



Lockport Housing Authority Administrative Building Geothermal Conversion Summer/Fall 2014



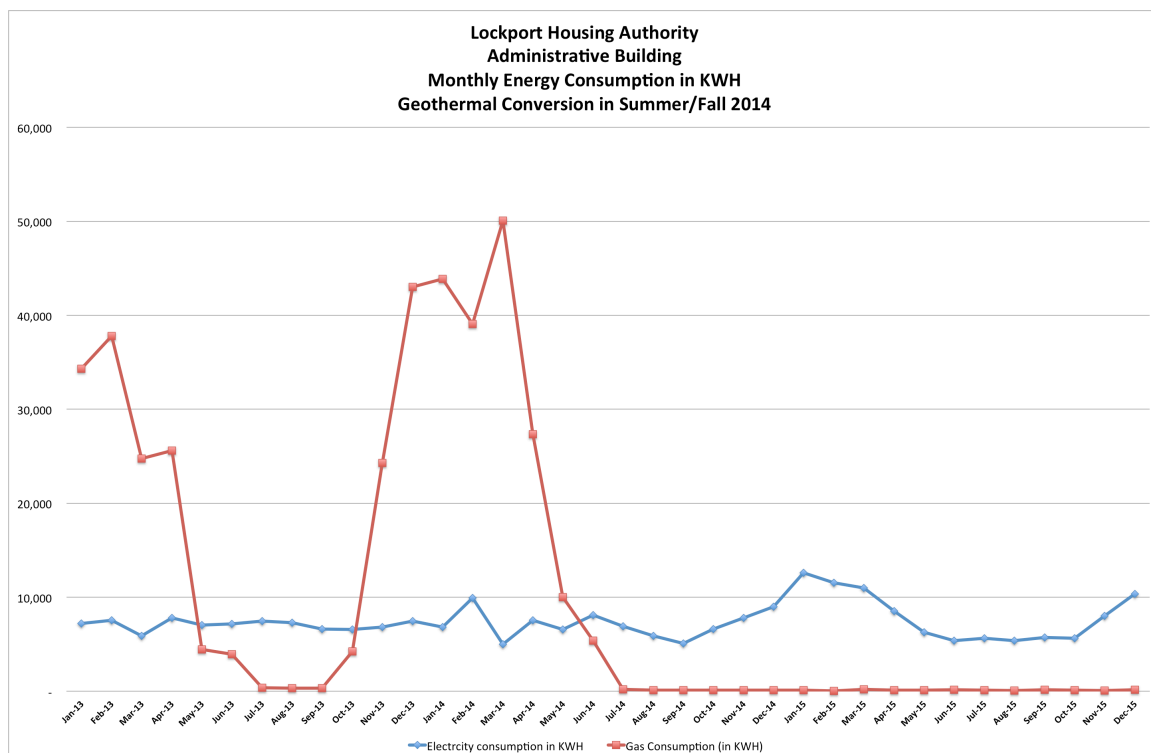
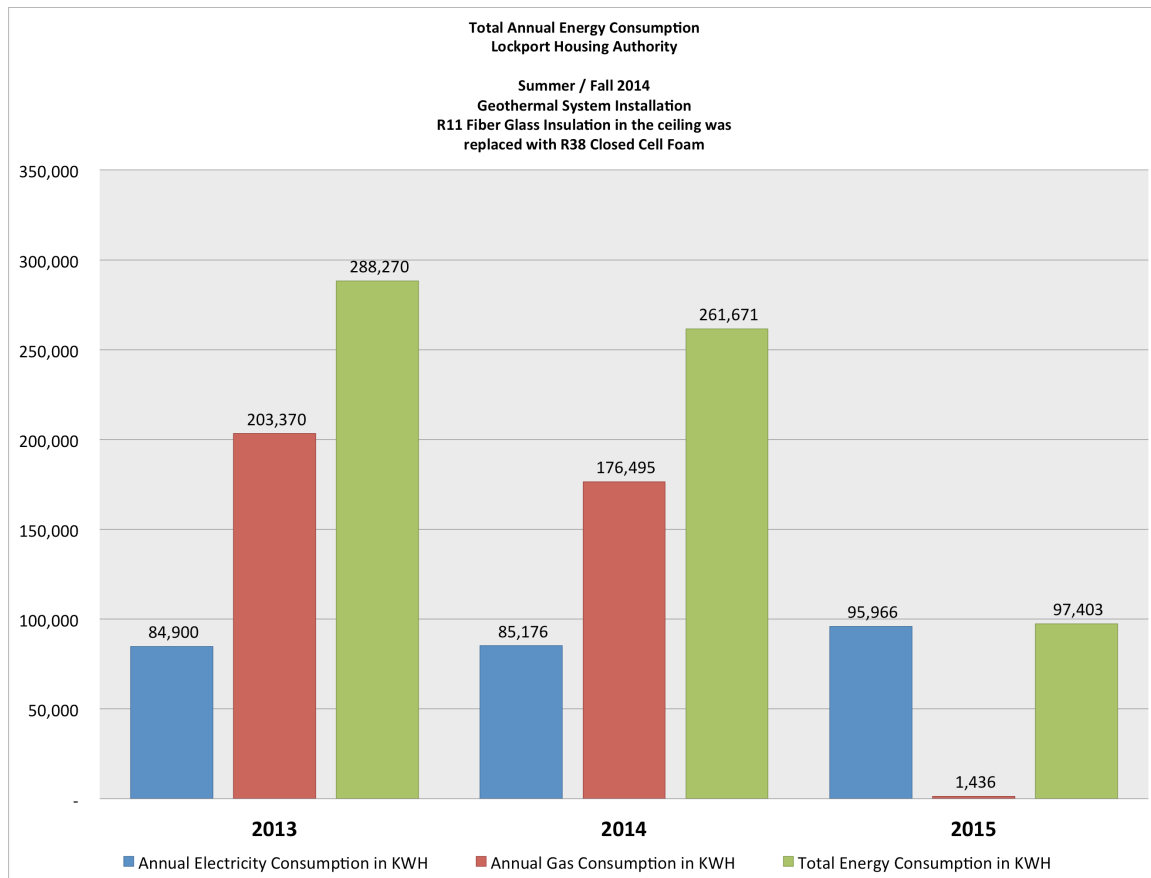
Summary of the roof insulation upgrade and geo conversion

- Location: 301 Michigan Street, Lockport NY 14094.
- 9300 sqf office building.
- The geo system was installed in summer/fall of 2014, which is a transitional year, 2013 and 2015 are full years directly before and after the geothermal installation.
- 28 Ton Horizontal Slinky Loopfield.
- (4) 5-ton and (1) 3-ton Waterfurnace 7 series variable speed heat pumps providing heating, cooling and domestic hot water generation.
- (1) geothermal 20 ton GV-20 flowcenter with (2) ultra efficient DC inverter driven variable speed circulation pumps for added redundancy.
- Total site energy consumption decreased from 288,270 KWH (BTUs transferred to KWH as units of energy for direct comparison) to 97,403 KWH, a decrease of 67.2%.
This is total energy for the whole site, including lightening, computers and other electrical consumers, which obviously did not change.
- Total annual electricity consumption increased by 10,066 KWH between 2013 and 2015.

- R-38 foam insulation in the ceiling was installed, replacing the R-11 fiberglass. Modeling the building with Wrightsoft manual J software suggested that 47,206 KWH in heating and 2,800 KWH in cooling energy reduction can be attributed to the added insulation, and the remaining reduction in heating energy used, from 156,165 KWH to 1,436 KWH (weekly test run of generators remains the only gas consumption), can be attributed to the geo system.
- The total site energy savings attributed to the geo system, after accounting for the impact of the added insulation, the total site energy reduction through the geo system was 59%.
- When adjusted for the difference in weather data between 2013 and 2015 (cooling and heating degree days), the total site energy savings were a total of 60%, since the heating degree-days were increased in 2015 versus 2013 (it was colder in 2015 than in 2013).
- Electricity and Gas meter readings were taken from the monthly utility bills and provided by the housing authority
- No other changes in the use of the building.

Summary: Converting the building from gas to geothermal, including upgrading the insulation from R-11 to R-38 in the ceiling, reduced the entire site energy consumption by 67.2%. Adjusting the data for the impact of the added insulation, and slightly different heating and cooling degree-days between 2013 and 2015, the geo system alone reduced the total site energy use from 242,837 KWH to 97,403 KWH, which is an annual energy reduction by about 60%.





Adjustment for upgrade from R-11 to R-38 ceiling
-23% for heating
-38% for cooling

