Shortlisted MSc projects for the Fuellers City University Prize 2020 showing the title of the project and a short summary of the work.

Dissertation title	Summary of the project	Student name	Email address
Does UK energy policy support an economic case for H2 production?	The objective of this dissertation is to assess whether flagship UK energy policies support an economic case for low carbon, competitive Hydrogen (H2) production. Two specific production processes are considered in this paper. The first is 'Green Hydrogen' produced from onshore wind energy via electrolysis. The second is 'Blue Hydrogen,' which involves steam methane reforming (SMR) of natural gas paired with carbon capture and storage (CCS) technology. A financial model was developed for two hypothetical H2 projects based in the UK. Price assumptions were assigned to a specific set of policies in combination with the key technical considerations for H2 production and estimated annual outputs. Dynamic Systems Modelling (DSM) was used to show the interrelationship of policy support, fuel costs and technical characteristics in H2 production. The findings suggest that H2 is economically viable, for both Blue and Green production, albeit for different purposes. For example, Green H2 can utilise multiple government and system operator incentives as a hybrid distributed generation source. A project could be profitable if allowed to compete in the Contracts for Difference (CfD) auctions at a strike price of £60/MWh. By contrast, Blue H2 is most suited to industrial production but has very few policy instruments to draw upon. A project could be profitable based on a 2019 average natural gas price of £25/MWh and assuming a wholesale H2 price of £2.3/kgH2. However, the lack of policy support means that the competitiveness of Blue H2 is highly exposed to price fluctuations in fuel markets. Overall, the research concludes that while policies improve the economic case for H2 in some key areas, existing frameworks are not ambitious enough to advance the transition to low carbon gas and power-to-X technologies such as Blue and Green H2.	**Oliver Joy**	Oliver.Joy@city.ac.uk
A technical evaluation of DSR flexibility for commercial office buildings through HVAC curtailment	Balancing supply and demand in the UKs dynamic power grid presents many challenges that are expected to intensify toward 2050. The legislated net-zero emissions targets will require an accelerated energy transition focusing on demand reductions and crucially, flexibility. This research aims to quantify and critically evaluate the capacity potential for the UK's commercial office building stock in providing flexible DSR through HVAC curtailment. Using operational building performance data, a flexibility model was constructed through a detailed HVAC demand analysis combined with extensive literature review centered on both academic and industry relevant research. A grounded theory methodology employing a scenario based case study approach was augmented by a sensitivity analysis to determine a range of outcomes. Due to the small dataset available, a Monte Carlo simulation method of statistical analysis was performed to provide credibility to the results. It was found that while peak demand flexibility is limited by levels of HVAC curtailment, improvements in thermal mass and storage capacity have substantial benefits to flexibility with increases of nearly 300% on a total consumption basis. Stark contrasts were also observed in seasonal flexibility with double the available capacity in summer months. The research results demonstrate how demand data can be effective in determining building flexibility and benefits all stakeholders in the widespread deployment of DSR activities.	**Richard Senez**	Richard.Senez@city.ac.uk

Evaluation of the Transmission Loss Allocation Scheme through the Imbalance Settlement Mechanism in the GB Electricity Market	In this project, the impacts of Locational transmission loss allocation scheme in the GB electricity market are investigated. The locational scheme has been implemented following the CMA order that mandated locational transmission loss pricing in the imbalance settlement mechanism. Before that all market participants were treated equally in terms all system losses. In the locational scheme, the market participants were grouped into 14 Grid Supply Points (GSP Groups) also called zones. Parties within each zone are treated the same though different transmission loss multipliers are used to allocate losses to different zones in order to take the locational impacts of parties on losses into account. This is done per each half hour also called settlement period. The analysis is focused on comparing the previous loss allocation scheme, which is called Uniform scheme in this project to imply all market participants were treated uniformly, with the current loss allocation scheme, which is called Locational scheme in this project. The Uniform scheme only distinguishes between Offtaking and Delivering market participants, while the Locational scheme, in addition to this, considers the region of each market player. The Uniform scheme is no more applied since 2018. In this project, the Uniform TLMs for Offtaking and Delivering market participants were calculated and used to allocated losses across market participants with actual metered volume covering the time span between April 2018 and the end of June 2020 when the locational scheme has been applied.	**Mehdi Jafari**	Mehdi.Jafari@city.ac.uk
Engaging People in Energy Management: Case Studies on the Relationship between Energy Culture and Behaviour Change	Behaviour change is an oft overlooked and undervalued technique for energy management and the pursuit of purely technological solutions is a hinderance to achieving energy efficiencies in organisations. Moreover, need to be contextualised to be fully understood. Therefore, the aim of this project is to obtain deeper insight into the relationship between context and intervention by presenting case studies in-depth descriptions of the intervention and its context using the Energy Cultures Framework. An employee engagement campaign and a tenant engagement programme are explored and deconstructed using the ADKAR Model for Change The findings show that the effective aspects and features of interventions are supported by specific energy culture factors, implying that an organisation's energy culture should be explored and defined in order to plan an intervention that is fit for purpose in that organisation. Comparing the cases reveals some commonalities in energy culture factors that drive behaviour change, which indicates possible best practices. The report also discusses of how the Energy Cultures Framework can be used to aid in the operation of ISO 50001:2018. Ultimately, this report presents a unique perspective on context and behaviour change that practitioners and researchers may find insightful.	**Michael O'Neill**	Michael.Oneill@city.ac.uk

First Prize Oliver Joy

Oliver works as an EU external affairs adviser for the World Bank. Prior to this, he served in the renewable energy sector as a public affairs adviser and spokesman for WindEurope, a trade association based in Brussels, which represents over 400 member companies in the wind energy industry. In his earlier career, Oliver was a journalist for CNN, Bloomberg News and the Press Association in London.

Oliver holds an MSc in Energy and Environmental Technologies and Economics with distinction from City, University of London. His research focused on an economic assessment of hydrogen production within current UK energy policy frameworks. He also holds a first class honours BA in Journalism from Bournemouth University.

Second Prize Richard Senez

Richard has passion for energy efficiency, building performance and optimisation. He has over a decade of experience with building HVAC controls, energy management systems (ISO 50001), data analytics and project management. Richard completed his Energy Management Professional certification through the *Energy Institute* in 2018 and recently graduated with distinction as a Master of Science in Energy, Environmental Technology and Economics from *City, University of London*. His award winning dissertation involved analysing and modelling DSR flexibility in commercial buildings through HVAC curtailment.