
Geothermal Heat Pumps

Heating & Cooling for Municipal Buildings



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What do they have in common?

Harvard University

Elton John

Trinity Church

George W. Bush

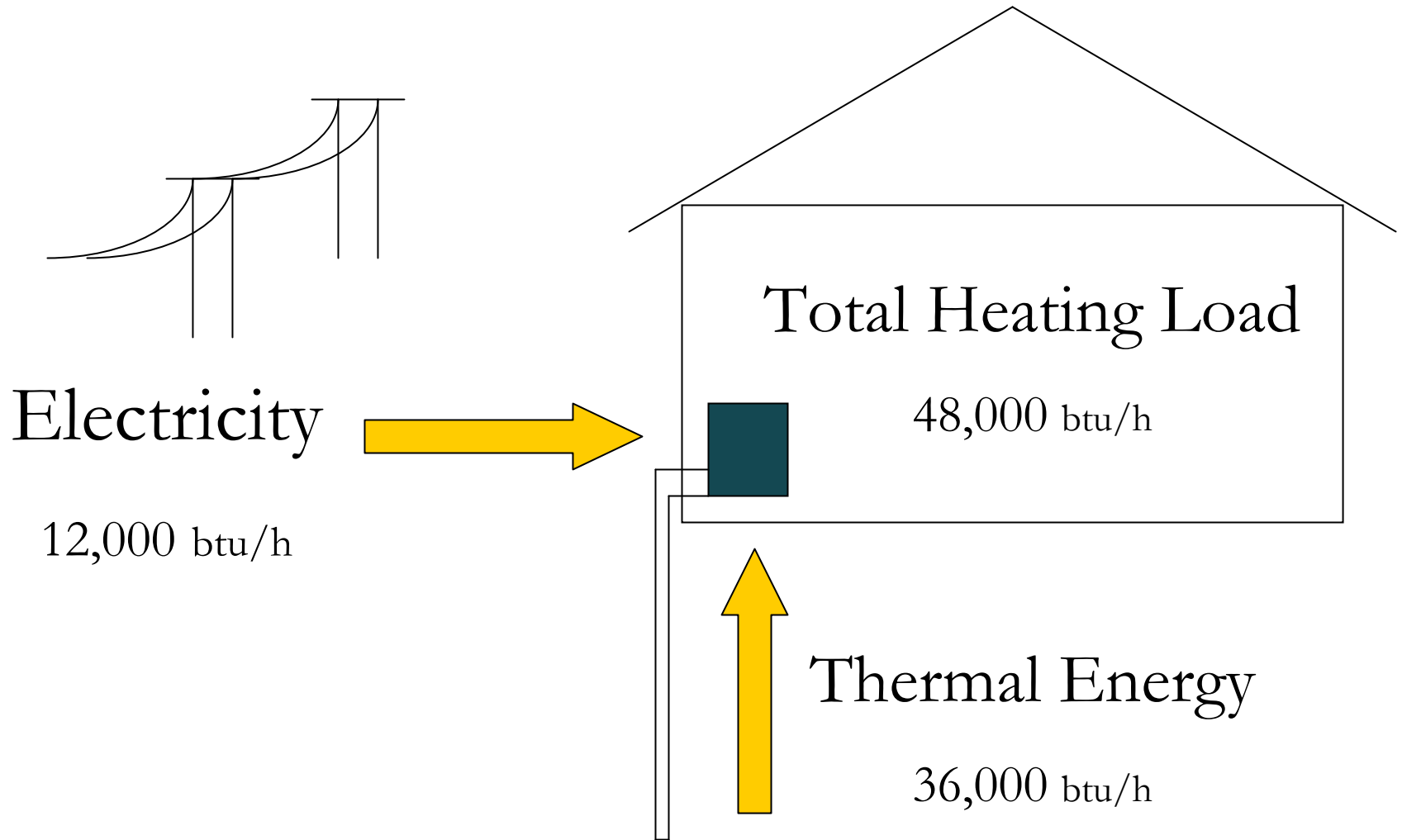
Google

Al Gore

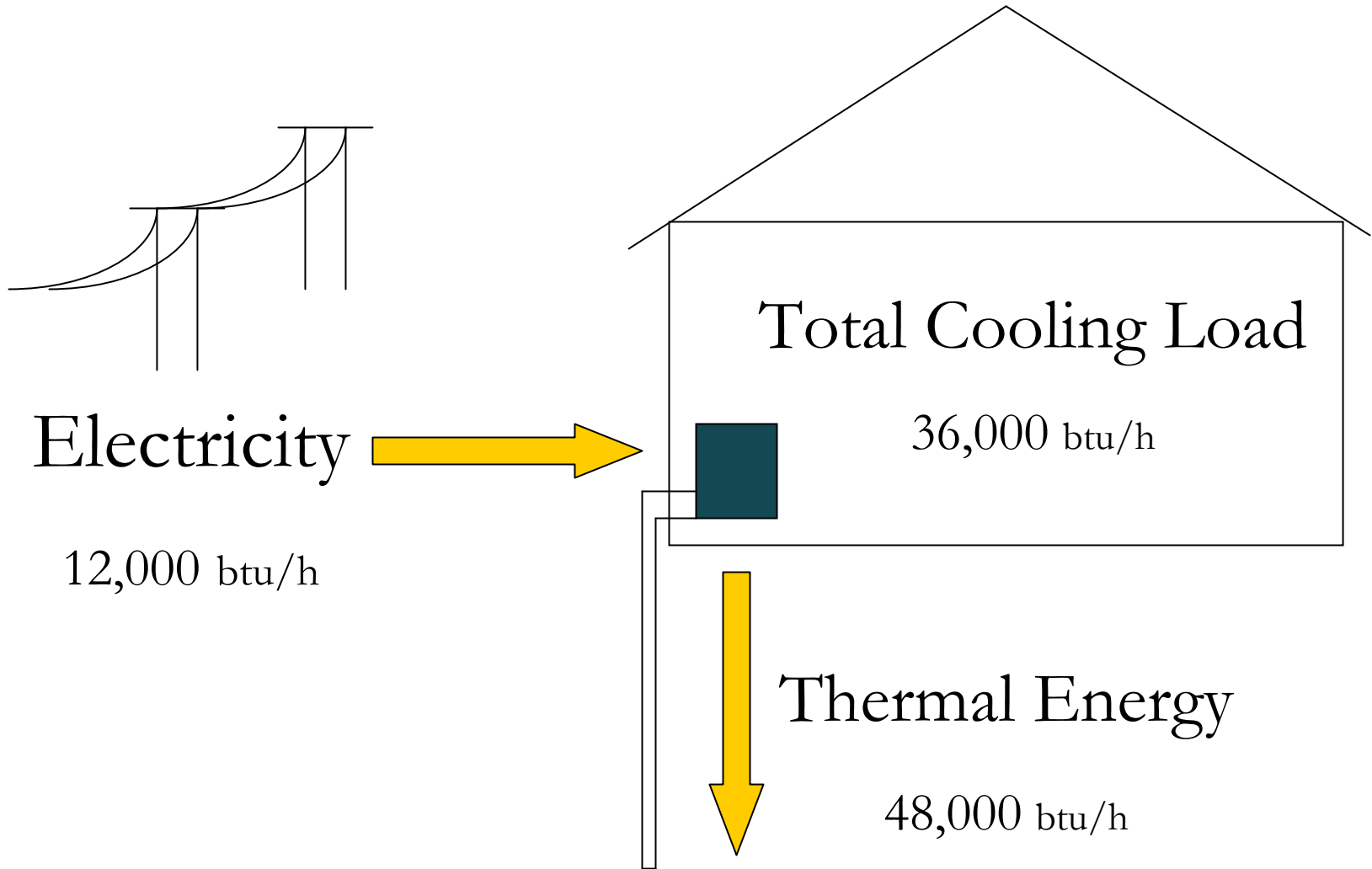


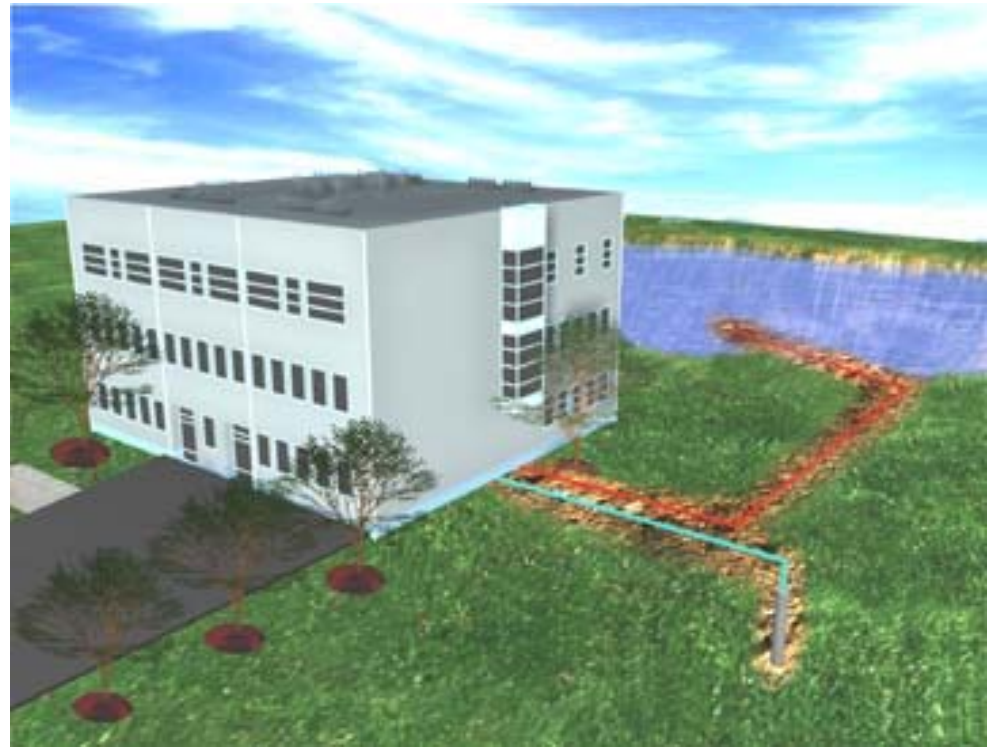
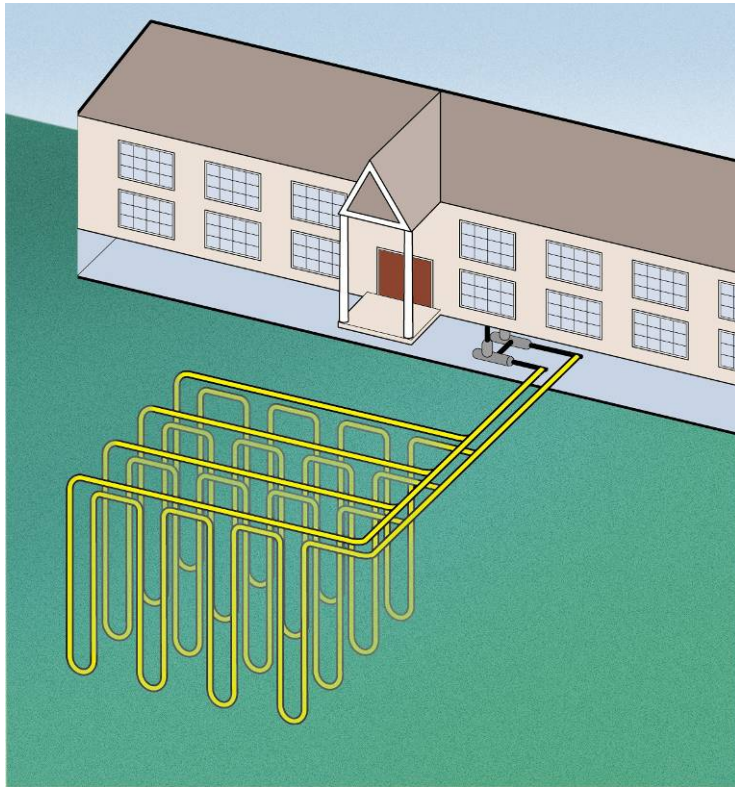
They all own Geothermal Heat Pump Systems

How a Heat Pump Works: Heating



How a Heat Pump Works: Cooling





Closed Loop or Open Loop

Both ground connection methods work. Quantify potential benefits of installing a heat pump first - then worry about which method to use.

Benefits of Using a Geothermal Heat Pump

- Financial - Operating cost savings of 25-40%
- Environmental - Small carbon footprint
- Aesthetics - Units are contained indoors
- Comfort - Low noise, good humidity control
- Maintenance - Modular, decentralized zones
- Safety - Combustion free

Evaluate and attempt to quantify these for yourself. This exercise provides context for the initial investment.

The Hastings School in Westborough, MA Before Geothermal Heat Pumps

- 72,000 square feet: 28 classrooms, auditorium, gym, library
- Built in 1970 as an all-electric and no cooling facility



Case study provided by Water Energy Distributors, Hampstead, NH

The Hastings School in Westborough, MA

Installing Geothermal Heat Pumps

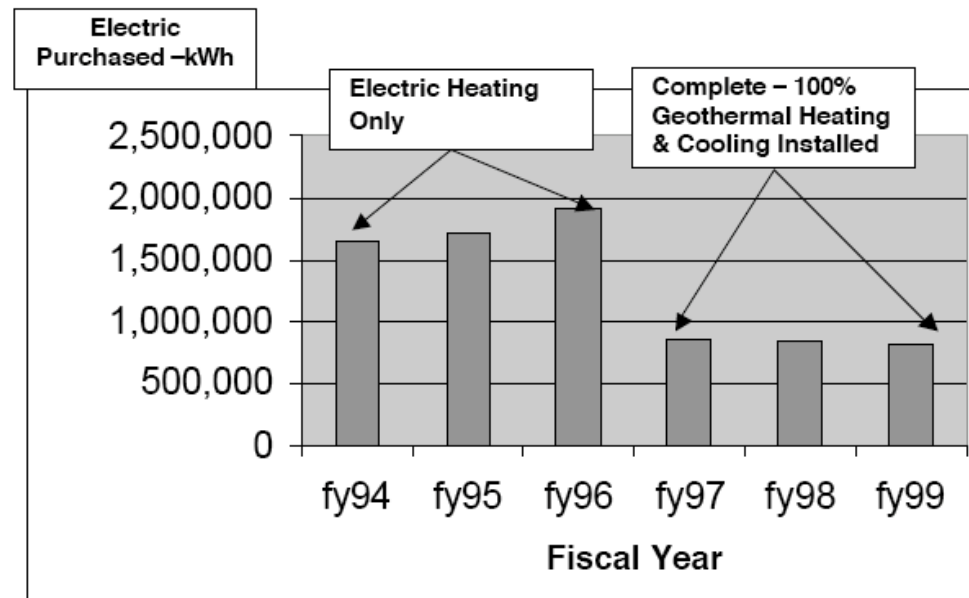
- Twenty heat pumps
- Hydronic (water based) heating & cooling delivery method
- Ground Connection: Six standing column wells (1,500 feet deep)



Case study provided by Water Energy Distributors, Hampstead, NH

The Hastings School in Westborough, MA Operating with Geothermal Heat Pumps

- Heating & Air Conditioning controlled by room
- Energy consumption reduced by 54% vs. heating only



Case study provided by Water Energy Distributors, Hampstead, NH

Researching & Installing a Geothermal System

Best Practice for Municipal Buildings

Find a trustworthy ‘river guide’ to help evaluate options

Qualities to look for in your river guide:

- Engineer
- Quality training
- Extensive experience
- Unbiased

Conduct a feasibility study to quantify the initial investment

- Solicit bids from experienced, accredited contractors
- Demand itemized costs in all proposals
- Consult a hydrogeologist

Resources

- Geothermal Heat Pump Consortium (GHPC) - Washington DC
- Int'l Ground Source Heat Pump Assn. (IGSHPA) - Oklahoma City, OK
- Massachusetts DEP - Ken Pelletier
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) & The National Groundwater Association

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