



# CASE STUDIES



# Swansea University

## Energy Cost Benefits

<b>Value</b>	<b>£700,000</b>
<b>Duration</b>	<b>2016-Present</b>

<p><b>Introduction</b></p> <p>In early 2016, the University required an overview study of the best options for future low carbon heat and power at their Singleton Campus. The Campus, comprising of 160,000 m<sup>2</sup> buildings, has a District Heat Network (DHN) fed by an Energy Centre that in turn contains a 1.8 MWe reciprocating gas engine Combined Heat and Power unit (CHP). The Estates (technical services) team worked in conjunction with the Energy Saving Trust and the Carbon Trust (via the Resource Efficient Wales scheme) to acquire the services of Laplace Energy, as part of Laplace Group Ltd.</p> <p>A starting point for the project was: "what low carbon heat and power strategy should the campus plan to implement over the coming decades?"</p>
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<p><b>Aim</b></p> <p>This project aimed to deliver significant 'quick win' financial benefits from optimum use of existing Energy Centre (including CHP) and DHN equipment.</p>
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<p><b>Objective</b></p> <p>Resolving CHP issues, boiler issues &amp; DHN interaction; Install container based CHP for day use &amp; backup; Further CHP for winter peak &amp; use absorption chillers &amp; ORC's and use movable assets in new Centre.</p>
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<p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>■ Energy Cost Benefits £ Improvements: £400K/year</li> <li>■ CHP Utilisation: Improved from below 30% to 75%</li> <li>■ CHP Output: Power &amp; Heat output increases by resolving technical engine issues centred on cooling &amp; service provision</li> <li>■ Process Control: Significant step changes in overall control of heat generation from Energy Centre</li> <li>■ Monitoring: Identified 'quick wins' on existing metering issues plus worked with Swansea staff to gather, analyse and understand key CHP, boiler and DHN system parameters. To boost communication of Energy Centre performance and savings to the core technical services team, an energy monitor with interactive dashboard was delivered to complement the existing Building Management System (BMS).</li> </ul>
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<b>Team Members + Roles</b>	
<b>Richard Pyatt</b>	Client Manager & providing Technical Support & Mapping out solution development
<b>Tony Parton</b>	Strategy Development, Specific Thermal Controls Knowledge, Business Case Development
<b>Herve Lebastard</b>	Project Engineering, Specification/Contract NEC 3 construction plus BMS Interface
<b>Steve Blundell</b>	Risk & Opportunity profiling responsibilities
<b>Pete Wallwork</b>	Mechanical Interfaces eg Fluid Flow Optimisation
<b>Ari Sinai</b>	Optimising GQCHP & CRC charges
<b>Chris Springett</b>	Overseeing the Sustainable Carbon reporting

<p><b>Outputs</b></p> <p>In conjunction with the Swansea University's BMS controls partner and burner service engineers, Laplace was able to introduce BMS controlled burner modulation and primary circuit software improvements to produce a much more stable EC flow condition. Additionally, with metering fundamental to proving performance and claiming cost benefits, fundamental issues were quickly identified and resolved. This included CHP heat and gas metering fixes and working extensively with the CHP service company to measure and troubleshoot the system (findings included flow restrictions and pumping issues).</p> <p>Finally, to improve the communication of savings and real-time CHP operation performance, Laplace delivered an Energy Dashboard which focuses on reporting the real time and accumulated savings derived from the operation of the CHP plus helps the Technical Services Team quickly identify performance issues within the Energy Centre.</p>
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<p><b>Lessons Learned</b></p> <ul style="list-style-type: none"> <li>■ Applying the concepts of flexibility and resilience when faced with a range of external and internal factors;</li> <li>■ Time applied to communication and teamwork;</li> <li>■ General problem areas were initially identified at the outset, with investigations developing and following root causes sometimes into unexpected places. This led to a risk-based review of all that the internal and external stakeholders contributed allowing the multitude of possible quick fix solutions to be robustly reviewed prior to subsequent implementation</li> </ul>
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