IONA

BLENHEIM PALACE

Case study

IONA Controller Delivers 46% Energy Reduction While Futureproofing a UNESCO World Heritage Site

"Working with Tyrrell Products on the IONA rollout has enabled us to make historic spaces smarter and more sustainable without compromising their legacy. It's an innovative, open, and scalable solution that supports our mission to be the greenest historic estate in the UK."

— *David Green, Head of Innovation, Blenheim Palace*

tyrrell PRODUCTS

Blenheim Palace is pioneering the future of heritage conservation by fusing tradition with technology. At the heart of this digital transformation is the IONA Controller by Tyrrell Products, a powerful building management controller featuring an integrated LoRaWAN® gateway powered by Intel® technology.

Background

Located within **12,500 acres** of the Oxfordshire Cotswolds, Blenheim Estate is a microcosm of challenges faced by thousands of private estates across the UK. With **over 180 rooms**, ancient architecture, and **£4 million annually spent on restoration and conservation**, managing such an estate requires intelligent systems that don't compromise heritage.

But with multiple, **disconnected BMS platforms** (six to seven in use), ageing infrastructure, and high energy costs, a scalable, open, and wireless solution was essential.

Challenges

- Fragmented infrastructure: Multiple legacy BMS platforms with no centralised visibility
- Energy waste: Spaces heated or cooled without occupancy-based logic
- Connectivity limitations: Installing cabling across listed buildings or rural grounds was impractical
- Data silos: No unified system for reporting or decision-making
- High operational costs: Particularly in energy use, restoration, and environmental maintenance

Tyrrell Products' Smart Solution

To address these needs, Tyrrell Products deployed its next-generation **IONA Controller** at Blenheim Palace:

- **Integrated Intelligence** IONA features an onboard LoRaWAN gateway, enabling wireless sensor communication across vast areas of the estate—without the need for additional cabling or infrastructure.
- **System Interoperability** The controller integrates seamlessly with Blenheim's existing BMS platforms, creating a centralised hub that unifies data and control.
- **Edge Processing Powered by Intel®** Local control and real-time processing allow for instant adjustments based on occupancy, temperature, or external conditions—critical in areas used for public tours or conservation.
- **Open Sensor Network** Unlike proprietary controllers, IONA supports Blenheim's open sensor network, maintaining accessibility for internal teams and third-party stakeholders.
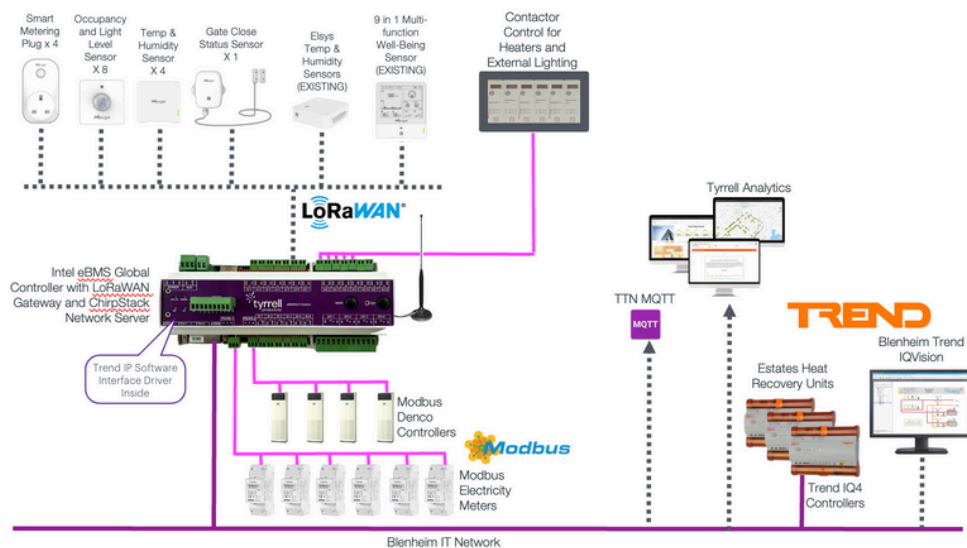
Impact and Results

Energy Efficiency

- 46% energy reduction in pilot areas
- Automated scheduling and shutdown of HVAC systems when rooms are unoccupied
- Optimised heating in conservation zones, maintaining ideal temperature ranges (e.g., 12–14°C)

Operational Visibility

- Centralised dashboards now monitor air quality, soil health, water usage, visitor flows, and more
- Real-time performance insights support proactive conservation decisions

Smart Visitor Management

An AI-driven system forecasts visitor numbers up to 30 days in advance, enabling precise staffing, catering, and energy scheduling

Digital Twin Roadmap

In collaboration with universities, the estate is developing a Digital Twin—a dynamic model that simulates the building's future needs and environmental behaviour