

This spring our HVAC contractor condemned three of our eight gas furnaces, two in the sanctuary and one in the south classroom wing. We were able to repair one of the sanctuary units at a reasonable cost and after a second opinion, the south classroom unit was determined to be operating okay. One of the sanctuary furnaces will not be repaired because it is expected that the other three units will provide enough heat even during the cold winter. The cost to repair this unit is a little over \$5,000. If another unit fails or if we find the sanctuary is not warm enough with only three furnaces, we have the option to make this repair, but we do not plan to repair it at this time.

We engaged a consulting mechanical engineering firm to assess our building and recommend replacement strategies. We desired to replace the existing system with something more environmental and consistent with our Climate Justice goals. Our priorities as stated to the firm were:

- 1) Reduce carbon footprint and eliminate use of fossil fuels.
- 2.) Increase energy efficiency.
- 3.) Increase individual space comfort and control.
- 4.) Phased approach to replace equipment over time option.

The firm came back with a thorough report of the existing building efficiency and several recommendations for HVAC replacement. Link to the report:

<https://drive.google.com/drive/folders/1AN-3WnuYahkWT5SeKuS0PECmGwO1fnln>

The top recommendations were to replace the existing air conditioners with heat pumps. Heat pumps have similar energy efficiencies as air conditioners for cooling, but their real advantage is that they provide very efficient electric heating. Heat pumps come in a variety of efficiencies and operational characteristics. The recommended heat pump is a high-efficient, variable speed model. Variable speed units are more efficient, provide better comfort, and operate quieter than a traditional heat pump.

Like air conditioners, heat pumps require an air handler or better known as a furnace. Hot refrigerant (in heating mode) comes from the outside heat pump to the inside furnace where the furnace blows air across the hot refrigerant coils and delivers warm air through ductwork to the rooms. Heat pumps do not manufacture heat, they merely transfer heat through the compression and evaporation of refrigerant, and thus can deliver heat (BTU) two to four times more than they are using for operation. For example, if the HVAC units are using 15,000 BTUs of electricity to run, they are delivering 30,000 to 60,000 BTUs of heat to the rooms. The amount of heat the heat pump can deliver varies with outside temperature, delivering 30,000 at approximately 0 to 5 degrees and 60,000 at 45 degrees. Electric furnaces are considered to have a 1:1 ratio and gas furnaces even less ratio.

Given that the heat pump capacity to deliver heat to the room is reduced when it's very cold, and given that the building requires even more heat when it's very cold, the furnace is needed to supplement the heat pump when the temperature drops to very cold. An electric furnace is an ideal air handler for a heat pump because it can work in coordination with the heat pump and the supplemental heat needed to maintain a warm room is minimal except on very cold days.

The Board desires to use electric furnaces (rather than gas) with high-efficient, variable speed heat pumps, even though this will require some additional electrical upgrades and costs. We are still investigating the required electrical upgrades and how we might be able to minimize those upgrades.

I recently met with Idaho Power and have identified that the existing transformer and electrical feed to the building can easily accommodate all new electric furnaces. However, the inside wiring from the panel to the furnaces is not sufficient for electric furnaces. We'll need to upgrade the wiring from the inside panels to each furnace. Fortunately, most of these runs are not that long (except south sanctuary units). We're still investigating this and whether we'll need to upgrade the electrical conduit as well as the wire size.

In addition to needing to replace our HVAC system soon, the Board is following the work of the Engaging Space Task Force and their plan for a sanctuary upgrade. These two major projects, as well as possibly other projects we might consider, add up to a very large price tag, much larger than our existing reserves can meet. The Board has identified a task force to evaluate funding sources and help develop a plan for funding these projects. Several board members and Rev Sara had a zoom meeting with a UUA Fundraising consultant and the Board authorized the task force to work with the consultant as needed.

The hope is to have the HVAC upgrade, sanctuary upgrade, and any other major projects defined and a funding strategy developed by the May 2024 Annual Meeting for a congregational vote. Assuming that a capital campaign or something similar will follow, that will likely be held during the 24-25 Fiscal Year (July, 2024-June 2025).

We are hopeful that the existing HVAC units will be operational, or can be fixed to be operational, for at least two years. We could then have an engineering firm develop specifications and designs and go out for construction bids for total replacement of all eight furnaces/air conditioners at once. This would likely be less expensive than partial replacement over time.

The current preference is to eliminate all gas usage in the building and go with heat pumps and electric furnaces. We are willing to spend more money for the required electrical wiring upgrades to satisfy our climate action priorities. We believe this is achievable within a reasonable cost. We are continuing to work with the engineering firm and contractors to fully develop a good strategy to meet all our needs.