

## **WUS HVAC Upgrades to Enhance Safety of Indoor Meetings**

During the last year we have taken advantage of an empty building to make a number of heating and ventilation system enhancements to monitor and improve the quality of the air in our indoor meeting places.

### Summary

- CO2 levels are the single best indicator of air 'freshness' and quality. Outside air runs 400 – 600 PPM (parts per million). If inside air gets over 1000 PPM, additional ventilation is suggested.
- CO2 levels are or will be monitored in all of our meeting rooms with new, state-of-the-art sensors with color coded feedback and Wi Fi connectivity for reporting and remote access.
- Fresh air is being added automatically in the large meeting rooms through our original, now 'smart' ventilation systems and, as needed, by open windows in the smaller rooms.

### Sanctuary & Symmes

- The original heating system for both the Sanctuary and Symmes was designed to heat with largely outside air (as opposed to a closed system of recirculated air). This was done to reduce contagion in response to a global flu pandemic during the mid 1800's. Both rooms have large, open, external air vents next to the radiators serving the room. These vents had been completely covered about 15 years ago in our efforts to save on energy use/expenditures. Now we replaced the covers in both rooms with smart venting systems that are controlled by CO2 monitoring & control units. The vents are opened by degrees in line with the CO2 levels measured in the exhaust air of each room.
- During warm days when the heat is off, we use open windows and three ceiling fans to introduce outside air and circulation. We have a separate CO2 level monitor continuously running in the Sanctuary and reporting through Wi Fi which shows this method successfully maintains low CO2 levels during services.

### Metcalf Hall

- Added CO2 sensor-based control to turn on the in-place air exchange system anytime the CO2 levels go above levels considered very safe for inside air. This system will stay on until the CO2 levels are reduced to well below trigger levels. This system also contains air filters that are used in the summer to remove the humidity in the air. The air exchange rate when on replaces the air in the room approximately 6 – 8 times per hour.

### Wallace (OWL Room)

- Added two HEPA air purifiers with filters capable of capturing very small (virus level) particles. When both running simultaneously during OWL classes, they will filter the air in the room well over the CADR (Clean Air Delivery Rate) rate recommended by experts [Joseph Allen, Director of Harvard's healthy buildings project ... *"It's easy to pick a portable air cleaner: 1. Look for HEPA filter only, nothing else 2. Select a high 'CADR' ..."* ]
- Added a high-end CO2 sensor to constantly monitor the air freshness with digital readout and visible color codes to signal when fresh air should be added to the room (e.g., open a window).

### Chapel

- Heat was restored to the Chapel by refurbishing and upgrading the blower which circulates the air in the chapel. The fresh air intake implemented for the Sanctuary also feeds into the air circulation stream for the Chapel.
- The Chapel also has an existing air exchange and humidity filtration system similar to the one in Metcalf. As in Metcalf, we have added CO2 sensor-based control to turn this unit on anytime the CO2 levels go above levels considered very safe for inside air. This system will stay on until the CO2 levels are reduced to well below trigger levels. The air exchange rate for this unit when on replaces the air approximately 5 – 7 times per hour.

### Winsor

- We restored the blower in Winsor to add heat and increase air circulation. When AA is ready to move back into the room, we will add a CO2 sensor with color coded feedback similar to the Wallace one that will inform when a window needs to be opened.

### Michelsen & Parlor

- When church activities are beginning to resume, we will also add the same CO2 sensor with color coded feedback noted above to the Michelsen and Parlor rooms, again informing occupants if and when a window needs to be opened.