

The Energy and Technology Committee
Public Hearing, March 20th, 2012
Testimony of Aaron J. Danenberg, Trumbull CT

Geothermal heat pump systems are a proven means of efficient and environmentally friendly heating and cooling. For a typical system, a heat pump will draw one unit of electrical energy to extract 4 units of energy from the ground in heating mode, or reject 4 units of energy to the ground in cooling mode. Connecticut is currently one of the greenest States in the country to install a geothermal system due to the relatively low emissions of our power generating portfolio. The high efficiency and low energy usage of these systems have the potential to substantially reduce the cost of meeting the heating and cooling demand of a building. For a residential geothermal system in Connecticut, the reduced operational costs justify the high initial capital investment with a payback period of roughly 4 to 8 years.

A residential system will experience a reasonable payback period due to the flat rate of electricity on a per kilowatt-hour basis. Commercial entities are billed for their electricity as a function of their total energy usage and peak demand. Roughly speaking, an HVAC system accounts for 50% of a building's total energy usage. With a geothermal system running off electricity, the peak demand for the building dramatically increases, causing the average cost of electricity to increase roughly 30% depending on the weighting of the demand charge. By increasing the cost of electricity, not only do the heating and cooling costs increase, so does all equipment operating in the building. A geothermal system adversely affects the ratio of total energy usage to peak load, which is the primary driver of the average cost of electricity on a per kilowatt-hour basis. The fraction of demand capacity utilized for an HVAC system fluctuates significantly as a function of the outdoor weather conditions driving the level of heating and cooling required to meet the desired indoor temperature. On a monthly basis, a typical HVAC system will need to satisfy a high level of heating or cooling approaching the system designed maximum capacity. At this time, the system will draw a high peak electrical demand. Even this peak demand is only required for a short period of time, it will drive the average cost of electricity for the entire month.

I understand the cost of electricity is driven by peak demand, and the general rate formulations are designed to allocate the cost of electricity proportionally to customers based on their share of the total cost. The benefit of geothermal systems to the State and Utility Companies is reduced stress on the grid during summer peak loading. A geothermal heat pump operates close to 50% more efficient than a traditional air conditioner, thereby decreasing the peak load required from the grid to satisfy the cooling demand of the building. During the winter, peak demand has less of an impact on increased costs of electricity to the State, and I believe the benefit of the reduction in peak demand during critical summer months should grant geothermal systems a level playing field in terms of electricity costs on a per kilowatt-hour basis.

Currently Connecticut Light and Power (CL&P), and United Illuminating (UI) impose different weightings of the demand charge on their utility rates for their customers. The CL&P demand charge is significantly higher than that of United Illuminating, resulting in greatly increasing the pay period of a geothermal system or eliminating it all together.

I support Bill 450 Section 15 requesting the Public Utilities Regulatory Authority conduct a proceeding to review the disparity in demand charges among Connecticut's Utility companies. If the disparity is eliminated for geothermal customers, it is likely new rate classes will need to be created for both UI and CL&P. I believe working with the Public Utilities Regulatory Authority in conjunction with the Utility companies, we can scale the demand charge such that the average cost of electricity on a kilowatt-hour basis will remain nearly constant before and after the installation of a geothermal system. In this scenario, the economic benefits of installing a geothermal system will provide incentive for commercial entities to adopt such systems. The State of Connecticut and the Utility companies have much to benefit from; reducing peak loads during critical summer months, reducing emissions due to heating and cooling systems, and using energy fuel sources produced here in the United States.