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Heating Best Practices to Achieve Energy-Efficient Buildings

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Facility managers and executives are continuously looking for sustainability solutions that can reduce energy usage and lower overall spend. Solutions to achieve these goals often include infrastructure upgrades such as retrofits, replacements, and technology updates, requiring extensive capital funding.

While these projects may be essential to improving the facility's energy portfolio, reducing energy consumption and achieving energy rating certifications (e.g., ENERGY STAR, LEED, etc.), the benefits are often outweighed by budgetary restrictions. Further, many organizations do not have access to an energy specialist to support and guide the process, leaving facility managers contemplating which solution will produce the greatest return on investment.

To help maximize building energy efficiency, below are 12 simple heating best practices and cost-effective solutions that maintenance teams can quickly implement or coordinate for heating applications. Although some of the approaches are common knowledge, these best practices are often overlooked or not utilized, creating inefficiency and monetary waste. Implementing these practices will benefit the facility team by improving facility energy utilization and preserving the life of the heating equipment during the winter months.

1 / Tune up the boilers

Tuning up the hot water and steam boilers before the heating season ensures a safe and efficient operation. Boiler Tuning will adjust the fuel/air intake ratios, damper linkages, and fine-tune the control settings to increase boiler efficiencies at the various load levels.

2 / Steam and Hot Water Piping and Valve Insulation

Improper insulation creates significant losses and waste due to heat dissipation. Ensuring proper insulation of piping and valves significantly lowers the heat dissipation losses. We recommend examining all pipes and valves carrying steam and hot water to the facility, especially pipes and valves that are exposed and in rooftop locations, ensuring proper insulation is in place.

3 / Optimize Boiler Cut-In/ Cut-Out Temperatures

Effectively staging boilers and hot water will reduce cycling and wasteful combustion gas purging. Review the cut-in and cut-out temperatures to adjust staging without overlapping temperature ranges and produce a lead/ lag boiler staging process.

4 / Reset Boiler Heating Water Temperature

Utilizing the outdoor air temperature as an input, reset heating water temperatures using the building management system (BMS). Resetting the temperature of the hot water supplied from the boiler or heating water systems can yield significant savings.

5 / Condensate Return

Using steam for heating will produce condensate as a byproduct. It is essential to route the condensate back to the boiler to reproduce steam. The returned condensate will recognize less city make-up water and a significant reduction in fuel use, reducing effluent wastewater costs, and chemical expenditure.

6 / Schedule Hot Water System Boiler Pumps

Schedule hot water or boiler system recirculation pumps to cycle off during unoccupied hours while maintaining unoccupied space temperature setpoints. Scheduling the pumps to cycle can be accomplished using local pump controls with a timer or a BMS.

7 / Steam System Tune-up

A steam system tune-up is essential for optimal operation and system preservation. Ensure that the heat exchangers are cleaned and inspected correctly during the tune-up to enable proper operation. Proper inspection and repair of pressure-regulating and pop-off valves must comply with and adhere to the steam trap maintenance plan to ensure proper operation.

8 / Hot Water Pump Setpoint

Based on system needs, the hot water pumps are set to come on at the desired temperature. If the setpoint is too high, there could be a significant energy loss due to excessive pump runtime and heating of the hot water system. In addition to energy loss, premature pump or motor failure could result. Be sure to identify and establish a proper setpoint for effective operation.

9 / Optimum Start and Morning Warmup

There are options to input night, evening, and unoccupied setbacks in the BMS. It is essential to understand the building envelope heating and occupant needs when implementing this energy-saving strategy. Be sure to identify expected results and monitor the savings, adjusting setbacks as needed.

10 / BMS Override

The BMS increases energy and efficiency opportunities through automation. The data analytics of a BMS removes the human error element. It is important not to override the automated system as it can cause a consequential effect on energy savings and safeties. If there is a need to override the BMS system, restrict the override to individual precise parameters. After meeting the specific condition, the operator must implement a follow-up procedure post-override to put the system back into regular operation.

11 / Tankless Water Heaters

A tankless hot water system, which eliminates reheating of stored water, is very efficient when sized adequately. . However, calibration of the temperature sensor is critical to efficient operation. An irregular temperature reading can trigger the recirculating pump and start the heat exchanger when it is not necessary, ultimately wasting energy.

12 / Domestic Hot Water Tank

Insulation blankets surrounding domestic hot water tanks prevent unnecessary heat loss. A hot water recirculating pump on a domestic hot water tank returns unused hot water to the tank, minimizing waste and saving energy.

These 12 heating best practice recommendations are simple, cost-effective solutions that can be easily applied by the site facility management team or a subcontractor. Implementing these practices will enable the facility team to supplement the energy goals by reducing energy waste, improving energy efficiency, and preventing costly equipment failures and repairs.

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