

A 1950's chalet-style bungalow



The Existing Property:

This is a detached brick-built chalet style bungalow built in the 1950's and renovated in two stages in 1985 and 1992.

Structure:

Traditional brick-built structure with cavity walls and a separate double garage to the rear of the property.

Windows & Doors:

Windows are all double glazed UPVC without trickle venting. Windows look to be 10 - 15 years old and in good order. The doors (other than the front) are UPVC and same age as the rest of the windows. A thin section Velux unit is present in the upper bedroom.

Insulation:

Chalet style bungalows (unless recently built) usually suffer from a lack of insulation in the sloping part of the upper rooms. The thermal camera confirms that this property falls into this type. Other points of weakness are the ceiling of the bay window and the flat roof of the extension - both areas show up on the thermal camera.

Power:

The property has a single-phase 100amp power supply. A 10-panel solar array provides an estimated maximum of 2.5kw at peak.

Heat calculation:

I calculate the property heat requirements to be approximately 20kW. This is currently more than a single-phase renewable air source heat pump can deliver (see renewable heating systems). With major improvements in the house's insulation, it may be possible to utilise a renewable system if you so desire.

Our Suggestions:

Insulation:

The best way to improve this property is to improve its thermal efficiency and reduce its overall heat loss. This process can be distributive and expensive but in terms of capital investment will give the best return. The most sensible approach to reducing your environmental impact is to reduce the amount of energy needed to heat the property. Some of the renewable heating options have a limited output (see renewables section) when you only have a standard domestic power supply. The following paragraphs outline possible ways to improve the home's efficiency and reduce the energy required.

The outer brickwork suggests that the building will have a cavity of some sort, but the depth and whether it has been insulated at some point in the past would require invasive investigation. If no insulation is present and the cavity is of sufficient depth, then it may be possible to inject a suitable product. These include blown fiberglass, blown cellulose polystyrene beads and expanding foam. The most appropriate product for your situation will depend on what is found during the investigative process. A practiced contractor in the field would be needed.

Areas such as the bay window ceiling and flat roof portion of the property should be investigated to understand the current insulation levels and improved where possible. The thermal camera did highlight possible issues in these areas.

Loft insulation in chalet style properties is more involved. The insulation in the sloping portion of the ceilings usually fills the available space, hence the only way to improve the efficiency of this insulation is to replace it with a better product or add more insulation material over the underside of the ceiling thus decreasing the size of the rooms.

This process can be phased as you renovate each area on the upper floor. If replacing the existing fiberglass with a more efficient PIR insulation, care must be taken to maintain a 25mm air gap between the back of the tiles and the insulation product. It is important that any gaps between the insulation and the roof timber should be filled correctly as part of the process.

If a further 25mm on PIR insulation is placed across the whole ceiling structure prior to the plasterboard being installed, the thermal bridging that usually occurs through the timber itself is also minimized, improving the situation even more.

Although this process can be messy, the results can be very effective in retaining the heat of the property.

The flat portion of the ceilings should have the insulation above increased to a minimum 300mm but ideally 400mm. I have personally undertaken this type of improvement as part of a property renovation and found it to be the single most effective activity completed. It is disruptive but worth the trouble.

The flat roof of the extension and the ceiling of the bays could be improved, the simplest way would be removing the ceiling and working from below, this could be part of a re-decoration project. Alternatively, if the flat roofing material is due for a change (felt roofs need changing periodically) insulation works could be included in this process.

Windows and Doors:

The UPVC windows and doors are in good order and performing well and need little attention. The timber front door will need addressing to improve the draft exclusion characteristics. There are product such as [Copper Draught Strip](#) available from Amazon that can be fitted. The traditional use of a heavy door curtains is also effective.

Lighting:

I did notice during my visit a number of halogen bulbs in use. A simple way to save energy usage is to replace these with LED units. Most styles of bulb do now have an LED version available, and the power consumption is far less than halogen or tungsten units.

Heating system:

Your current single-phase connection limits the output of an air source unit to 12kW which is less than you currently require. With insulation improvements you could reduce your needs down to a point that it may be serviceable by such a unit.

As part of any renovation works to the heating system, I would suggest that you configure a new plumbing system to be "Renewables ready". Renewable heating systems like air source have specific infrastructure requirements to make them perform correctly. These requirements are fully compatible with current fossil fuel systems like your gas boiler but will effectively future proof your system if you wish to switch to a renewable heating system in the future

Summary:

The bungalow is generally in good order. I would suggest a top-down approach improvement to the roof insulation will yield the greatest benefits. In the interim I would get the walls checked to see what is needed.

Heating system:

The current boiler is a reasonable quality product with a good service and parts support network. Your current single-phase connection limits the output of an air source unit to 12kW which is less than you currently require.

If you wish to consider a renewable heating system, you will need to upgrade your power supply to 3 phase.

Alternatively, you may wish to consider a hybrid system using both air source and a gas boiler (see renewables section).

Control systems:

I would also suggest that you use a modern digital control system. These types of systems afford you greater control of the heating at room level and also make the boiler work far more efficiently. It also offers remote monitoring and control functionality.

Your Nest unit is an intelligent thermostat, the system above is a very different product giving you a far greater degree of control over the heating system.

Comments from the owner:

Thanks for arranging the survey and report which confirms the assessment we made before buying that there is scope to improve insulation and that any change of heat source would not be cost effective until the current boiler is starting to fail.