

## *High electricity costs 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. They contacted their public utility, and were told that-while the increase seemed anomalous-the utility was not responsible.

The Stankavich's monthly electricity bills are summarized in Table 1 for 2002 to 2005. Billing date was for the 20<sup>th</sup> to 22<sup>nd</sup> 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. In 2004 the annual electricity bill increased by \$1,000 to \$2,400 (70% increase). No major changes in electricity use during 2004 could explain this increase. The monthly bills remained high until April 2005, when Larry Stankavich installed high frequency filters and the monthly bills began to decrease compared with the previous year (Table 1, Fig. 1). The increase in their December 2004 electricity coincided with the installation of another set of cell phone antennas within 600 meters of their home (Table 2).

Table 2. The difference in monthly electricity bills for the Stankavich residence (Duanesburg, NY) based on 2002 as a reference year. Note: An RF hour-watt meter for remote readings was installed from July 2003 to March 2004; more cell phone antennas were activated December 2003; and high frequency filters were installed April 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%	<b>100%</b>	
Mar	\$ 95.06	1%	97%	97%	
Apr	\$ 95.41	12%	<b>157%</b>	97%	
May	\$ 95.56	16%	<b>143%</b>	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%	

<b>Legend</b>	
<b>% of 2002</b>	
	> 100% higher
	40 to 99% higher
	10 to 39% higher
	within 10% of 2002 monthly bill
	10 to 39% lower

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.

During the period 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.

By April 2005, one month after the Stankavich’s installed high frequency filters, their electricity bill began to decrease, compared with the 2004 monthly means, and by July 2005 their monthly electricity bills returned to the 2002 reference level and remained at or below that level until December 2005 (Tables 1, 2, Fig. 1). During this period the cell phone antennas continued to operate.

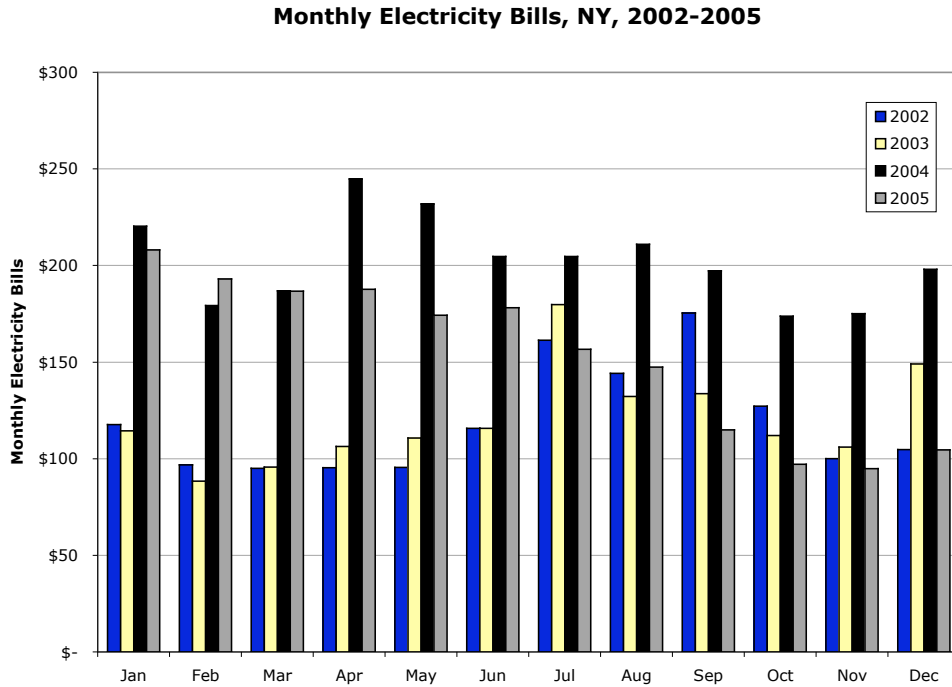


Figure 1. Monthly electricity costs for the Stankavich residence from 2002 until 2005.

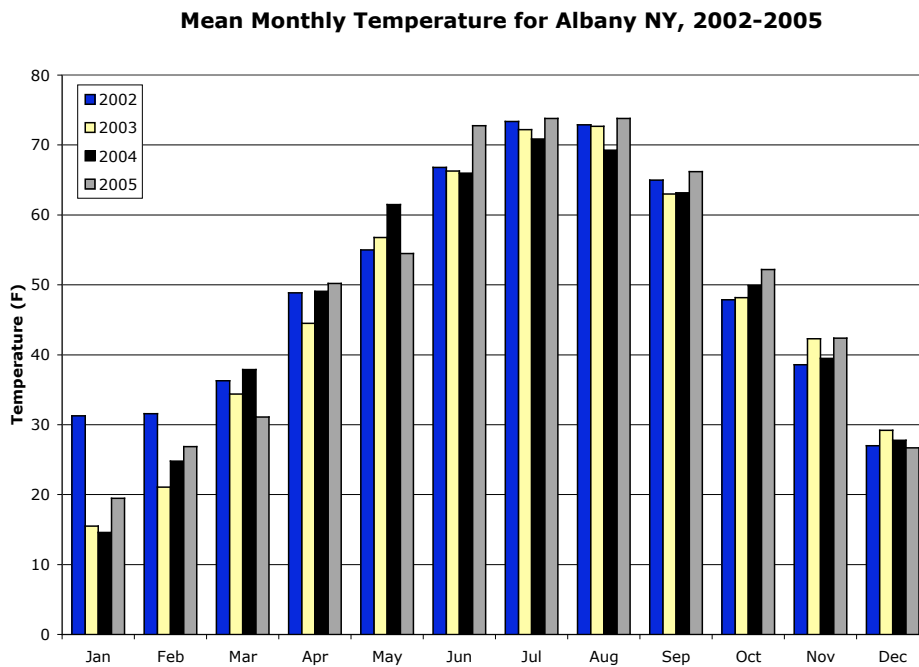


Figure 2. Mean monthly temperature for Albany NY from 2002 to 2005.

(Source: [www.weather.gov/climate/index.php?wfo-aly](http://www.weather.gov/climate/index.php?wfo-aly))

**Hour Watt Meters:** On July 10, 2003 the local utility installed a new RF hour-watt meter to remotely recorded monthly electricity use. The Stankavichs complained since they did not want more exposure to radio frequencies and the older type of mechanical hour-watt meter was reinstalled March 19 2004. A

comparison of the readings for August, September and October show higher readings in 2002 with the original hour-watt meter than in 2003 with the new RF hour-watt meter (Table 2, Fig. 3). This may be due to higher energy consumption or higher readings with the mechanical hour-watt meters. High frequencies on electrical wiring can affect the accuracy of mechanical hour-watt meters (Ontario Hydro 1998). 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).

**High Frequency Filters:** On March 7, 2005, the homeowners installed high frequency filters 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.

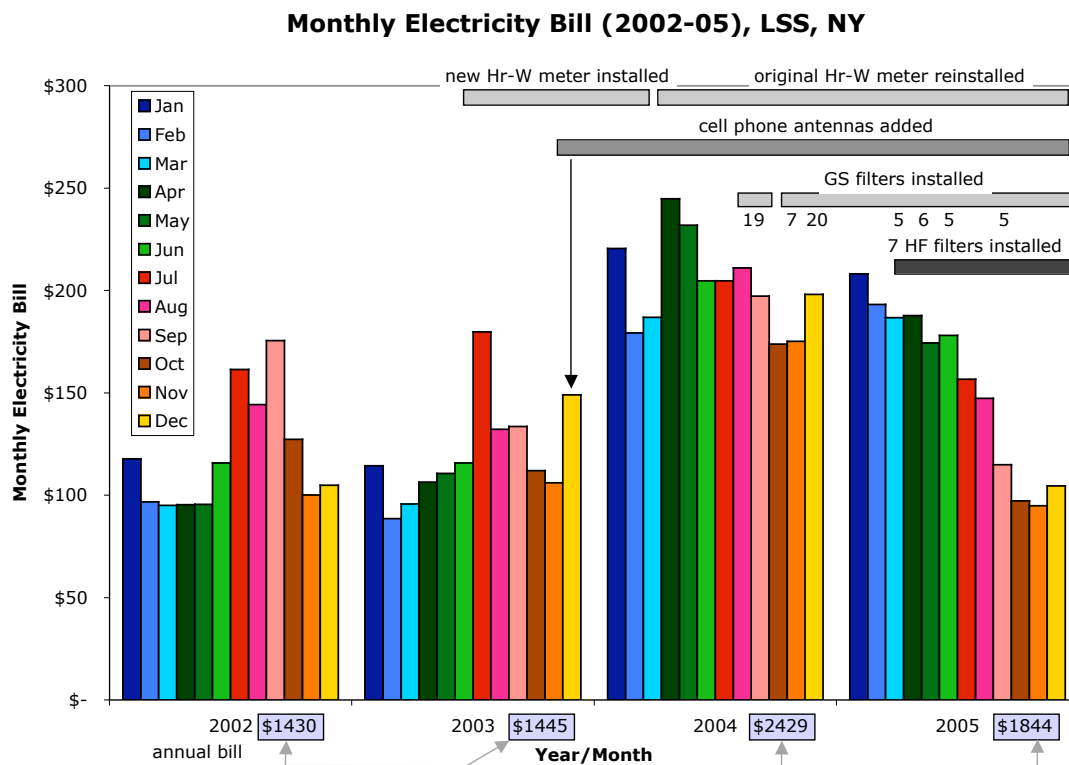


Figure 3. Monthly and annual electricity bills from 2002 until 2005 for the Stankavich residence. NOTE: The local electricity provider replaced a new radio frequency (RF) Hr-W meter that could be read remotely from the road with the original mechanical Hr-W meter that recorded monthly electricity use.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

**Conclusions:** These data show that monthly electricity costs increased co-incident with the activation of nearby cell phone antennas. The increased electricity costs could not be explained by temperature weather patterns. The electricity costs remained high until high frequency filters were installed in the home. The most likely explanation for the abnormally high electricity costs is that the hour-watt 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 hour-watt 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.
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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