RHCC Heating System Upgrade

Project Summary

I. Boiler

Replace current Smith Mills fuel oil fired boiler with a cascade system of three Buderus GB162 (290 MBH), Wall Hung, Gas Fired, Condensing Boilers. Dan Allen has used several methods to calculate the "heat load" for the church for the coldest day in the winter; the results showed our maximum heat load is about 600 MBH (thousand btu's per hour). Initially, he proposed two Buderus 333 MBH boilers, but codes changes for boilers above 300 MBH mean that three 290 MBH boilers don't cost any more than two 333 MBH boilers. In addition, having the three gives us a little more cushion on high side and a lower minimum rate 61 MBH vs. 69 MBH. Our existing boiler has a design capacity of about 1310 MBH, typical over design of old steam heat systems.

Figure 1 Buderus GB 162 at Cobalt Lodge

II. Hot Water Heater

Replace current fuel oil fired domestic hot water heater with Buderus, 100 gallon solar ready, indirect hot water heater. Initially the domestic hot water tank would be heated by coil from the boilers, but it has an additional set of coils that could be connected to solar panels in the future.

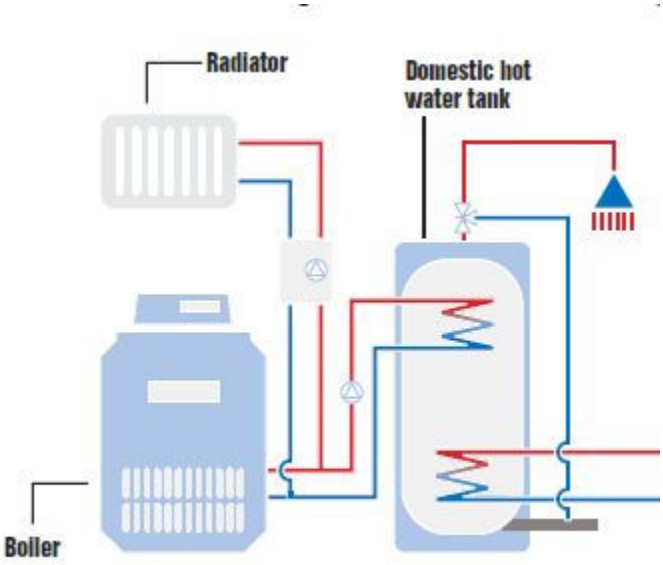

Figure 2 Solar Ready Hot Water Tank

III. Conversion of Steam Heat to Hot Water Heat

Convert the existing steam heat systems in Chapin Hall, the Sanctuary, and the ’53 Addition to hot water radiation. This is a big part of the cost, approximately 40%; new piping for the ’53 is less certain until some walls are opened. In an earlier memo to us, Dan estimated having to make eight 2’ x 2’ holes.

IV. Increase Number of Heating Zones

Add six new heating zones, increasing the total number of heating zones from ten to sixteen. Four new zones would be added in the ’53 Addition so that there would be zones on each side of the building on each floor (the Senior Pastor Office and adjacent office would continue to be a separate zone). In the Sanctuary, the Choir Room and the Narthex & bathroom, would become new zones. A complete listing of the zones is attached. Earlier we considered 5 or 6 more zones (nearly every room in the ’53 Addition); so this is a compromise, a big step in improving our efficiency, but not all the way to every room a zone as modern construction would be.

V. Replace Radiators in Sanctuary

The three radiators on the east side of the Sanctuary need to be replaced since they can’t be used in hot water service; three new radiators on the west side of Sanctuary will be replaced as well so that the east and west side match. The specific style hasn’t been selected yet, but the leading candidates are – Myson Horizontal Column, Myson Flat Panel or Buderus Flat Panel. Below are a couple of images; most flat panel radiators look alike. The flat panel radiators don’t extend as far from the wall.

Figure 3 Myson Horizontal Column Radiator

Figure 4 Buderus Flat Panel Radiator

VI. Gas Piping

Install gas piping from point where CNG connects gas to the Church (expected to be to the room where the Chapin Hall air handler unit is) to the new boilers. Make provision for future use of gas appliances in kitchen.

VII. Exhaust

Exhaust from the three boilers will be piped directly out the side the boiler room in a single exhaust vent. Specific design of the vent on outside of building hasn't been selected yet, but the design used at the Grace Lutheran Church is the leading candidate. The picture below shows Grace Lutheran Church in

Hartford. They have two pipes, but we would only have one. It isn't clear from this picture, but each one is a pair of concentric pipes, for inlet combustion air as well as exhaust gases.

Figure 5 Grace Lutheran Exhaust

VIII. Connecticut Temperature Control (CTC) Work

CTC will provide six zone valves with electronic actuators and pipe temperature sensors. They will install six space zone temperature sensors with set point and override. They will wire and program new zone valves. They will provide control relays, current switches and programming for zone pumps. The six new space temperature sensors are expected to be in the Narthex, Choir Room, Chapel, Room 24, Church Office, and Room 25. We need to contact CTC to see whether they want a single payment or would want this amortized over the remaining years of our current contract.

IX. Thermostatic Radiator Valves

Some non electric, thermostatic radiator valves will be added to some radiators to offer more control within a zone. Most of these haven't been specified yet. One that has been specified is the radiator in the bathroom in the Narthex. Some additional possibilities are the new radiators in the Sanctuary (to balance the temperature from east side to west side) and the Parlor and classrooms in the '53 addition.

X. Demolition and Debris Removal

In general, Mechanical Energy, LLC will be responsible demolition and debris removal. RHCC intends to contract with a scrap metal dealer to recover the scrap value of iron and steel in boiler, piping and six radiators from the Sanctuary. RHCC will arrange for a dumpster for the scrap metal. In addition, RHCC will attempt to resell the six steam control valves and actuators that CTC installed in February 2010. Our preliminary plan is attached.

XI. Carpentry and Painting

RHCC will be responsible for any sheetrock repair, painting, and other construction needed for pipe concealing.

XII. System Startup & Training

XIII. Schedule of Values

The June 7, 2011 estimate $120,900 needs to be revised to incorporate scope changes since then, such as fewer zones (16 instead of 20), more radiators for Sanctuary, vender pricing, etc. The CTC estimate of $12,932 may need to be revised as well; in their estimate they have assumed six new zone pumps.

XIV. Payment Schedule

Earlier Dan suggested the following milestones for payments but didn't include percentages:

1. Acceptance of proposal (contract signing)
2. Boilers on site
3. Piping connected
4. Boiler fired and punch-out list
5. Town Approval
6. Completion

XV. Rebates or Incentives

Dan says he has received an announcement that there are some incentives this year, and he will help us apply. Probably would be several thousand dollars if we are successful.

Heating Zones for RHCC Heating System Upgrade

Introduction

This is the list of heating zones being included in our project to renovate our heating system. Currently we have 10 zones – 5 in the 1993 addition and 5 for the remainder of the church. The 5 zones in the 1993 addition will stay as is. The new system would have 16 zones.

Chapin Hall (One Zone)

1. Zone 1 - Air Handler System & Wall Radiation (same as current arrangement)

Sanctuary (Three Zones)

1. Zone 2 – Main Floor & Balcony
2. Zone 3 - Narthex & Bathroom off Narthex (new zone)
3. Zone 4 – Choir Room (new zone)

1953 Addition (Seven Zones)

1. Zone 5 – RHCC Nursery School
2. Zone 6 – Senior Pastors Office & Adjacent Office (Mission Room)
3. Zone 7 – Chapel (new zone)
4. Zone 8 – Rooms 20,22, & 24 (new zone)
5. Zone 9 – Child Care & Youth Rooms
6. Zone 10 – Church Office, Parlor, & First Floor Bathrooms (new zone)
7. Zone 11 – Rooms 21,23 & 25 (new zone)

93 Addition (Five Zones, same as current arrangement)

1. Zone 1- Quilters Room(Room 6)
2. Zone 2 – Associate Pastor's Office (Room 16)
3. Zone 3 – Fiorilli Room (Room 15)
4. Zone 4 – CE Director's Office (Room 26)
5. Zone 5 – Classroom 27

Other

There are some additional radiators in spaces that aren't yet included in the above zones. How they will be handled has to be determined. In the '93 Addition, there is a radiator at the Center Street entrance and in the Custodian's Room. In the '52 Addition there are radiators at the Old Main Street entrance and stairways, the Custodian closet, and one ground floor bathroom.

Location of New Thermostats

New Thermostats will be installed in Narthex, Choir Room, Chapel, Room 24, Church Office, and Room 25.

RHCC Heating System Upgrade

Demolition and Salvage Plan

Introduction

In general it will be the responsibility of our primary contractor, Mechanical Energy LLC (Dan Allen), to demolish and remove parts our old heating system that will be replaced. However, recognizing the potential value of the metal in the boiler and piping to be removed we are investigating ways to get its salvage value. Additionally, the six Siemens

control valves and actuators that were installed in our February 2010, may have a value of several hundred dollars if we can find a buyer.

Metal Salvage

Neal Cox and Jay Montana are already investigating possible salvage buyers for all of the metal in the old boiler and piping in boiler room (primarily high grade cast iron). First estimates are that we could get 12 to 14 cents per pound, and we think that the boiler and piping weighs 5000 to 6000 pounds. In addition, we will be replacing at least three (possibly six) cast iron radiators which weigh 300 to 400 pounds each.

We would ask Dan Allen to remove the material from the church and put in the salvage buyer's dumpster. He would also do any asbestos abatement that is necessary. He has already said that he would do so and that he has no interest it attempting to get the salvage value of the material. One potential buyer has said that they would charge us about $100 for the dumpster; we would still net several hundred dollars and would be recycling as opposed to just sending the material to a dump.

Siemens Valves and Actuators

These valves and actuators are only two years old and are in very good condition. The challenge is in finding a buyer. So our next step is to get detailed specifications on the parts from CTC who installed them. CTC has stated that they won't buy them back, as they only install new devices that are under manufacturer's warranty. We would ask Dan Allen to remove these without causing any damage and set them aside for us. In the meantime, we start looking for companies that install HVAC system and who might be interested. In addition, we could try to sell them online thru sites like eBay or Craig's List.

Fuel Oil Tanks

The easiest approach is to just ask Dan Allen to take care of removal and disposal. Since a lot of consumers are probably doing what we are doing, switching from fuel oil to gas, there may not be any value for our tanks. Alternatively, we might ask Cromwell Energy if they would be interested in removing them. In any event, we should try to manage our fuel oil deliveries so that we aren't left with a lot of fuel oil at the end of the heating season.