



## Case Study Castle Lodge Ludlow

### Castle Lodge – Heating & Domestic Hot Water Installation

Client: Castle Lodge Hotel

Consultant: Zeroridge Consulting

Completion: January 2026

### Project Overview

Zeroridge Consulting was appointed to design and oversee a high-efficiency heating and domestic hot water (DHW) system for Ludlow Castle Lodge, a black and white listed hotel property.

The brief required a powerful, reliable system capable of meeting significant hot water demand across multiple floors while integrating renewable energy and intelligent controls.



### The Challenge

The Lodge required:

- High-volume domestic hot water for guest bathrooms and kitchens
- Zoned heating across three floors
- Integration of solar thermal technology
- Legionella protection compliance
- Efficient hot water circulation across complex pipe routes
- Simple, intuitive system control

The solution needed to deliver performance and efficiency while respecting the constraints of a heritage building.

## The Solution

At the heart of the installation are high-efficiency condensing natural gas boilers connected to three large buffer vessels. Each buffer incorporates stainless steel hot water production coils, solar heat exchanger coils, immersion backup provision, and multiple temperature sensors to optimise performance.

Rather than storing domestic hot water, the system produces it instantly on demand via stainless steel coils within the buffers. This approach improves hygiene, reduces standing losses, and ensures rapid response to fluctuating demand.

With a total boiler capacity of 160kW, the system can deliver up to 6,000 litres per hour of continuous hot water draw-off, comfortably meeting peak hotel usage.

## Solar Thermal Integration

To reduce reliance on gas and improve sustainability, five banks of evacuated solar thermal tubes feed dedicated solar coils within the buffers. The system includes solar heat metering and intelligent pump speed control to maximise renewable contribution whenever conditions allow.

Solar integration supports lower fuel consumption and long-term operational savings while aligning with clean energy objectives.

## Zoned Heating Control

Heating is divided into ten independently controlled zones across the ground, first, and second floors. Each zone benefits from:

- Weather compensation
- Individual room temperature sensing
- Time and demand-based control

This ensures balanced comfort throughout the building while minimising unnecessary energy use.

## Domestic Hot Water Hygiene & Circulation

Given the multi-floor layout, effective circulation and hygiene control were critical.

Thermostatic circulation regulators balance the hot water return circuits, ensuring consistent temperatures at all outlets. A time-controlled Legionella protection cycle runs automatically each week, raising system temperatures to sterilisation levels to ensure full compliance and guest safety.

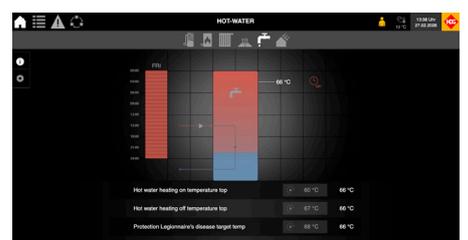
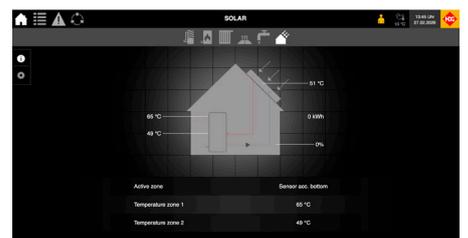
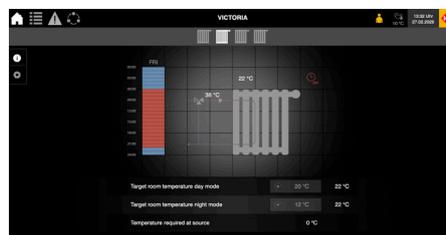
## Intelligent System Management

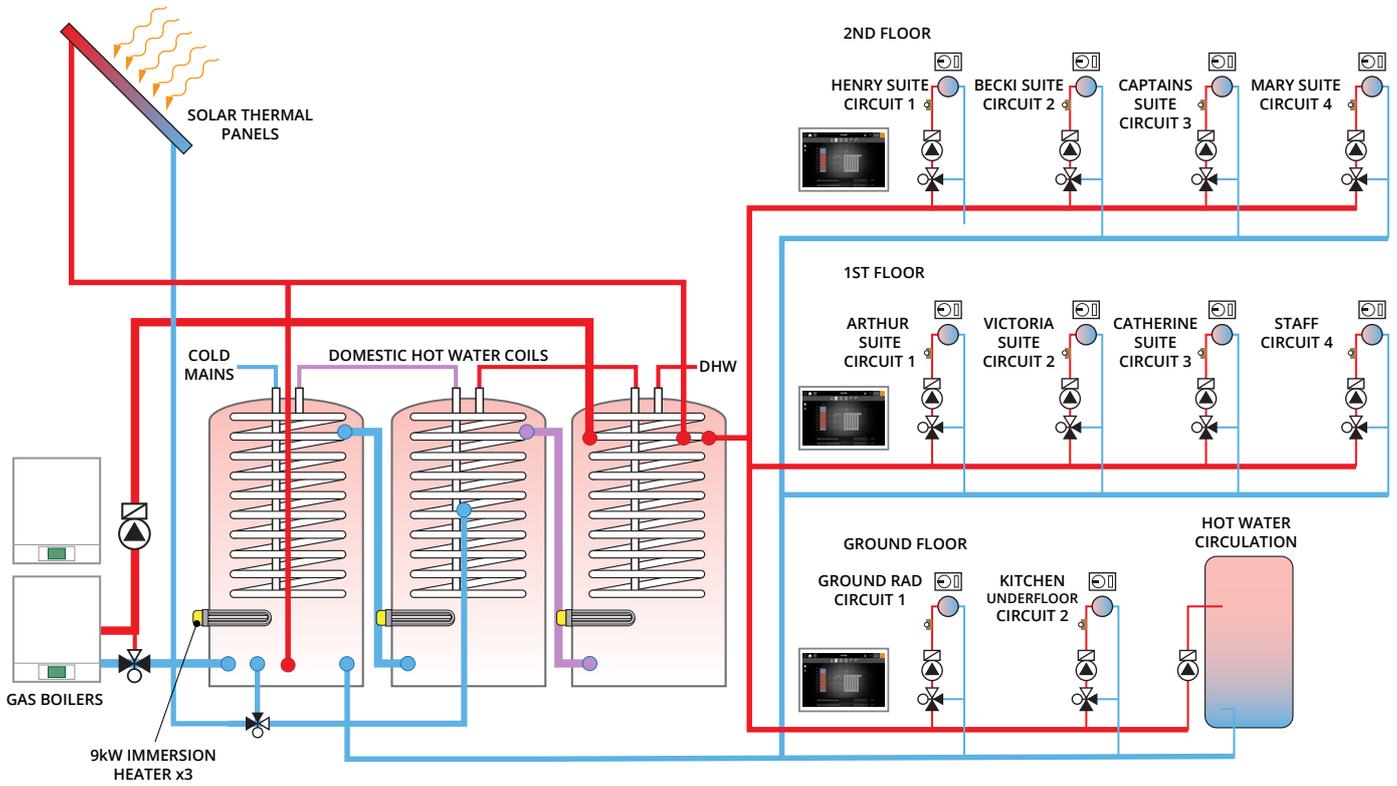
The entire installation is managed via the HDG Control system, comprising of an intuitive touch-screen interface supported by remote app access. The control platform integrates boiler operation, buffer management, solar input, heating circuits, and domestic hot water production into one intelligent system.

Time scheduling, demand control, and real-time system data ensure maximum efficiency and ease of operation for hotel management.



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## The Outcome

The completed installation provides Ludlow Castle Lodge with:

- High-capacity, on-demand domestic hot water
- Renewable solar integration
- Fully zoned, weather-compensated heating
- Intelligent energy management
- Legionella-safe operation
- Reduced energy losses through demand-led control

This project demonstrates Zeroridge Consulting's ability to deliver sophisticated, energy-efficient heating and hot water solutions tailored to complex hospitality environments, combining performance, sustainability, and long-term reliability in a heritage setting.

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| The Lodge<br>Castle Square<br>LUDLOW<br>SY8 1AY | Energy rating<br><h1>B</h1>            |
|   | Valid until<br><b>12 February 2036</b> |

### Property type

Hotels

### Total floor area

711 square metres

