

Digital twin tools for decarbonisation management
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Background:

The growth in anthropogenic carbon emissions is a major climate change driver, which has widespread implications across society, influencing the scientific, political, and public sectors³. Accurate assessment of carbon emissions will help policy makers to make informed decisions and optimal management balancing the energy use, carbon reduction and economics. This would contribute towards carbon footprint reduction and the 1.5oC climate goal. Models are powerful tools in understanding carbon life cycle and atmospheric processes, making predictions, uncertainty quantification and optimal control/design for decarbonisation.

The proposed study will address “how to effectively can we manage our growing cities in an operational sense (hourly/daily) in response to increased pollution, climate change, health and economic impacts”. The research aim is to develop an advanced **digital twin decision support framework** using hybrid-AI and physical modelling tools which will enable the urban population as well as policy makers to make both strategic and everyday decisions that are essential for generating a net-zero environment by 2050. one of targets in the UK. The possible studies can be selected from:

1. **Urban Planning and Design:** Planners use digital twins to test different urban designs, infrastructure layouts, and zoning policies.
2. **Traffic Management:** Digital twins help optimize transportation systems, reduce congestion, and improve mobility.
3. **Energy and Sustainability:** Digital twins model energy consumption in buildings and urban districts, helping cities become more energy-efficient and move toward sustainability goals.

The Candidate The successful candidate should have a good mathematical background and a good degree/diploma in an appropriate field such as earth science, physics, mathematics, computer science or engineering. Good written and spoken communication skills are essential.

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