



“.....meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

CITY OF APPLETON LIBRARY PROJECT

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City of Appleton

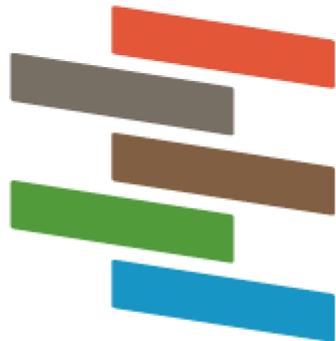


APPLETON PROJECT PLANNING

Sustainability - the intersection of the balance between the environment, equity, and economy.

ENVISION FRAMEWORK

- Quality of Life
- Leadership
- Resource Allocation
- Natural World
- Climate and Resilience



ENVISION



SUSTAINABLE DEVELOPMENT FRAMEWORK

- Environment
- Social
- Economic



DECARBONIZATION FOR MUNICIPALITIES

Decarbonization and Resiliency is a priority for Appleton and is incorporated when feasible

DECARBONIZATION PROCESS

- Implement energy efficiency
- Electrification
- **Renewable energy**
- Manage Electricity loads (Future)

BENEFITS OF DECARBONIZATION

- Manage utility costs
- Improve air quality
- Mitigate climate change



Creator: ivansmuk
Credit: Getty Images/iStockphoto



APPLETON PUBLIC LIBRARY

A major design component for the Appleton Library project was decarbonization

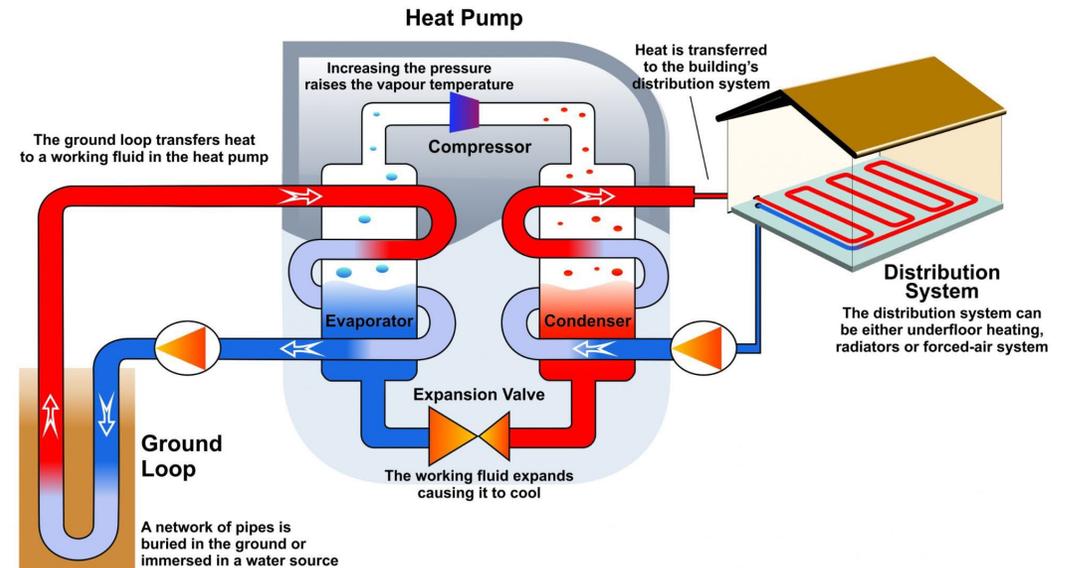
DESIGN ELEMENTS FOR DECARBONIZATION

- Removal of the natural gas service
- Replace NG water heaters with electric
- Geothermal HVAC
- Latest lighting/daylighting technologies
- Solar field on roof



GEOHERMAL INCORPORATION

- Additional Investment - \$986,700
- Annual Energy Cost Saving - \$71,000
- 10 year cumulative saving @ 3% annual escalation - \$997,358



GEOHERMAL

Pros

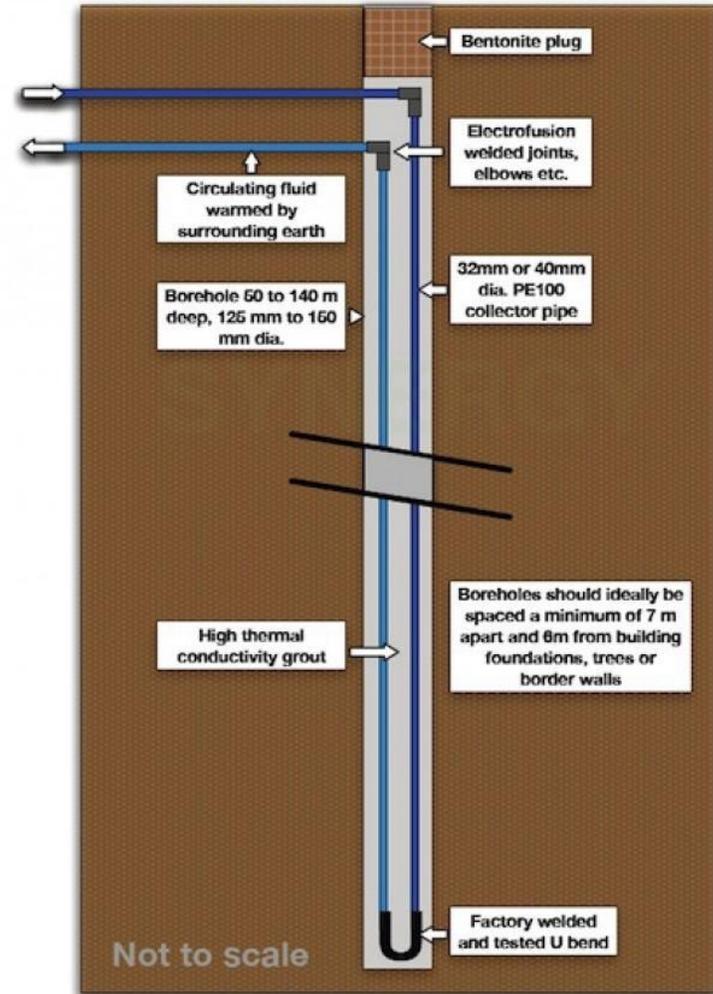
- Reliable system with less disturbance from weather conditions.
- 25%-50% more efficient for cooling.
- 3-4 times more efficient for heating.
- Fewer moving parts = less maintenance issues.
- Quieter for the Building and for the neighbors.
- Indoor equipment has longer life expectancy e.g..
- Heat Pump life expectancy is 25 years

Cons

- Higher initial cost.
- Fewer installers than standard HVAC and thus less competition.
- Training of operating staffs and maintenance personnel is recommended to understand the system.
- Underground loops not accessible after installation (but also are protected)
- Geological conditions, soil and rock type, may impact installation costs and project schedule. (Test well will alleviate this risk)

Schematic diagram of Geothermal Borehole

Synergy Boreholes and Systems Ltd.



GEOHERMAL INCENTIVES

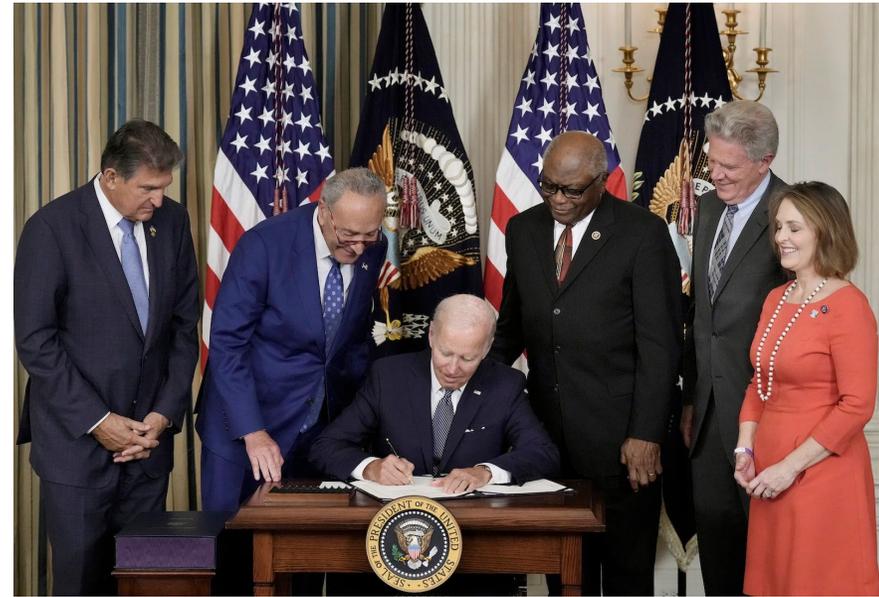
INVESTMENT TAX CREDIT IRC S 48

- 6-30% of the installed cost.
- 2% to 10% increase for meeting domestic content requirements
- 2% to 10% increase for siting in an “energy community” (brownfield sites)
- Low-income community bonus credit of 10%-20% (more limited – must apply)



focus on energy[™]

Partnering with Wisconsin utilities



FOCUS ON ENERGY

- Focus on Energy can be used with IRA projects
- Business Custom Program For High Performance Design.
 - \$0.13 per KWhr of annual energy saving
- The Renewable Energy Competitive Incentive Program (RECIP)
 - Only available for geothermal system
 - Up to \$0.5 per KWhr of annual energy saving
 - Not to exceed 50% of the system cost and capped at \$400K
 - Require to submit a complete energy analysis
 - Based on fund availability, may require multiple submissions



APPLETON PUBLIC LIBRARY

GEOHERMAL FINANCIALS

- Additional Investment - \$986,700
- Annual Energy Cost Saving - \$71,000
- IRA Incentive - 30% of \$6,030,000 = \$1,809,000
- FOE Incentive – $\$0.13 \times 731,427 \text{ kWh} = \$95,085$
- Geothermal HVAC option is \$917,385 less than a traditional system with \$71,000/yr energy savings!

BENEFITS OF THE GEOHERMAL SYSTEM

- Reduced emissions within the community
- Provides a learning opportunity for the public
- Reduced monthly energy cost
- Lower install cost vs traditional system (with incentives)
- Proof of concept for other businesses within the community

