

How Lowe can this house go?

Whole house energy efficiency refurbishment project

“Two years ago, I stood outside our house and promised not to buy it. I had an inkling as to how much work needed to be done. That was before I had a proper look at the electrics, plumbing and heating!”

“For some crazy reason I thought, along with my wife (happy wife, happy life), that it would be a great idea to accommodate my mother-in-law. It was during the middle of covid. Crazy things happened during Covid. Who wouldn't want to live with three daughters, a wife and a mother-in-law deep in the Welsh countryside?!”

Eighteen months after moving in, we removed the gravity fed plumbing system. No more air locks. No more tanks in the loft (we had three). We removed the solar fed hot water tank. Its pump set had long run dry. We removed the heating system. No more micro bore pipe. No more cold radiators. No more red hot radiators that you couldn't turn off. We insulated all internal walls and installed a pressurised heating and hot water system. We use PV panels to store heat energy in a Sunamp Heat Battery. We use ESBE circulation units to efficiently control the distribution of hot water around the system.

There is so much more that we could do. I want to add solar battery storage. In the summer we send way too much electricity to the grid and pay far more for the electricity we buy back in. I'd also like to add a ground source heat pump, but this would cost serious money, approximately 15 times more than a combi boiler. This will have to wait. I'd dearly love to be free from my reliance on fossil fuels. The technology is there, the cost remains prohibitive to the vast majority of households.

At Essco we do our very best to help our customers install systems that are as efficient as they can be. Hopefully you find something in this case study that inspires you to install something a little more efficient. Essco are here to help.”

Matt Lowe

Commercial Director - Essco Group
June 2023



PRODUCT OVERVIEW

- Sunamp Thermino Heat Battery
- ESBE circulation units
- Danfoss radiator valves
- Salus controls
- Elysator TRIO 10.1

PROJECT OVERVIEW

- Optimise building fabric during renovations to minimise heat losses and flow temperature required for comfort
- Make better use of existing solar array to charge a heat battery for efficient hot water generation
- Introduce separate control groups for radiator circuits, under floor heating circuits and hot water recirculation
- Improve control with independent room thermostats, each with time and temperature control
- Full system balancing through presettable TRV's and balanced UFH manifold circuits
- Full remote control and visibility of heating system

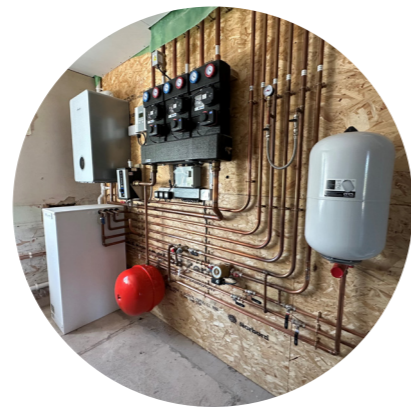
Call us on **01489 779068** or email **projects@esscogroup.co.uk** for a quotation or to find out how we can add value to your next project.



Domestic Hot Water

The Challenge

Make use of the surplus PV-generated electricity and store that energy efficiently to provide hot water to suit the family's needs. Ensure the furthest rooms are also faster to respond when hot water taps are opened.



Solution – Sunamp Thermino Heat Battery

The Sunamp heat battery charges using surplus PV-generated electricity, which would otherwise have been wasted. Compared to a classic solar hot water system or solar hot water panels, the ultra-low heat loss also makes it very energy efficient. There is also the option to recharge the battery using a timer during the winter, or using off peak tariffs where available to ensure the battery is only charged using electricity at the cheapest time of the day. Coupled with a hot water recirculation pump, the hot water pipework can be kept warm at the furthest points to reduce delay of hot water to the furthest parts of the home.

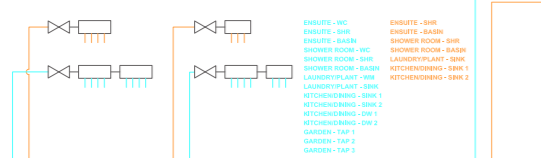
HEAT BATTERY BENEFITS

- Four times smaller than equivalent hot water tank
- No moving parts, so no annual service necessary
- No stored hot water, so no legionella risk or checks required
- Failsafe performance with over 40,000 cycles of charging and discharging; equivalent to over 50 years of continuous use

Sunamp Heat Batteries™



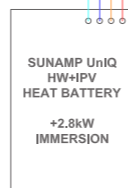
GF DOMESTIC WATER MANIFOLDS



Elysator Trio

ELYSATOR BENEFITS

- Chemical-free corrosion protection
- Meets with Europe's most stringent water quality standards VDI-2035



SUNAMP UniQ HW+HPV HEAT BATTERY +2.8kW IMMERSION



Heating System

The Challenge

Only parts of the original home were habitable during the winter, due to poor insulation levels and high resultant heat loss. We took a "fabric first" approach during renovation and fit insulation wherever practical and implemented low temperature heating solutions and efficient independent room heating controls throughout.



Solutions

A step change between the original house and later extensions allowed for sufficient depth to consider underfloor heating to most ground bearing areas in the home. 125mm EPS insulation was accommodated with a UFH tackler system and 75mm cement screed to remove the step change.

Plaster was stripped from existing walls to expose empty timber wall cavities for insulating, flooring was also lifted to the first floor and joists insulated. The lower the lambda value of an insulation, the more resistant it is to heat transfer, so where depth was an issue, PIR insulation with a lower lambda value was selected.

The old single thermostat with boiler relay was removed, and a whole Smart Home system was introduced using Salus Quantum room thermostats throughout the home. All radiator and underfloor heating zones featured their own Quantum thermostat, the slimmest on the market at only 9mm thick off the walls. Coupled with the Salus Gateway, brought a whole host of remote features including the ability to control zones away from home, and IFTTT ('If This Then That').

Radiators were also installed using Danfoss pre-settable thermostatic radiator valves, ensuring each emitter was flow set to match the design heat loss, removing any previously wasted overheat and balance issues. For zone control of each radiator, the Salus battery powered TRV10RFM TRV sensor heads were also selected, providing truly independent room control.



Salus UG600 Universal Gateway



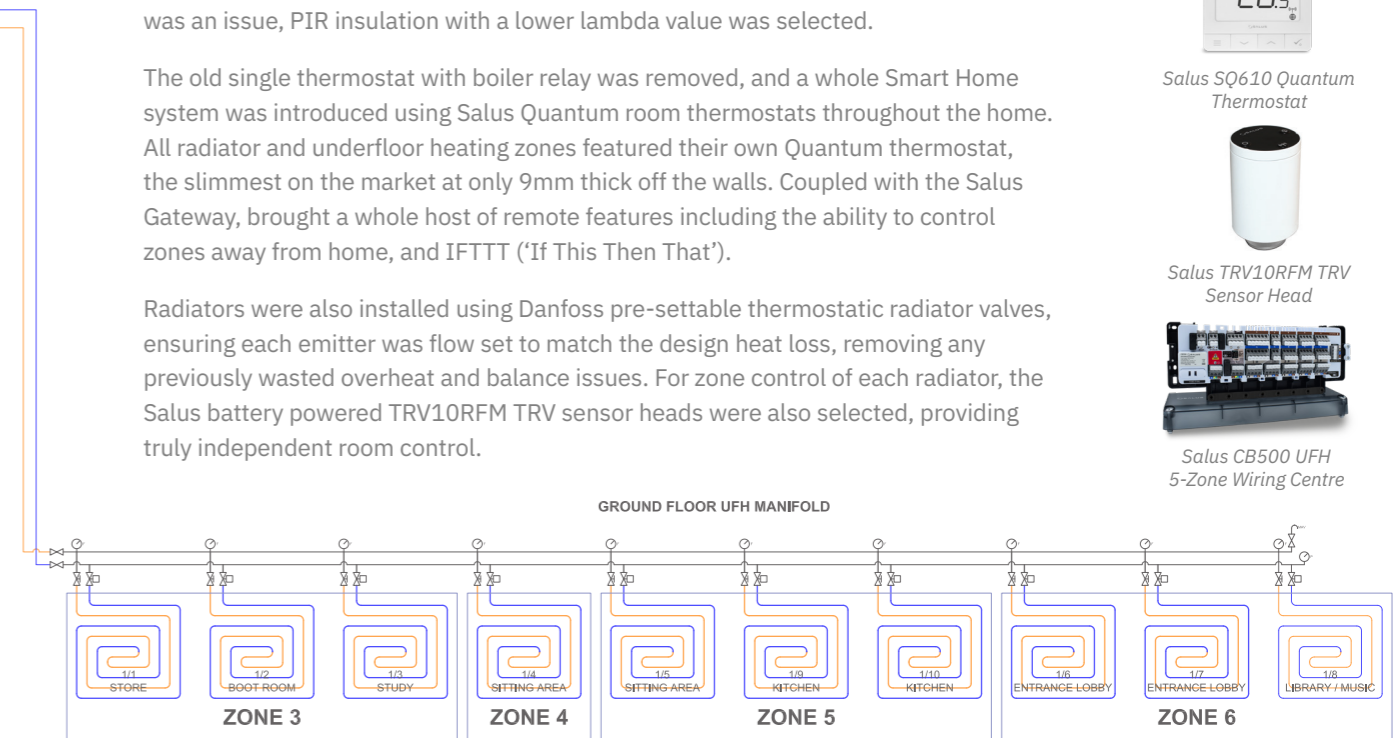
Salus SQ610 Quantum Thermostat



Salus TRV10RFM TRV Sensor Head



Salus CB500 UFH 5-Zone Wiring Centre



Danfoss pre-settable TRV

BENEFITS

- Even heat distribution increases comfort
- Energy consumption is lowered, reducing costs
- Condensing boilers run in condensing mode more often
- Lower risk of noise
- Commissioning of radiator valves using Danfoss Installer App
- Each electronic sensor heads acts as 2-port valve, so radiator isolation can be done remotely using Salus Smart Home App
- Controls solution is scalable and can later include other Smart Home products

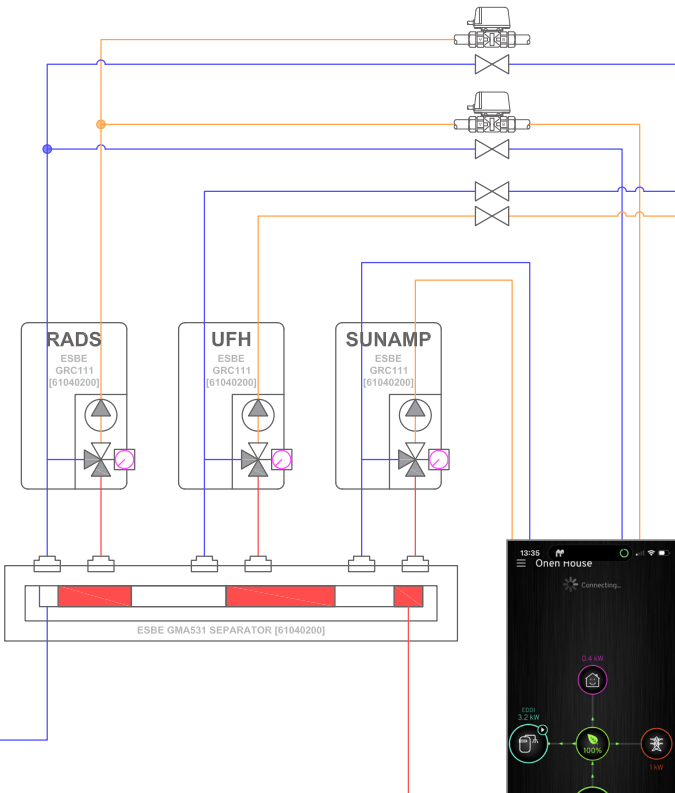
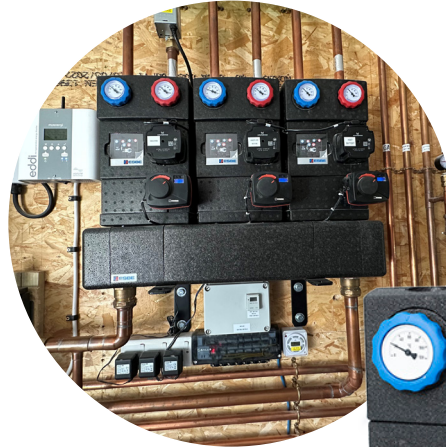
Plant Room Circulation Groups



ESBE Circulation Units

ESBE circulation units are intended for heating systems with multiple zones that operate at different flow temperatures. For this installation, there were three mixing circuits; underfloor heating, radiators and the Sunamp heat battery, making the circulation groups the ideal choice.

The circulation units ensure the best controls performance independent from flow rate and low oversizing risk, thanks to the perfect heating curve and the progressive valve characteristic. Groups also vary in design to accommodate other applications such as direct heating circuits with no mixing or weather compensated heating circuits. The assemblies are very compact and come fully insulated to minimise heat losses.



BENEFITS

- Compact fully insulated design to minimise heat losses
- ESBE Rotary mixing valve offers excellent flow characteristics with precise control of high and low kW system demands
- Direct or indirect configurations to suit different heating systems
- Thermo-ball valves provide visual temperature indicators of each flow and return
- High efficiency circulation pump (Wilo or Grundfos)
- Self-acting or BMS controlled



The myenergi app is also being used to provide visibility of energy consumption and the amount of electricity exported to the grid. The next phase will include energy storage to optimise usage and further improve savings.

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