Research Centre
for Gas Innovation

Optimisation of natural gas supply chain considering life cycle costs and environmental impacts

The aim of this PhD will be to develop an engineering systems inspired sustainability assessment optimisation approach that can be used to assess the environmental and economic performance of natural gas production and LNG supply value chain options

The MERG group at Imperial College has developed a Life Cycle Assessment (LCA) model for the natural gas production, supply chain and power generation that estimates accurately the GHG emissions based on the engineering system characteristics of the supply chain considered. The group has also developed life cycle cost (LCC) models for CO_2 transport and storage (including CO_2-EOR), as well as a multi-period spatially explicit least cost optimisation model of an integrated power generation, CO_2 transportation and storage infrastructure, which allows the evaluation of the techno-economic performance of the CO_2 supply chain under constraints.

Using these models as a starting point, the proposed PhD will :

-Develop life cycle cost models for the upstream components (natural gas production and supply value chain) to couple with the existing LCA models at the same level of detail.

-Add the necessary functionality to the LCA and LCC models to assess CO_2 abatement opportunities in natural gas production and LNG transportation.

-Consider, jointly, the techno-economic performance of different value chain options over time, given the uncertainty in market conditions (e.g. oil, gas price, CO_2 price) and policy factors (e.g. UK/EU Emission Performance Standards, the BG group's environment and climate change standards).

-Implement the optimisation approach and models to be developed for Brazilian natural gas resources and supply chain options

-Provide strategy recommendations and publish the research results.

This doctoral program at Imperial College is part of the Agreement between CNPq and BG Brazil, signed in 2013, as part of the Research Center for Gas Innovation (GIC) sponsored by FAPESP and BG Brasil (Process 2014/50279-4). Candidates should hold a first or upper second class honours degree (or equivalent, 7,5/10 grade) or an MSc (Masters) in engineering or science disciplines with an interest in energy policy and economics.

Enquiries and applications (curriculum vitae, full degree transcripts, and contact details of two referees) to Professor Anna Korre, Department of Earth Science and Engineering, Imperial College London, South Kensington Campus, London SW7 2AZ. Tel: +44 (0) 20 7594 7372 or email: a.korre@imperial.ac.uk. Note that the successful candidate will be asked to

submit a PhD research application to the Registry at Imperial College to ensure they have met the College's admissions criteria.