

What is the UK's carbon footprint?

Supervisors:

Prof Simon O'Doherty (School of Chemistry, University of Bristol) – Main supervisor

Dr Matt Rigby (School of Chemistry, University of Bristol)

Dr Alistair Manning (Hadley Centre, Met Office)

Host institution: University of Bristol

Project description: The UK is committed to reducing its greenhouse gas (GHG) emissions by 80% by 2050. As the 11th largest global emitter, this is a welcome step towards the global emissions reductions that will be a required if we are to avoid catastrophic climate change. However, we have a significant problem; we don't exactly know what our GHG emissions are. In this project, you will develop "top-down" emissions verification methods to quantify UK GHG emissions more accurately than ever before.

You will work with scientists from across the UK, including those who monitor GHGs through the DECC (Deriving Emissions related to Climate Change) network and those in the Global And Uk Greenhouse gas Emissions (GAUGE) consortium. DECC and GAUGE measurements, made from telecommunication towers, satellites, planes and boats, make the UK's GHG environment the most intensively studied in the world. The challenge now is to use these observations to derive emissions. You will do this, in collaboration with the Met Office, using models of atmospheric transport and chemistry and inversion methods including new hierarchical Bayesian statistical techniques. With these methods, you will calculate the UK's GHG emissions from different sectors of the economy, and determine the uncertainty that remains after all available observations have been used. These "top down" estimates can then be used to verify "bottom up" inventories. This work directly feeds into the UK's annual reports of its GHG emissions, submitted by the Department for Energy and Climate Change to the United Nations, and informs government GHG emissions policy.