

## Diesel Genset Engine Block Heat Pumps – John Adams Building

### DESCRIPTION

There are four diesel generators that can supply back-up power to the John Adams Building. Currently electric resistance heaters keep the engine blocks warm and ready-to-start. The proposed project is to install heat pumps (HP) as a primary source of block heating in series with the existing block heaters. This will reduce energy usage and provide a back-up heating system which utilizes the existing heaters for redundancy.

### ANNUAL BENEFITS

- Reduction in kWh: 130,588 kWh
- Reduction in CO<sub>2</sub>: 34 metric tons
- Reduction in Cost/Seat: \$5
- Annual Savings: \$19,588
- Estimated Utility Rebates: \$31k

### PRIMARY OBJECTIVE

The proposed project is the installation of (4) heat pumps to serve four emergency CAT 3516 diesel generators, one heat pump per diesel genset. Each heat pump will be piped in series with the two existing electric resistance heaters located on each side of the genset. The heat pumps will warm and circulate coolant in the generator to the desired temperature while in series with the existing heaters. The heat pumps will reduce block heating costs by approx. 80%. Life expectancy of the heat pump can be over 15 years which increases generator starting reliability, provides redundancy, saves energy and reduces maintenance expenses. Electric resistance heaters typically begin to fail in 4-5 years.

### FINANCIAL SUMMARY

- Estimated Project Cost: \$71,700
- Estimated Net Project Cost: \$40,359 (minus est. utility rebates)
- Estimated Payback: 2.1 years

### RISK MITIGATION

The following measures can be considered during design to mitigate, if not eliminate, identified risks that may impact business continuity during the installation and lifetime of the proposed system.

- The new heat pumps add a secondary source for engine block heating, which mitigates the risk of cold engine start due to failed electric resistance coils. Since the heat pumps are more efficient they will run as primary. If the heat pumps fail to perform, the system will automatically revert to the electric resistance block heaters.
- An option is available to integrate with the BAS to display alarms. Standard configuration is a set of dry contacts to alarm if the heat pump fails.
- A bypass option is available, if the heat pump fails, the return coolant will bypass the heat pump and be directed to the resistance heaters that will then operate to heat up the fluid.

SYSTEM INFORMATION

Sample Indoor Installation



Genset with existing block heater (circled in red)



Sample genset with engine block heat pump installed

Simple Line Diagram

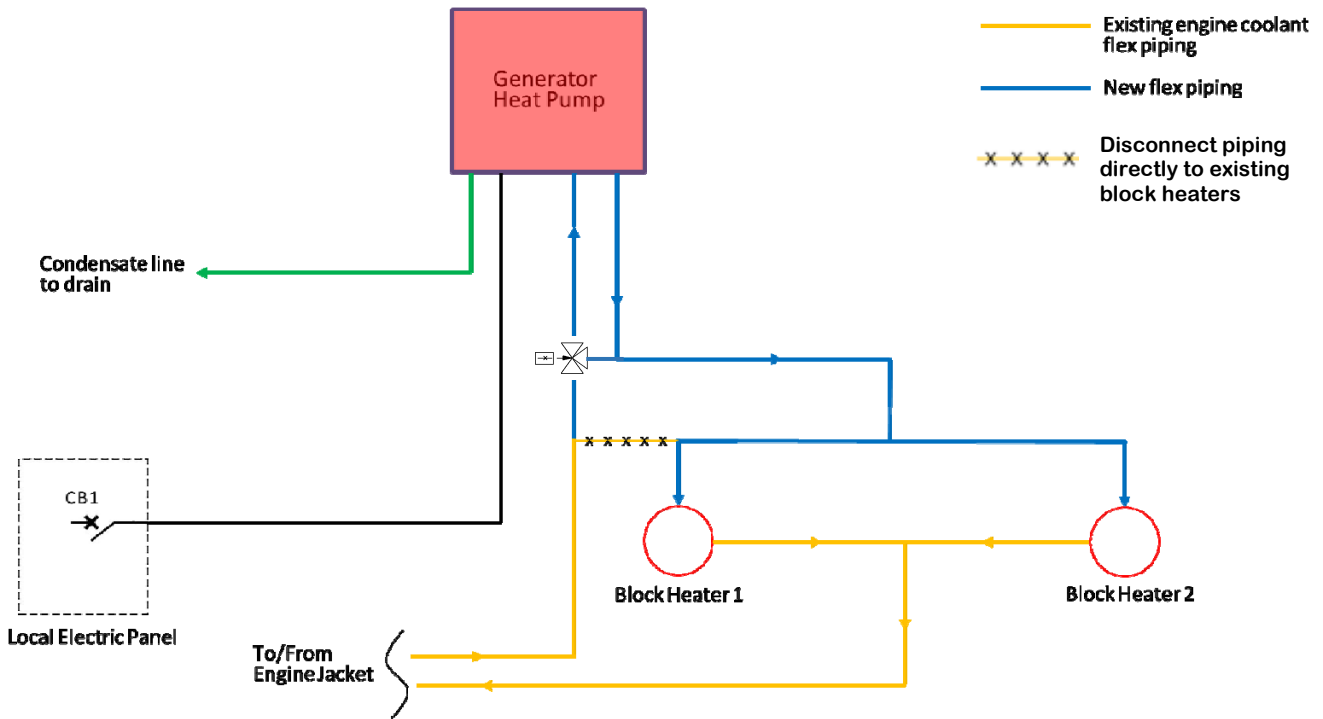


Diagram above shows the main components of the system integrated with the proposed generator engine block heat pump in place. The optional bypass valve can return coolant to the existing block heaters.