

## **CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT**

### **Megawatts to Negawatts: The Barriers to unlocking a Pull Market for Demand Side Response in the UK**

As global economies grapple with the challenges of climate change, security of energy supply, and resource scarcity, the energy landscape for corporate consumers is shifting. Energy provision has become more complex; it is no longer just a commodity, but rather its sustainable future demands a proactive and efficient approach to the management of supply and demand.

A myriad of factors have catalysed the instability of the global energy market, presenting a range of risks and opportunities. The global industry faces rising energy prices, regulatory intervention has become increasingly more volatile and businesses reputational pressure continues to grow. The energy trilemma of cost, security and environment is one of the largest challenges facing government and industry. The confluence of these factors forms a compelling argument for the need for industrial and commercial consumers to actively manage both electricity supply and demand.

The energy industry is at a pivotal time to evolve and influence the energy trilemma, with the emergence of digital technology and continued growth of intermittent renewable energy there is an increasing demand for flexibility. These challenges reinforce the opportunity for a system that can leverage excess capacity within existing energy assets, improving efficiency and lead-times inherent to existing supply systems, whilst being carbon neutral and comprising minimal capital investment.

Demand Side Response (DSR) has developed in direct response to these challenges. Through financially incentivising customers to lower or shift their electricity use at peak times, DSR helps to regulate the load and voltage profiles on the electricity network.

DSR marries the supply and demand profiles of the electricity system, by strategically leveraging latent capacity in the network. Existing academic research suggests that by 2030, DSR could directly reduce the cost of energy, to the consumer base, by up to an estimated £8 billion. Whilst these estimates will help the UK meet its ambitious 2050 carbon reduction targets, its sustainable nature will in turn help secure the future of the UK's electricity supply for generations to come.

To date no academic source has examined the opinions of industry stakeholders, in the adoption of DSR in the United Kingdom. This research bridges the gap in existing knowledge by identifying and critically examining the barriers to implementation, and the potential opportunities, for the adoption of DSR within the United Kingdom. Contrasting other sources of academic research, this project focuses explicitly on the perspectives of industry stakeholders.

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