

July 2020

Centre for Advanced Sustainable Energy



NEWSLETTER EDITION 1

Welcome to the 1st edition of the CASE newsletter. Our Phase II funding, announced in January 2020, will enable the Centre to focus on the development of highly innovative solutions for the sustainable energy sector. Sam McCloskey, Director of CASE said: “We are delighted that the Minister and Invest NI has recognised the importance of continuing research in sustainable energy and has committed to funding CASE in this second phase.

This R&D is particularly important in light of the links between decarbonising the energy system and reducing the impact of climate change”.

Trevor Haslett CBE, Chair of the CASE Board, said: “Our ambitions are to capitalise on the positive R&D outcomes from our collaborative projects to date and to maximise the benefits for our industrial members.”



CASE PHASE II FUNDING

Minister announces £3.6m funding to support pioneering advances in sustainable energy.

“Over the last six years, CASE has helped to position Northern Ireland within the global sustainable energy market. It has created opportunities for over 50 ambitious companies to work collaboratively with researchers to explore innovative technologies and services with global commercial potential. In the coming years, I look forward to watching the progress CASE makes with some of the world’s major challenges in sustainable energy research for the benefit of the Northern Ireland economy.”

Innovating to secure a zero carbon energy future – a CASE Conference in conjunction with Energy Institute.



The conference took place on 16th January 2020 at Riddel Hall, Stranmillis with over 120 delegates attending. Session 1 included presentations by three CASE International Advisory Panel Members who each gave an update on the global situation with respect to research in their field of expertise; bio - energy, marine renewables and energy systems. All commented on the role that sustainable energy must play in decarbonising and mitigating against climate change. This was followed by a panel discussion in which representatives from academia and industry discussed some of

the major past project successes funded by CASE.

The afternoon session involved an Energy Institute Symposium '*Decarbonisation – Understanding the Strategic Energy Framework: Pitfalls & Possibilities*' with speakers from NI Electricity, Energia and Phoenix Natural Gas. This was followed by Meabh Cormacain (Strategic Investment Board) introducing the Department for the Economy consultation on the Northern Ireland Strategic Energy Framework. The conference concluded with a workshop to help formulate 5 strategic questions for Energy Institute input to the consultation.

I was invited to speak, on behalf of Phoenix Gas at the Energy Institute session of the CASE conference earlier this year. I found the format of the event created a high quality of engagement across a broad range of stakeholders with local, national and global experience within the room.

As a result of being there, Phoenix has now become a member of CASE and we are looking forward to working collaboratively on the CASE funded 'decarbonisation of heat' project.'

**Jonathan Martindale,
Phoenix Natural Gas**



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.

MEMBER COMPANY SPOTLIGHT

SENERGY

With 20 years' experience in the commercial roofing industry, CEO Christine Boyle MBE founded Senergy Innovations Ltd as a Belfast based enterprise that designs and manufactures smart energy products and systems.

Being aware of the sun's potential to deliver limitless amounts of solar energy, Christine was inspired to design an architecturally attractive solution that would reduce the upfront cost of a solar heating system making it affordable to harness the sun's renewable energy. Senergy is collaborating with experts in academia, industry and government to turn this idea into reality.

CASE funding enabled Senergy to advance their technology concept from an embryonic stage by realising pre-production prototypes. The funding also facilitated an upgrade to Ulster University Centre for Sustainable Technology's outdoor solar collector testing facilities enabling these to host the Senergy array demonstrator coupled to a domestic hot water heating system.

The outdoor demonstrator helped to prove the operation of the collector design in a relevant environment. The R&D has led to the current stage of prototyping, manufacturing and installation of Senergy solar thermal panels which are due to be installed on the roofs of pilot customers and partners by Winter 2020.

<https://www.senergyinnovations.co.uk/>



Past Project Spotlight

Triple Ts

Tidal Turbine Testing

Project Details

Cluster: Marine Renewables

Knowledge Provider: Department of Civil Engineering, School of Natural and Built Environment, QUB
(PI Prof Trevor Whittaker and Dr Carwyn Frost)

Industrial Partners: Applied Renewables Research, CNR-INM, McLaughlin and Harvey, Oceanflow Energy, ORE Catapult, QED Naval, Sustainable Marine Energy & Schottel Hydro



PROJECT BACKGROUND

Northern Ireland's coastline is well known as one of the most beautiful in the UK. Whilst possessing stunning scenes like the Giant's Causeway and the Mourne mountains, it also hosts powerful tidal currents such as can be found around Torr Head and Fair Head. Northern Ireland also has a rich heritage of utilising tides with the Nendrum Monastery tidal mill being one of the oldest recorded sites to harness tidal energy. This site is significant as a few kilometres away in the Strangford narrows the world's first grid connected free stream tidal turbines were commissioned in 2007.

The Strangford narrows is the optimal proving ground for tidal stream technology, and the TTT project provided the perfect axis to span the knowledge gap between tank and field-testing. TTT sought to reduce the uncertainties associated with the performance and device interaction with turbulence and wake interactions in the marine environment.

PROJECT OUTPUT

By testing in both the controlled laboratory and the uncontrolled field environment, it was possible to ascertain the impact of the turbulence on the turbine power and loading performance. This required an understanding of the turbines control response. The TTT project restructured the devices drivetrain architecture making it similar to a commercial device, thus its performance in response to turbulence would be comparable to commercial units. We found that the less turbulent lab environment has higher performance than the turbulent field environment.

As the tidal energy sector is progressing to the deployment of turbine arrays (multiple turbines in one location), the project sought to examine the impact of one turbine against the other (as shown in Figure 1). A range of proximities in-line and offset to one another were conducted and provided insight to nearfield interactions. The outcomes from the TTT research will help to inform the optimal placement of turbines in arrays.

Project KPIs

At the end of the 4 year project:

- 2 journal publications, 3 international conference proceedings and 2 pending publications
- £151k of additional funding in similar or related research areas
- £200k of actual and potential contracts for industrial partners
- Strangford Narrows - a recognized tidal energy test site in the EU MARINET Programme
- Growing interest in the Strangford Lough QUB Tidal Test Site from Developers



Figure 1 TTT Devices operating in close proximity in Strangford Lough

CASE Project Summaries

Phase I					
Project Title	End Date	Status	Project Title	End Date	Status
Waste Heat Recovery	Jan-18	Project complete	WHR Controls	May-18	Project complete
Pelletisation (READ)	Feb-18	Ongoing commercialisation	Photocatalysis	Dec-18	Ongoing commercialisation
Dual Fuel Modelling	Dec-16	Ongoing research	DINOSAURS	Dec-18	Ongoing research
Triple T 2	May-16	Ongoing research	AD Microalgae	Oct-18	Ongoing research
Tension Pile Foundations	Mar-16	Project complete	Battery / CAES	Nov-18	Ongoing research
Fatty Acids Catalysis	Aug-18	Ongoing research	CAVICAT	Nov-18	Ongoing research
Triple T 3/Triple T 3.5	Nov-18	Ongoing research	Renewable Methanol	Nov-18	Ongoing research
BioGas to BioRefinery	Feb-18	Project complete	Solid State Battery Electrolytes	Nov-18	Ongoing research
SUBB	Nov-18	Ongoing commercialisation	Filtration of Landfill Leachate	Nov-18	Ongoing research
Senergy	Nov-18	Ongoing commercialisation	Brookhall Estate Project	Jan-19	Ongoing research
Coleraine Microgrid	Aug-17	Ongoing commercialisation	Heat Mapping	Nov-18	Ongoing research
BRILL	Nov-18	Ongoing research			

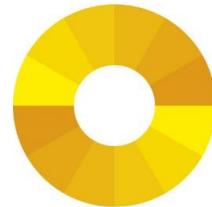
Phase II			
Project Title	Status	Project Title	Status
Foyle River Gardens	Project ongoing	AESIR	Project ongoing
Bio PL	Project ongoing	Biochar	Project ongoing
Aquaflex	Project ongoing	Floating Solar	Project ongoing
CE-SEA	Project ongoing	Heat Decarbonisation	Project ongoing

CASE PHASE 1 FACTS

- 60 companies
- 24 R&D projects
- £8.1 m leveraged funding (for N.I.), including €9.7m Bryden Centre
- 17 academic publications
- 2 patents in process
- 31 full time positions 1 – 5 years
 - 30 part time
 - 2 PhD studentships
- Regional and global firsts
- Internationalisation
- Recognition as a 'go to' centre for sustainable energy in NI

MEMBERS

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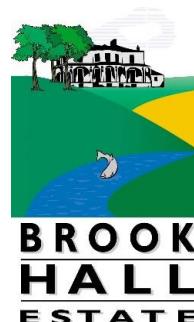


Keeping you
up and running

FOYLE
RIVER
GARDENS



S Solaform



E+I ENGINEERING GROUP



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