

COUNCIL ACTION FORM

**SUBJECT: PRELIMINARY PLANS AND SPECIFICATIONS FOR BAKER
SUBDIVISION GEOTHERMAL HEAT PUMP SYSTEM**

BACKGROUND:

On August 5, 2020 the City of Ames signed a professional services contract with Design Engineers P.C. to design a Geothermal Heat Pump System for the Baker Subdivision. The subdivision consists of 26 single-family lots and one multi-family lot along Tripp Street between Wilmoth Avenue and State Avenue. The geothermal system would provide space heating and cooling and boost water heating efficiency for all the homes in the subdivision. Ames Electric Services would install, own, and operate the well field and distribution piping to serve customer-owned appliances in the homes.

The construction costs are estimated at \$290,000, with a project life of over 50 years. A monthly customer charge would be based on the size of the customer's system. The average charge would start at \$5.25, with Council-approved rate increases as appropriate, resulting in a payback time of around 27 years. One goal of the project would be to keep the utility costs of homes in the neighborhood comparable to or lower than those with more traditional heating and cooling systems.

This project proposal was motivated by an effort to advance environmental sustainability of the subdivision developed by the City, while maintaining affordable utility costs for the mixed-income neighborhood. Ground source heat pumps are highly efficient and reduce both emissions and operating costs of home heating, cooling, and water heating.

Despite their advantages, ground source heat pumps have seen slow adoption because they have a high up-front cost and provide a return on investment over many years (10-25-year ROI, with system lifetimes of 50+ years). That is a difficult investment model for most individuals, and especially difficult for low-income, first-time homeowners.

With the utility-provided well field and distribution system proposed with this project, homeowners can connect to the system with no greater up-front costs than traditional heating and cooling systems. The operating costs are also similar, at today's natural gas prices. (The cost comparison would favor geothermal with the projected increase in natural gas prices and changes to regional climate.) Greenhouse gas emissions are expected to be 10-14% lower than traditional HVAC systems and water heaters. As Ames' energy portfolio adds more renewable energy sources, emissions could be reduced even further.

The system would reduce the electric demand of cooling homes during the electric system's peak hours compared to standard efficiency air conditioners. It would also help to balance the seasonal load and utilization of existing electric infrastructure.

The Baker Subdivision is a unique opportunity for a district geothermal model because the City is acting as the developer of this neighborhood. This allows City departments to coordinate in the installation of this innovative application of a reliable, proven technology.

The system would also serve as a demonstration of the performance of geothermal heat pumps and introduce more local contractors and residents to the technology. This could encourage further adoption of geothermal heat pumps, which would further reduce summer peak loads and community greenhouse gas emissions. Customer-owned geothermal systems have been supported with rebates for many years for those reasons.

The approved Operation and Maintenance budget for Demand Side Management contains \$405,756 carried forward from the FY 2019/20 budget to cover these costs.

ALTERNATIVES:

1. Approve the preliminary plans and specifications for the Baker Subdivision Geothermal Project and set October 14, 2020, as the bid due date and October 27, 2020, as the date of hearing and award of contract.
2. Do not approve the preliminary plans and specifications, and delay the Baker Subdivision project.

CITY MANAGER'S RECOMMENDED ACTION:

A district geothermal system will provide highly efficient, affordable, and sustainable space heating and cooling to the new development. The project would reduce greenhouse gas emissions of the homes by 10-14%, without increasing costs to the homeowners. This application of geothermal heating and cooling would introduce more local contractors and residents to the technology and model an innovative project structure for other communities.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1 as stated above.