AEC case study

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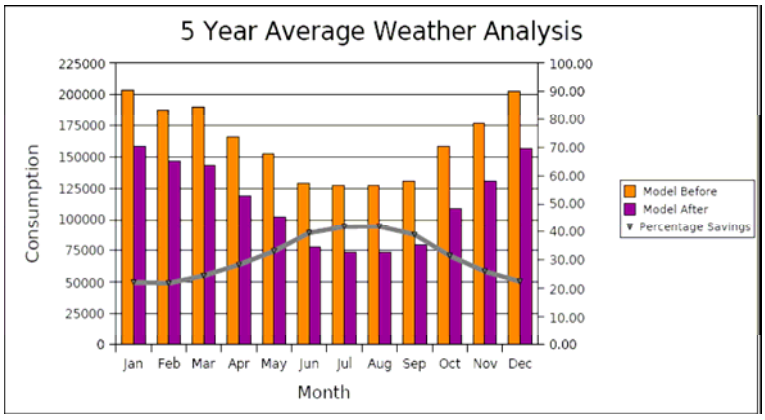
Her Majesty's Palace and Fortress The Tower of London
28% improvement in HVAC energy efficiency

"Not your average building" as one of our engineers put it when first faced with the challenges of identifying and delivering savings at the Tower of London. A considerable moment of understatement as we found when we embarked on this project, however perseverance and tenacity paid off when we were able to report back to the Historic Royal Palaces that we had achieved a significant 28% annual savings on heating.

In order to achieve these savings we looked at data from their building energy management system (BEMS) using the AEC analysis tools, which revealed some significant controls efficiency issues. In common with many old buildings (and there are few older), there were may legacy issues to be dealt with at the Tower, made more complex by the fact that this is a World Heritage site (moving a temperature sensor was a major issue) not to mention the thermodynamic challenges presented by fifteen foot thick granite walls.

Our solution was to minimise any hardware changes and focus on software, to this end we significantly altered the boiler control strategy and at the same time were able to increase the resilience by placing one of the two boiler headers on permanent stand by, as demand is never likely to be great enough to call for it.

We were able to improve the compensation of both the primary and various zoned heating circuits. The provision of adequate Domestic Hot Water was a particular issue which had to be addressed and further plans suggested by us include taking DHW provision away from the main heating boilers, which will lead to even greater savings through being able to turn the boilers off altogether for large parts of the year.



The results achieved at the Tower of London can be seen in the graph above, where we have modelled energy consumption "before" and "after", normalised this and used an average of the past five years degree days to iron out any potential spikes in short term data. This graph also demonstrates the seasonality of the savings from about 20% in winter (when demand is higher) to over 40% in summer - with the removal of DHW from the main boilers they will be able to be turned off thus achieving even greater savings in the future.

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