

# Centre for Advanced Sustainable Energy

Newsletter February 2021



As we all move into a New Year, full of enthusiasm, despite the ongoing impact of coronavirus, CASE has started 2021 with some exciting news – we've launched a new call for project applications. Having been encouraged to see a broad range of project ideas coming our way, we're also pleased with the progress of the nine projects that were approved following the last call and particularly delighted to welcome new post-doctoral researchers to the CASE team.

Outside of our day-to-day research, we've been working on a wide range of other ways to support our members including highlighting some of our research to the Department for the Economy and collaborating with Belfast Harbour Commissioners through their Smart Energy Network. The UK's 6<sup>th</sup> Carbon Budget was announced in December, strengthening the need to decarbonise the energy system and identifying greenhouse gas emission reduction goals for Northern Ireland. I'm pleased to say, CASE has taken these into consideration in our updated Research Strategy, which has been finalised this month.



Mr Trevor Haslett,  
CASE Board Chair

## Call for Projects

We are currently seeking applications from suitably qualified consortia for research and development funding to support the decarbonisation of the energy system in Northern Ireland.

Do you work (or want to work) within the following fields?

- Ocean energy – wave, tidal, offshore wind, floating solar
- Bio-energy – anaerobic digestion, biogas production, upgrading, bio-fuel production,
- Energy systems – community/local energy, grid stabilisation, ancillary and distribution system operator services, demand side management and Power-to-X

*We would particularly welcome applications in the hydrogen and heat sectors as these have the potential to contribute significantly to the decarbonisation of energy systems in Northern Ireland.*

**Deadline: 5pm Friday 26<sup>th</sup> February 2021**

**Further information can be found at:**

<https://www.case-research.net/call-for-case-project-applications-2/>

# MAKING THE CASE FOR RENEWABLE ENERGY



The future potential for renewable gas is the subject of a new research project funded by CASE with support from Phoenix Natural Gas and industry partners AgriAD and Enerchem Solutions.

The new partnership will seek to quantify the opportunity available to harness biomethane from agricultural waste across Northern Ireland for injection into the natural gas grid locally, creating a renewable gas home heating solution.

Speaking about the project, Director Sam McCloskey said: "The decarbonisation of the energy system is a key priority for populations across the globe as we collectively seek ways to reduce the impact of climate change. Locally we have a significant opportunity to realise the potential of our indigenous resources to fuel our transition to net-zero carbon. With biomethane injection into the natural gas network already proven, the next step is to identify and assess the amount of biomethane potential that exists across our abundance of agriculture waste and understand what percentage of renewable gas could be generated that can in turn fuel homes across Northern Ireland."

Jonathan Martindale, Director of Business Development at Phoenix Natural Gas said "Natural gas was a disrupter to traditional home heating choices when it arrived in 1996, and since then it has been a key enabler for carbon reduction locally, providing increased fuel choice and enabling households to displace high polluting alternative fuel sources. We are proud to be part of this collaborative research project which will identify the opportunities to further enhance the environmental credentials of the gas infrastructure and provide an even lower carbon home heating solution for consumers across Northern Ireland."

Further information on the role of natural gas in delivering a lower carbon future can be found at:

[www.phoenixnaturalgas.com/cleaner](http://www.phoenixnaturalgas.com/cleaner)

## Decarbonisation of Heat (from Agricultural Waste)

An overall picture of the biomass to energy potential for Northern Ireland will be demonstrated through collection and collation of a range of data sets and the development of a combined multi-layered map of the landscape. The data developed will be invaluable in the development of biogas/biomethane grid injection projects (both in supporting business case and site selection).

**Project partners:** Queen's University Belfast, Enerchem, Phoenix Natural Gas and AgriAD.





## Member Company Spotlight

Brook Hall Estate began researching and developing short-rotation coppice willow as a secure and sustainable source of biomass fuel following the installation of their first biomass boiler in 1988. Their work on growing this technology has been replicated across the UK and Ireland as well as Europe and North America replicating the model here at Brook Hall.

Brook Hall continues to develop their sustainability working with Queen's University Belfast, AFBI and Ulster University to seek to measure and continually improve their carbon footprint.

Working with CASE has benefited Brook Hall Estate substantially, helping to validate the biofiltration

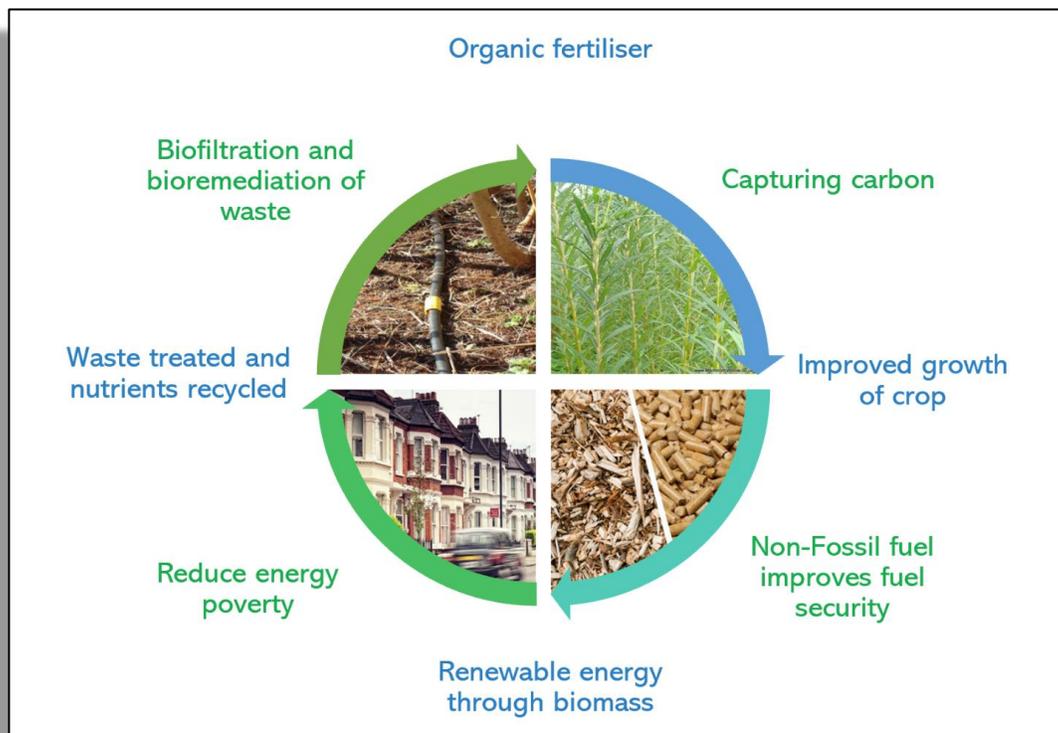
and bioremediation potential of willow, leading to legislative change to promote this technology.

CASE has also helped create connections with new industrial partners to take Brook Hall Estate to develop renewable electricity alongside the existing renewable heat potential on site.

The future aim of Brook Hall Estate is to be one of the first completely self-sufficient and measurably carbon neutral farms in Northern Ireland. This would not be possible without the support provided through the CASE projects.

To get in touch, please email:

[info@brookhall.co.uk](mailto:info@brookhall.co.uk)





# Project Spotlight: Foyle River Gardens

**Project description:** Maximising the use of on-site renewables / sustainable energy resources for the new Eden Foyle project will allow for a 'near zero' energy concept to be built into the full-scale project. The CASE project will develop a novel, intelligent integrated energy system for the whole site incorporating solar PV and thermal panels, biomass woodchip and seasonal thermal energy storage; and develop a model for use in renewable energy schemes elsewhere.

**Academic Lead:** Dr Carwyn Frost (QUB)

**Project Partners:** Ulster University, Queen's University Belfast, Brook Hall Estate, Foyle River Gardens, B9 Energy

## PROJECT BACKGROUND

The process of drying wood chip is essential for the supply of a stable source of biomass fuel for the renewable energy market. The wood chip has been made from harvesting short rotation coppice (SRC) willow at Brook Hall estate, which can dry in bulk using forced air ventilation on drying floors. The research is funded by Invest NI/CASE in collaboration with Brook Hall Estate. The work package aims to evaluate the drying performance and implement control to optimise energy efficiency and reduce parasitic losses. This will be achieved through the development of an automated Arduino based control and data acquisition system for the forced ventilation bed drying operation. Figure 1 is a process flow diagram identifying the key instrumentation required to evaluate and control the system. This work package will seek to deliver performance improvements and enable future integration of renewable energy into the drying process.

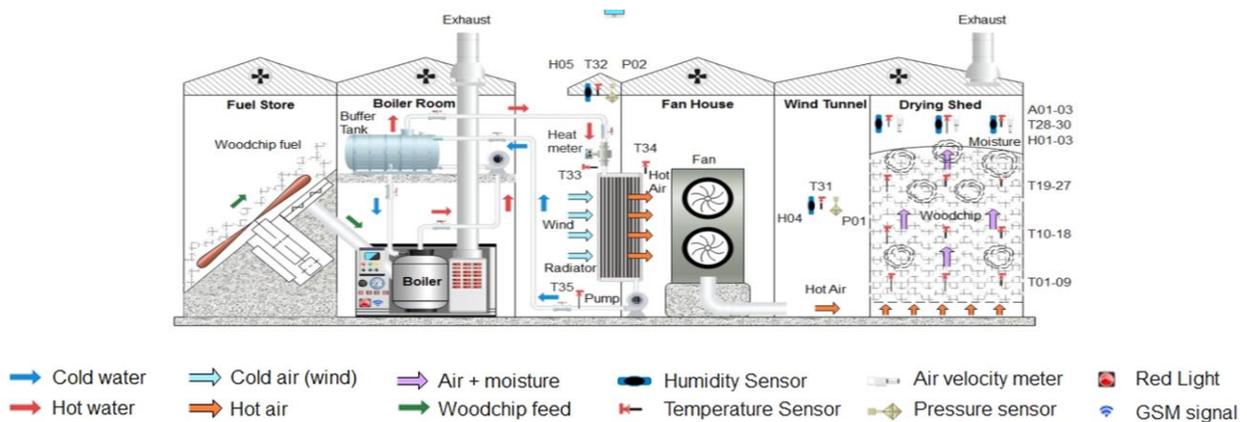


Figure 1 The Process Flow Diagram for Woodchip Drying Shed Control System

The Centre for Advanced Sustainable Energy (CASE) is funded through Invest NI's Competence Centre Programme and aims to transform the sustainable energy sector through business research.

## Introducing CASE Researcher Dr Prashant Kamble



Dr Prashant Kamble is an interdisciplinary engineer with a varied educational background including degrees in Chemical, Petroleum, and Mechanical Engineering. He is now a Research Fellow in the Centre for Advanced Sustainable Energy (CASE) at Queen's University Belfast. He specialises in process optimisation and making instrumentation, control systems for biomass gasification, pyrolysis, tar detection and food decontamination research. Dr Kamble designed and made pilot for gasification, pyrolysis, food decontamination units and developed low cost, robust instrumentation and control systems on open-source protocol were worked on different control strategies.

## CASE Project Summaries

Phase I					
Project Title	End Date	Status	Project Title	End Date	Status
<a href="#">Waste Heat Recovery</a>	Jan-18	Project complete	<a href="#">WHR Controls</a>	May-18	Project complete
<a href="#">Pelletisation (READ)</a>	Feb-18	Ongoing commercialisation	<a href="#">Photocatalysis</a>	Dec-18	Ongoing commercialisation
<a href="#">Dual Fuel Modelling</a>	Dec-16	Ongoing research	<a href="#">DINOSAURS</a>	Dec-18	Ongoing research
<a href="#">Triple T 2</a>	May-16	Ongoing research	<a href="#">AD Microalgae</a>	Oct-18	Ongoing research
<a href="#">Tension Pile Foundations</a>	Mar-16	Project complete	<a href="#">Battery / CAES</a>	Nov-18	Ongoing research
<a href="#">Fatty Acids Catalysis</a>	Aug-18	Ongoing research	<a href="#">CAVICAT</a>	Nov-18	Ongoing research
<a href="#">Triple T 3/Triple T 3.5</a>	Nov-18	Ongoing research	<a href="#">Renewable Methanol</a>	Nov-18	Ongoing research
<a href="#">BioGas to BioRefinery</a>	Feb-18	Project complete	<a href="#">Solid State Battery Electrolytes</a>	Nov-18	Ongoing research
<a href="#">SUBB</a>	Nov-18	Ongoing commercialisation	<a href="#">Filtration of Landfill Leachate</a>	Nov-18	Ongoing research
<a href="#">Senergy</a>	Nov-18	Ongoing commercialisation	<a href="#">Brookhall Estate Project</a>	Jan-19	Ongoing research
<a href="#">Coleraine Microgrid</a>	Aug-17	Ongoing commercialisation	<a href="#">Heat Mapping</a>	Nov-18	Ongoing research
<a href="#">BRILL</a>	Nov-18	Ongoing research			
Phase II					
Project Title	Status	Project Title	Status		
<a href="#">Foyle River Gardens</a>	Project ongoing	<a href="#">AESIR</a>	Project ongoing		
<a href="#">Bio PL</a>	Project ongoing	<a href="#">Biochar</a>	Project ongoing		
<a href="#">Aquaflex</a>	Project ongoing	<a href="#">Floating Solar</a>	Project ongoing		
<a href="#">CE-SEA</a>	Project ongoing	<a href="#">Decarbonisation of Heat</a>	Project ongoing		
<a href="#">Vertical Axis Turbines</a>	Project ongoing				

**MEMBERS**



**FOYLE  
RIVER  
GARDENS**



**EP UK Investments**

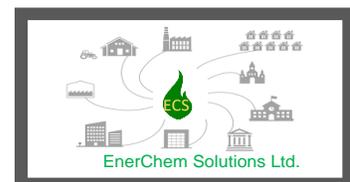


**SENERGY**



**For further information on CASE Membership:**

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