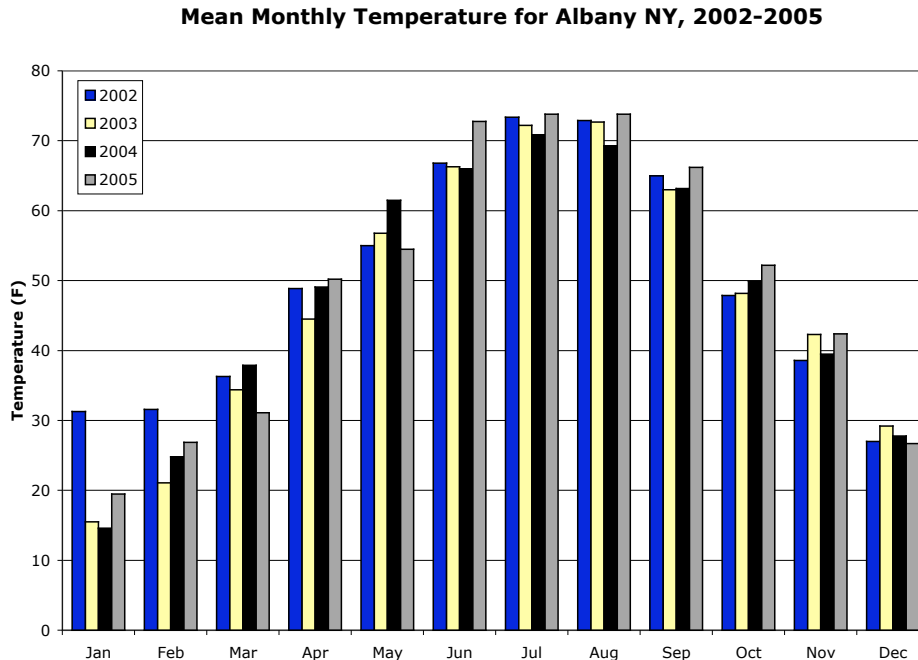


Figure 2. Mean monthly temperature for Albany NY from 2002 to 2005.
 (Source: www.weather.gov/climate/index.php?wfo-aly)

Watt-Hour Meters

On July 10, 2003 the local utility installed a new RF watt-hour meter to remotely record monthly electricity use. The Stankavichs complained since they did not want more exposure to radio frequencies and the older type of mechanical watt-hour meter was reinstalled March 19, 2004. A comparison of the readings for August, September and October show higher readings in 2002 with the original watt-hour meter than in 2003 with the new RF watt-hour meter (Table 2, Fig. 3). This may be due to higher energy consumption or inaccurate readings with the mechanical watt-hour meters.

Ontario Hydro recognizes these inaccuracies and this is what they state in their Power Quality Reference Guide (1996) about watt-hour meters: “harmonics generate additional torque on the induction disk which can cause improper operation since these devices are only calibrated for accurate operation on the fundamental frequency” [60 Hz] resulting in “incorrect readings.” In other words, frequencies other than 60 Hz on electrical wiring can affect the accuracy of mechanical watt-hour meters (Ontario Hydro 1996).

The most likely explanation is that the meter read inaccurately due to the high frequencies put on the line from the equipment at the base of the cell towers and not due to the broadcast signals.

Graham/Stetzer Filters

The homeowners tried to clean up their electrical environment. They installed 19 Graham/Stetzer filters on August 15 until September 24, 2004. These filters improve power quality and have helped people with EHS (Havas and Stetzer 2004, Havas et al. 2004). More filters were added during the next 12 months. Based on the available data these filters did not seem to affect monthly electricity costs (Fig. 3).

Choke

On March 7, 2005, the homeowners installed a choke and continued to add more Graham/Stetzer filters. By April 2005, the monthly electricity bills dropped from the previous year (Fig. 3). By July the monthly bills returned to the 2002 reference level and remained at or below this level until December 2005 (Tables 1, 2, Fig. 1). During this period the cell phone antennas continued to operate.

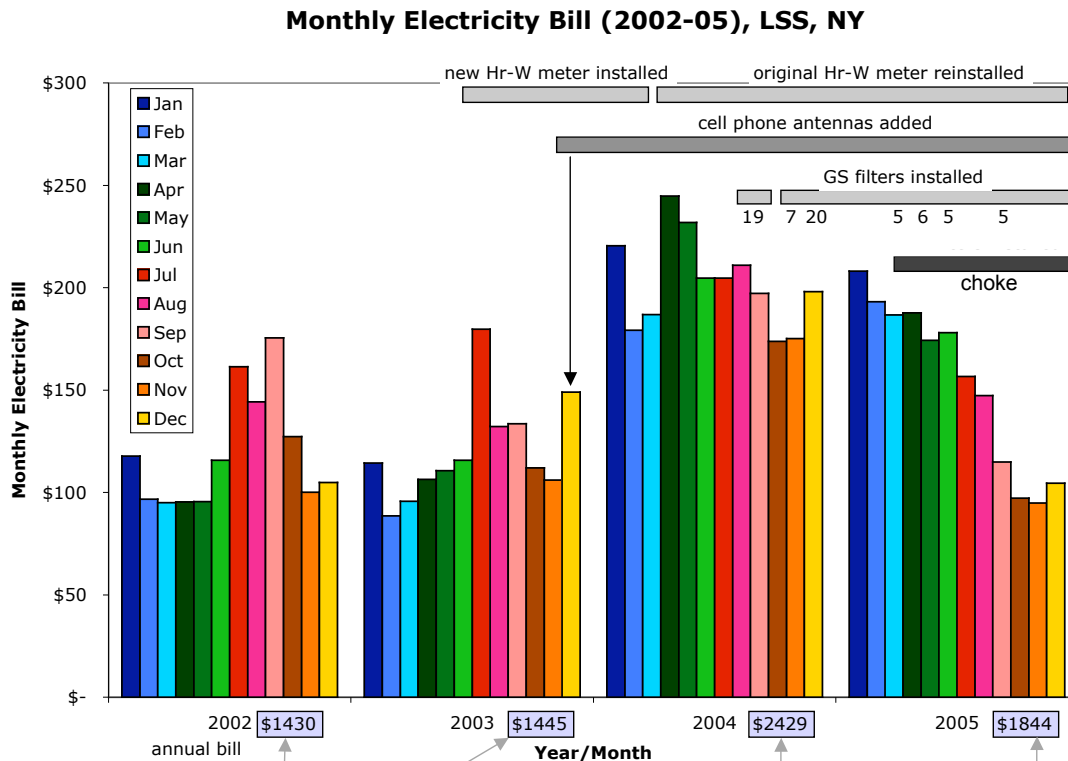


Figure 3. Monthly and annual electricity bills from 2002 until 2005 for the Stankavich residence. NOTE: The local electricity provider replaced a new radio frequency (RF) W-Hr meter that could be read remotely from the road with the original mechanical W-Hr meter that recorded monthly electricity use. A cell phone provider installed antennas nearby in December 2003. The homeowners installed Graham/Stetzer (GS) filters to improve power quality in their home and a choke to reduce the high frequencies on the line leading to the Hr-W meter.

Conclusions

These data show that monthly electricity bills increased co-incident with the activation of nearby cell phone antennas; that this increase could not be explained by colder winters or warmer summers; and that the electricity costs remained high until a choke was installed in the home. The most likely explanation for the abnormally high electricity bill is that the watt-hour meter read inaccurately due to the high frequencies put on the line from the equipment at the base of the cell towers and not due to the broadcast signals. With the many cell phone antennas that are dotting the landscape, the degree to which they interfere with watt-hour meters and contribute to inaccurate readings and high electricity costs needs further examination. If this is indeed a wide-spread phenomena we recommend the following actions be taken:

1. The **Cell Phone Provider** needs to filter their equipment to minimize radio frequencies on electrical wires.
2. The **Electricity Provider** needs to ensure that their meters are measuring electricity use accurately in situ.
3. The **Electricity Consumer** needs to be compensated for any errors in the amount of electricity they have been billed for but not used.

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