



SUstainable **POWER GENERATION** from **Bioenergy**: The **SUPERGEN** Bioenergy Hub

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Aim

To bring together industry, academia and other stakeholders to focus on the research and knowledge challenges associated with increasing the contribution of UK bioenergy to meet strategic environmental targets in a coherent, sustainable and cost-effective manner.



Objectives

- Act as a focal point for sharing and dissemination of scientific knowledge and engineering understanding to facilitate near-term deployment of technologies
- Investigate and develop new approaches for dealing with the very significant engineering challenges associated with deployment of more novel technologies
- Improve scientific understanding of the fundamental aspects of different forms of biomass and its conversion
- Take a whole-systems perspective to comprehensively evaluate the potential of future technology options
- Adopt an interdisciplinary approach to look beyond the engineering and technical aspects of bioenergy and ensure adequate consideration of the impacts on ecosystems, social responses to technology deployment and the economic context of policy development





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Initial Projects

1. Emissions from solid biomass
2. Impact of feedstock parameters on airborne emissions
3. Evaluation of substitute natural gas
4. Streamlining the supply chain
5. Carbon uncertainties in the supply chain
6. Gasification integration
7. Torrefaction integrated assessment
8. Carbon capture & storage enabling technologies
9. Bio-oil upgrading
10. Whole systems analysis of novel biofuel technologies



SUPERGEN Bioenergy Hub Additional Projects

1. Bioenergy value chains: Whole systems analysis and optimisation – Imperial College
2. Development of fast pyrolysis based advanced biofuel technologies – Cranfield University
3. Photocatalytic bioethanol production – Robert Gordon University
4. Clean energy utilisation from biogas and biomass gasification – Lancaster University
5. Intcreasing energy yield from the integration of anaerobic digestion and fast pyrolysis - Aston
6. Biomass Carbon Capture and Storage
7. Rice straw project
8. Perceptions & policy implications of using arable land/crops for anaerobic digestion
9. Food-fuel interfaces in southern Africa



SUPERGEN Bioenergy Hub **Future Work**

Future Work – EPSRC Funded - Research

1. Greenhouse gas balances of bioenergy systems
2. Bioenergy systems engineering
3. Integrating biological and thermochemical technologies

Future work - hub funded – impact & barriers

1. Small grant fund – up to £10k for research visits, secondments, development work on large proposals, proff of market
2. Open call – larger projects up to £100k
3. Commissioned work – up to £300k

Widening the feedstocks that can be used across bioenergy technologies

Economic modelling of bioenergy systems



Rice Straw Project

Department for International Development (DFID)
– Energy for sustainable development/Sustainable energy for development

EPSRC – Impact, International Collaboration, Social dimension

Hub - To bring together industry, academia and other stakeholders to focus on the research and knowledge challenges associated with increasing the contribution of **UK** bioenergy to meet strategic environmental targets in a coherent, sustainable and cost-effective manner.



Links to other hub projects

Evaluation of substitute natural gas:

Explore SNG potential across a range of feedstocks for AD, providing data on GHG, ecosystem and economic impacts

Streamlining the supply chain:

Define and quantify the losses of energy / carbon along a selection of representative supply chains. Propose improved practices.



Links to other hub projects

Carbon uncertainties in the supply chain:

Investigate the main sources of uncertainty in different key supply chains and evaluate their potential greenhouse significance

Gasification integration:

Improve the integration of gasification systems with downstream applications such as conversion to electricity or upgrading to biofuels





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