Reheat

Heating Heritage Buildings

National Trust Case Study – Dunham Massey

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Heating Heritage Buildings

National Trust – Dunham Massey

Historic properties are a ‘hard to decarbonise’ resource

- **Remote locations**
- **Sites of architectural and historic importance**
- **Regulations e.g., Listed Building Consents**
- **Energy efficiency and fabric first measures constraints**
- **Renewable energy solutions require careful consideration**

Why biomass?

- **Hard to heat buildings**
- **Large properties with old heating systems**
- **Operating at higher temperatures**
- **Brings benefits to rural economy**
- **Smaller overall footprint compared to GSHP/WSHP**

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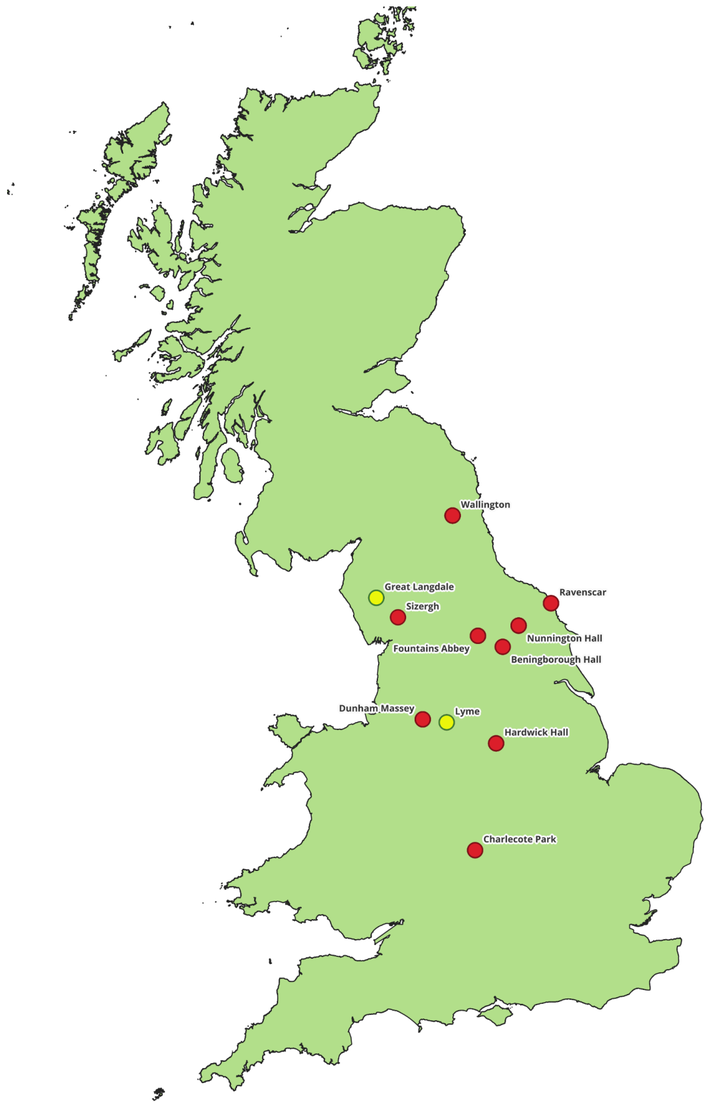
NATIONAL TRUST
DUNHAM MASSEY

Reheat’s National Trust Projects



Our team have delivered practical renewable heat projects for National Trust across the UK including:

- 10 New Biomass Installations
- 2 Remedial Projects including system optimisation, upgrading and improving the existing biomass installations

- Over 2MW of installed capacity
- Dunham Massey was the first NT renewables project to remove 1m kWh of fossil fuel heat
- Chip and pellet boilers
- Integrated with other technologies

Dunham Massey

Dunham Massey Hall – National Trust

- Two 180kW wood pellet boilers
- Purpose built energy centre and large fuel store
- Over 400m of underground heat main
- Connected 8 buildings to the network
- Integrated existing heating controls
- Crossed a moat

- Overall system efficiency of 84%
- Reliable form of heating and hot water
- Minimal gas usage and plant unlikely to be replaced at end of life
- Provided effective control and resilience

Delivering a highly efficient system

- System designed by determining the ‘typical’ requirements
- Accurately sizing heat mains and reducing the total volume of hot water underground
- Meeting peak loads with variable flow rates and managing differential pressure and pump duty across the network
- Correct pump sizing and control
- High specification equipment and underground pipework
- Remove heat exchangers wherever possible, direct connection can reduce the flow temperature
- Accurately size heat emitters to provide the best delta T
- Balance all radiators throughout the system to lower return temperatures
- Effectively control flow rates

Project Challenges

- Adhere to Listed Building Consents and consideration to building fabric
- Crossing a moat!
- Minimize disruption to the site and reinstate any external works effectively
- To integrate existing controls within Visitor Centre, Residential Cottages, Stable Connections, Domestic Flats and the Main Hall into one system
- To deliver a project whilst the site remained open to the public ensuring the safety of the property and visitors.

- Longer times to deliver
- Higher costs
- More opportunity to engage with the public
- Futureproofing the site

Dunham Massey - Project Drivers and Successes

Financial

- Fossil fuel cost reduction
- Estimated £10,500 annual reduction in heating costs
- Approx. £25,000 annual RHI income

Volatility vs Stability

- Self generation
- Security of supply

Decarbonisation

- Estimated 120 tonnes annual CO_2e savings

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Thank you for listening

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