

Boilers

Key Characteristics

Most businesses have a boiler of some sort. Usually they are used to heat premises but they may also be used for heating water, oil, or steam, for use in industrial processes. There is no such thing as a 100% efficient boiler - around 20% of all heat generated is lost up the chimney – but this heat loss can increase to 30% or more if the boiler is poorly maintained or operated. Major savings can be achieved from reducing the amount of energy lost at this primary stage.

Major Opportunities for Savings

Boiler Maintenance:

A badly maintained boiler plant will waste significant amounts of money. Check your boiler plant regularly and check for signs of inefficiency - look for any warning lights, signs of leakage from pipework, valves, flanges, and the boilers themselves, and gas smells, damage and burn marks to boilers and flues, undue noise from pumps and burners. If you spot anything, call your maintenance person to check it out.

Good efficiency depends on good combustion and low chimney losses. Measuring the temperature and oxygen content of the flue gases indicates the quality of combustion and heat losses through the chimney. Consider installing a flue gas thermometer at an approximate cost of £20. The boiler is ready for cleaning again when the maximum temperature of the flue gases rises by over 40° since the last service.

A build up of deposits caused by combustion will reduce boiler efficiency. Boilers and burners should be properly cleaned and serviced at least once a year by a qualified contractor. The service should include a combustion efficiency check and adjustments of the burner air/fuel ratio for optimum efficiency in accordance with the manufacturer's instructions. Worn controls and linkages will result in poor combustion – have these checked too.

Ensure your boiler house is adequately ventilated with all louvers and vents open and not obstructed. Restricting the supply of air to a boiler will result in loss of efficiency due to incomplete combustion. Inadequate ventilation can also allow the release of potentially dangerous gases; therefore ensuring good boiler house ventilation is also an important health and safety matter.

Boilers that are not insulated may lose heat into the surrounding area - this can represent a significant waste of money. If they are not insulated, consider fitting 50mm (minimum) thick mineral fibre mat with foil laminate to the inside of the boiler casing, but make sure that the insulation does not interfere with the burner or air supply to the boiler.

Boiler Operation;

Leaving boilers running when there is little or no demand for heat is an obvious waste of money. Check that your boiler is not firing in periods when your premises are not in use. Sometimes boilers can continue to fire even when the room thermostat or time switch shuts off the circulation pump. This means that, although the premises are not being heated, the boiler continues to generate heat, all of which is wasted. If this is happening you may be able to have the wiring altered so that the thermostat or time switch shuts off both the pump and the boiler. Many businesses have more than one boiler to provide adequate heating during the winter months. If you have a multi-boiler installation you may be able to turn off one or more of them during periods milder weather and still be able to provide a comfortable level of heating. If you can use fewer boilers during the warmer months, try to use the smallest boilers possible as larger boilers lose more heat.

Also, if you have a multi-boiler set-up, ensure that you have boiler sequencing controls installed. These ensure that the minimum number of boilers to meet demand are firing and that boilers are fired in the most efficient sequence, e.g. smallest first.

Steam Generation:

Providing steam for (process and space heating) can be one of the main energy costs at industrial sites and factories throughout the UK. Steam costs are also a major contributor to energy bills in building complexes within other sectors. Improving the efficiency of steam generation can make average energy savings of 7%.

- Where batch processing is used the steam supply should be turned off when not needed. Also, supplying steam to space heating systems when not required increases energy costs. If required, arrange for isolating valves to be fitted to pipe sections that are not used for significant periods.
- Investigate using the lowest possible steam pressure for your process. Reducing steam pressure means lowering steam temperatures, thus saving energy costs.
- Check the steam temperature required for each individual process (including space heating and domestic hot water). Use the lowest possible temperature of steam at all times, and make sure high pressure and superheated steam is not used unnecessarily.
- Steam supplied to a process could be controlled manually by opening and closing valves. Manual controls are ineffective for controlling variable amounts of steam.
- Assess the viability of installing automatic controls - automatic steam controls based on temperature can reduce steam consumption and save costs.

Distribution System:

It is estimated that up to 20% of energy could be lost through poorly designed and maintained heat distribution systems. A further 20% could be wasted at the point of use at sites operating without proper attention to efficient use of energy. The loss of heat through exposed pipework can represent a significant proportion of the energy wasted in a heat distribution system. Heat loss from pipes can be reduced by over 70% through the proper lagging of all pipework and the payback period is usually only a few months. Consider replacing any older lagging with modern materials and don't forget to lag valves and flanges as well; the heat lost from a valve is the equivalent of about 1m of pipe.