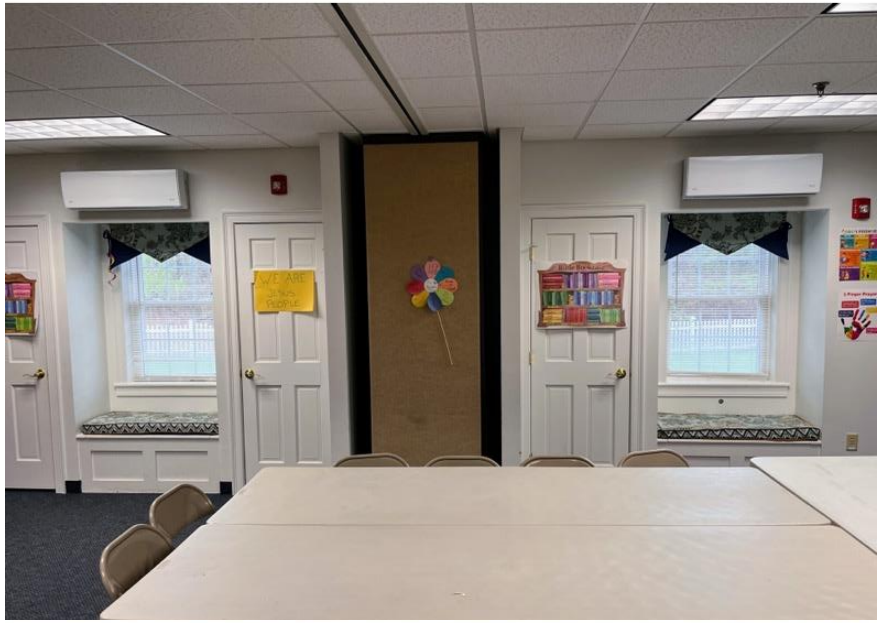
HEAT PUMPS IN CHURCH FACILITIES

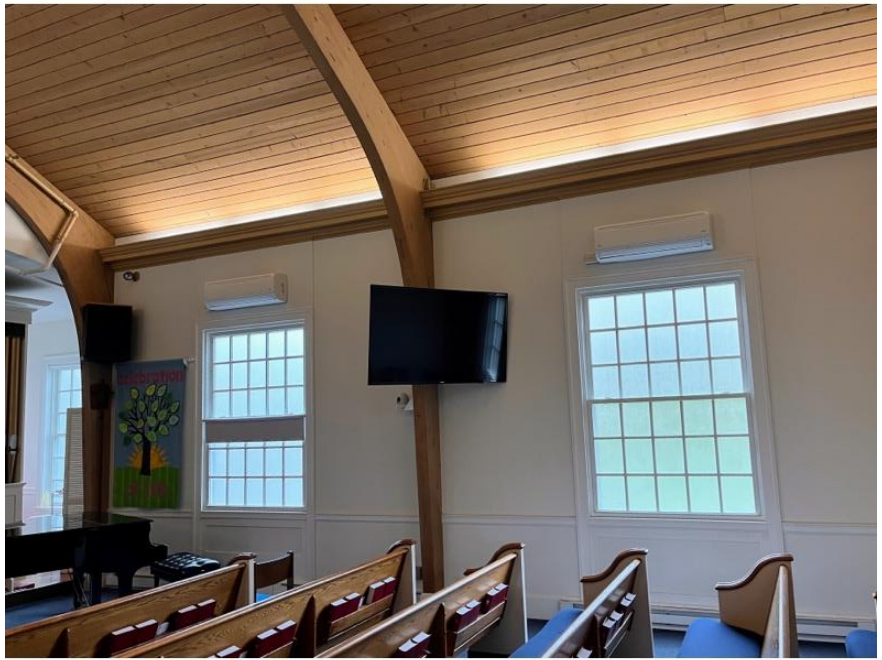
FAITH LUTHERAN CHURCH

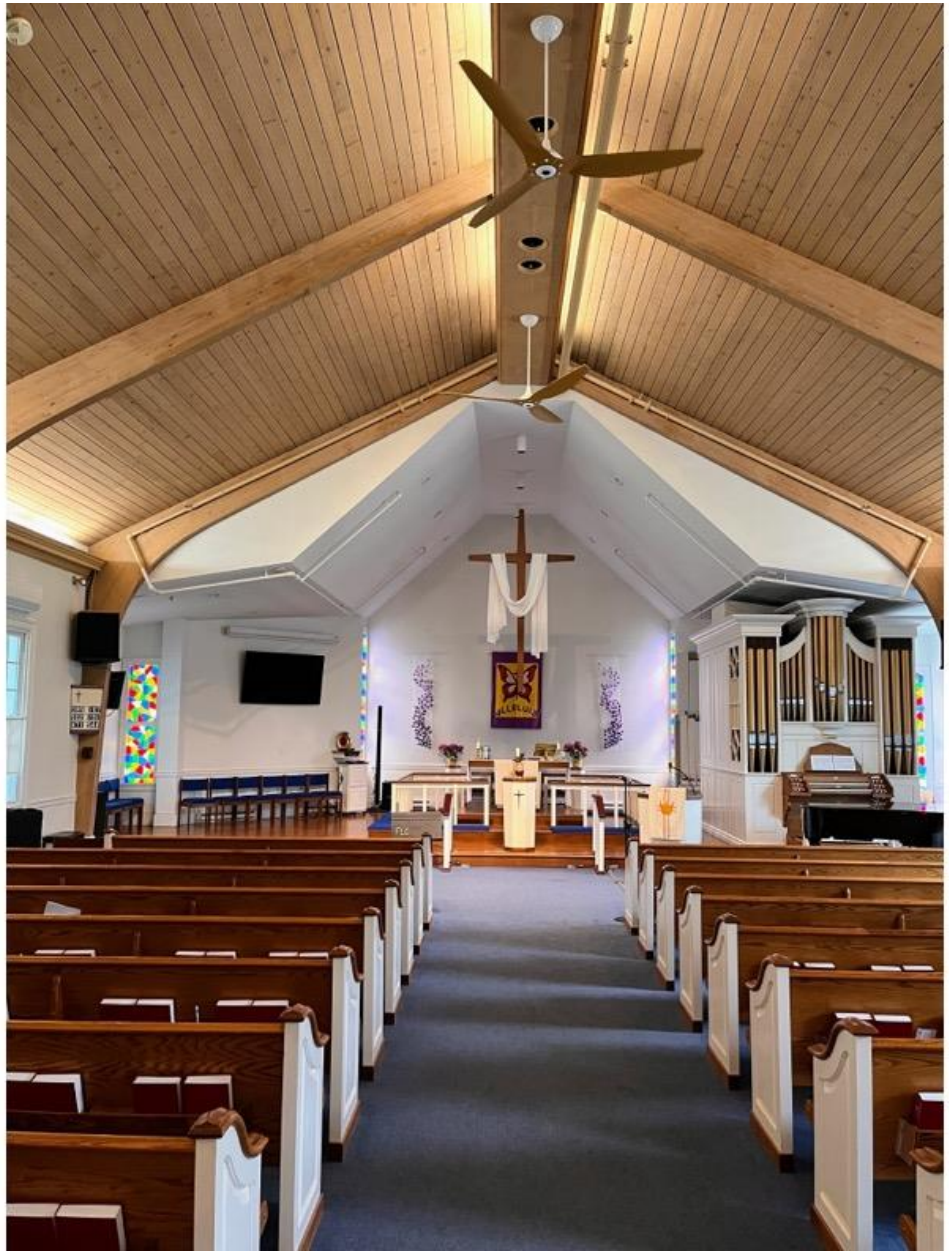
ANDOVER, MA

FAITH LUTHERAN CHURCH. - ELCA

- Church Facility built ~ 1970
  - Current church is about 6,000 sq ft with 2,400 sq ft sanctuary
  - Originally all electric baseboard heat with no AC
  - Added heat pumps to classrooms 2012, sanctuary 2019
  - Baseboard remains in other facility areas
- Current congregation – 350 active members
- Sanctuary has 3 external Fujitsu units and 5 internal heads
  - total capacity of 7.8 Tons at 47 F and 5 F
- Classrooms have 3 external Fujitsu units with 3 internal heads
  - total capacity of 4.5 Tons at 47 and 5 F







CORONA VIRUS

- Coronavirus led us to re-evaluate the indoor air quality and determine when it was safe to enter
- We considered and tried different solutions, including:
  - Air exchange rate , air cleaners, UV virus destruction, masks, limiting time and limiting the number of people
  - In the end, we tried all the ideas, but have some lasting solutions
- Implemented UV strips in the heat pumps and UV on the top of ceiling fans
- UV light use is growing as a way to destroy bacteria and virus particles and we feel this technology combined with the heat pumps and the new ceiling fans has a significant impact.

HEAT PUMP OPERATION

- **Comfort** – impossible to please everyone, but a key is to minimize the temperature distribution in the sanctuary - top to bottom, side to side, close to HP heads and away from heads.
- **Safety** – Detailed conversation, but the UV strips are a large help and should be used with or without other measures. We also implemented the ceiling fan UV option.
- **Cost** - Need evaluation of facility improvements and operation of the units (Help from IPLMass)
- **Ownership** – Critical issue in the congregation. Who decides the strategy and who operates it. The operators need to be a small number of people.

KEY ASPECTS OF CURRENT OPERATIONAL PROCEDURES

- Determine who can operate the controls.
- Sanctuary in the Winter – Set controls on 60 F during the week. Saturday evenings increase to 72 and decrease to 60 after services. Also use the fans to help distribute the heat.
- Sanctuary in the Summer – Just turn to 72 on Sunday morning.
- Classrooms – Turn the units on when we use the rooms mostly Sundays
- Electric baseboards set to minimums in other areas during the week and increased on Sunday.

CONCLUSION

- We are happy with the heat pump systems in terms of comfort and air quality
- It took work to understand how to control them and patience from our congregation as we learned
- They can be used to improve air quality
- We are considering how to further improve our energy use and cost