Article 1: Reducing fuel costs by insulating hot water pipes and high temperature surfaces

A very common, low-cost opportunity for reducing fuel usage is insulation of exposed pipework, uninsulated areas of the boiler system, and replacing damaged insulation. Examples of poor insulation are demonstrated in the pictures below.

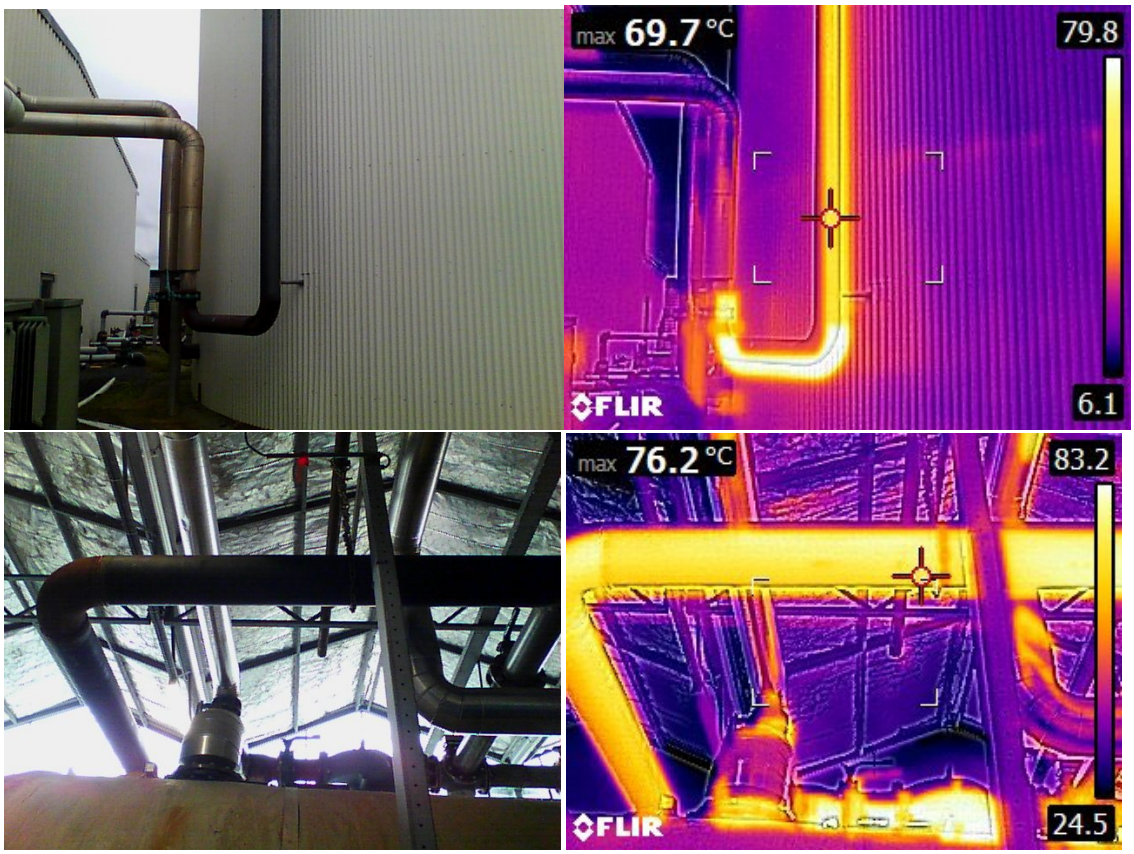

Figure 1: Images of uninsulated pipework coming out of the boiler (top photo) and entering a buffer tank (bottom photo)

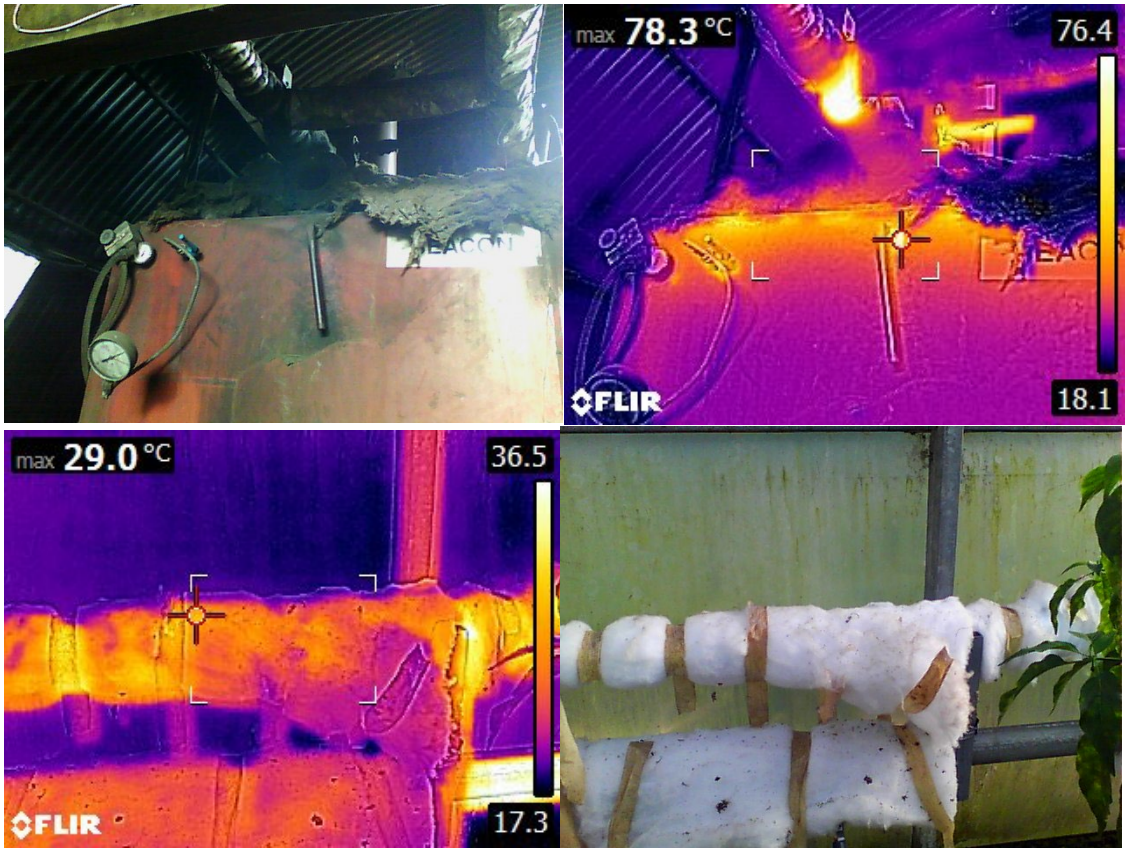

Figure 2: Damaged insulation and the heat escaping from this damage

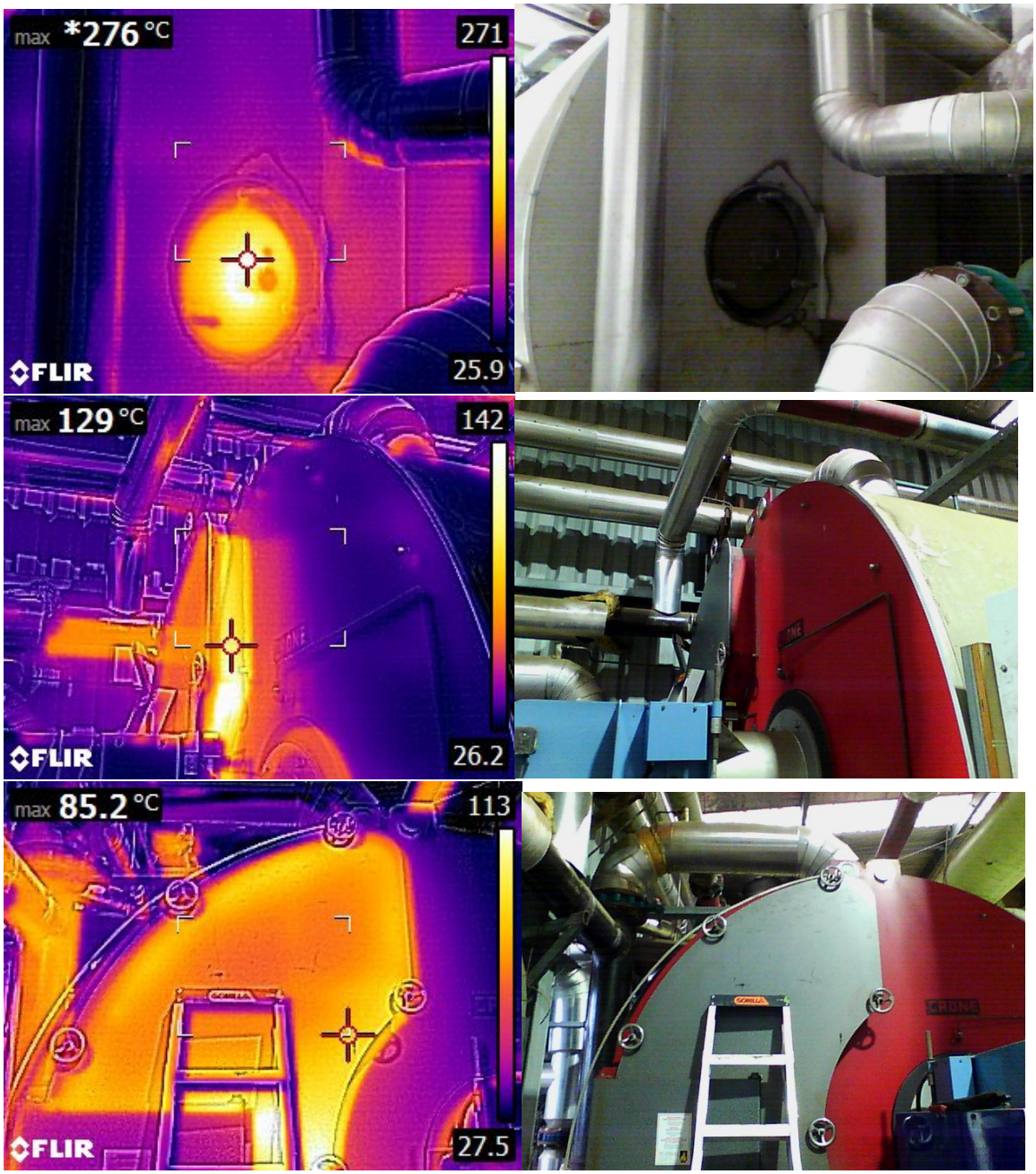

Figure 3: Examples of site glasses and boiler openings that have large areas of heat loss

Figure 1 shows pipework exiting the boiler and entering a hot water buffer tank that has no insulation surrounding it. The thermal imaging camera shows that the pipework reaches temperatures of 70+°C, around the same temperature as the water circulating through the boiler house.

A large amount of insulated pipework can result in major losses depending on the length of uninsulated pipework and how exposed it is. Additionally, damaged insulation should be repaired quickly, because even small gaps can lose a significant amount of heat and reduce the efficiency of a heating system. This is shown in Figure 2.

Figure 3 identifies the amount of heat loss that occurs around uninsulated sections of boiler systems. To minimise heat loss, boilers need to be very well insulated. Some of the areas that exhibit the highest amount of heat loss are near the sight glasses and around the valves connected to the boiler.

By insulating the exposed areas, a grower can save a moderate amount of heat for a low price. At a pipe temperature of 70°C, in an outdoor area with an average temperature of 10°C, insulating pipes will reduce heat loss by 1297W/m^2, noting that the savings related to this number depend on the cost of the fuel.

For common prices of gas, waste oil and coal, the savings are tabulated below.

Table 1: Savings ($/metre) for common fuel types for insulating pipework and boiler systems

Fossil fuel	**Savings**
	($/metre Insulation)
Natural Gas ($24/GJ)	$113
Coal ($450/Tonne)	$82
Waste Oil ($0.5/L)	$58

Although these savings appear minor, insulation is cheap. If 50 metres of insulation is installed for a natural gas boiler and associated pipework, this could save nearly $5000 per year. Insulating pipework is a low-cost way to reduce energy costs, as a metre of insulation costs somewhere between $10 and $50, depending on the quality and whether a professional installer is used.

The yearly savings associated with insulation allows the insulation to pay for itself in between one and two years.