



FLEXIS

SMART ENERGY FOR OUR FUTURE
YNNI CALL AR GYFER EIN DYFODOL

November 2018
Advisory Board Report



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EUROPEAN UNION



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Foreword



The past six months have seen a flurry of exciting developments for FLEXIS.

Of particular note is the progress made on the FLEXISapp, which is in the business planning stage with the Welsh European Funding Office (WEFO), aiming for a January 2019 start. We are delighted to be formally partnering with Neath Port Talbot Borough Council (BC) so that our Demonstration Area may become a testbed for low carbon technologies which are commercially viable. The FLEXISapp business plan is near completion, while an MOU (Memorandum of Understanding) between Neath Port Talbot BC and ourselves is in draft.

FLEXIS will have a new base within the Demonstration Area and we are in talks with Baglan Bay Innovation Centre, located in the Baglan Energy Park – a flagship business centre created by Neath Port Talbot BC's successful regeneration scheme. We are recruiting a Project Manager and other team members to support the overall development of the Demonstration Area.

In terms of general project progress, we have received very positive feedback from the Mid-Term Evaluation Report. Whilst we are on track to achieve our targets of increasing research capacity in Wales as set out in our initial Business Plan, our ambition is not to stop there. Our goal is very much to lead on energy transformation to help address local and global issues of air quality and fuel poverty. To this end, through insightful discussions within our team and with our evaluators, one of our final objectives is to engage with additional large organisations and commercial partners to form a platform for long-term relationships. It is also acknowledged that energy transformation is an expensive and ongoing enterprise, and that FLEXIS may serve as a pump-priming initiative.

Our Neath Port Talbot traction projects are well underway and include work on real-time energy monitoring, low emission vehicles, evaluating electrical grid constraints and mine water heat recovery, all with a view to enabling Port Talbot to become a smart low carbon town.

We continue to make excellent progress on a number of short-term scoping projects run with Tata Steel Port Talbot. As well as looking into means of waste heat recovery, initiatives include a hot strip mill-skid cooling system (a significant issue worldwide), power flow analysis in order to unlock flexibility and assessment of the potential for export of BOS gases to assist Tata with its goal of energy self-sufficiency.

Last month we had the pleasure of presenting FLEXIS to the Minister of State for Energy and Clean Growth, the RT Claire Perry MP, as part of Cardiff University's #GreenGB Week events. FLEXIS continues to be represented at industry events including the Low Carbon Networks & Innovation Conference 2018 and we are delighted to be attending the United Nations Climate Change Conference (COP24) in Katowice in December.

Finally, I must take this opportunity to draw your attention to the FLEXIS Young Researchers' Conference, which took place in July. We invited all of our early-career researchers to meet for the first time and share their work as well as identify opportunities for collaboration and gain an overview of the project. Over 100 project staff attended the event, with 49 academic posters on display and a tour of the demonstration area. A better illustration of the breadth of our research capacity would be hard to find.

Prof Hywel Thomas

Who's who

FLEXIS is made up of approximately 100 academics, researchers and administrative staff from three of Wales' leading universities - Cardiff, Swansea and the University of South Wales.

Prof Hywel Thomas

Lead Principal Investigator and PI of Sustainable Earth Energy

Dr Aleksandra Koj

Project Manager

Principal Investigators

Prof Nick Jenkins

Network & grid integration of renewables;
low carbon energy infrastructure in Wales
Cardiff University

Prof Alan Guwy

CymruH2Wales2 - hydrogen and fuel cells
University of South Wales

Prof Phil Bowen

SMART-POWER: enabling integrated energy systems
Cardiff University

Prof Andrew Barron

Energy safety research
Swansea University

Prof Manu Haddad

Alternative environmentally-friendly gas for electrical networks insulation
Cardiff University

Profs Nick Pidgeon & Karen Henwood

Public response to energy systems technologies
Cardiff University

Dr Petar Igic

Power electronics
Swansea University

Partners



Advisory Board

John Scott (Chair)

Director, Chiltern Power Ltd

Prof Paul Beasley

Head of R & D UK at Siemens

Ben Burggraaf

Energy Operations Manager at
Dwr Cymru Welsh Water

Martin Brunnock

Research, Development and Technical
Director for Tata Steel UK

Dr Mike Colechin

Director of Cultivate Innovation Ltd

Prof Bill David

Professor of Chemistry at
the University of Oxford

Ceri Davies

Executive Director – Knowledge
Strategy and Planning at
Cyfoeth Naturiol Cymru /
National Resources Wales

Steven Edwards

Director of Regulation & Commercial
at Wales & West Utilities

Robert Harper

Gallium Nitride Programme Manager,
Compound Semiconductor Centre

Roger Hey

Future Networks Manager at
Western Power Distribution

Prof Ron Loveland

Energy Advisor to the
Welsh Government

Dr John Newton

Managing Director at ITM Motive

Dr Iliana Portugues

Head of Innovation for National Grid
Electricity Transmission Owner

Stephen Phillips

Chief Executive at Neath Port
Talbot County Borough Council

Dave A Roberts

Director of Smart Interventions,
EA Technology

Prof David Slater

Honorary Professor, School of
Engineering, Cardiff University

Nick Smailes

Head of Business Development
at Energy Systems Catapult

Mahesh Sooriyabandara

Associate Managing Director at
Toshiba Telecommunications
Research Laboratory, Toshiba
Research Europe Ltd

Dr Mark Winskel

Chancellor's Research Fellow
on Energy Innovation, Science
Technology and Innovation Studies,
University of Edinburgh

James Yu

Future Networks Manager at
SP Energy Networks

Project updates

Integrated Energy Supply Systems

During the last few months, grants of £888,102 have been won from the EPSRC, Royal Academy of Engineering and National Grid.

These awards allow the Cardiff University team, in particular, Dr Liana Cipcigan, Prof Jianzhong Wu and Dr Meysam Qadrdan to expand research in electric vehicles and integration and flexibility of energy systems.

Fast-track project work with Tata Steel Port Talbot continues apace. Two projects have met their first objectives as follows:

(1) Unlocking flexibility- develop an understanding of the energy distribution networks and power systems within the steelworks.

(2) Waste heat recovery - identify the gaps and potentials for optimising the energy systems.

Two Knowledge Transfer Partnership (KPT) projects placed researchers on secondment with private British companies seeking to further develop their expertise in applied Power Electronics.

Research related to Power Electronics and the Demonstration Area is ongoing. The team purchased equipment, software licences and other components, setting them on track to meet one of their project aims of expanding their research capacity in the Power Electronics Lab.

Flexible Power Plant

In a significant strategic development for Cardiff University's Gas Turbine Research Centre (GTRC), two new projects have been won with innovation-based companies Renishaw and HiETA relating to the utilisation of additive layer manufacturing (ALM), commonly known as 3D printing, in the power sector.

ALM introduces an exciting, disruptive technology to the sector, enabling the creation of innovative component designs (burners, recuperators, injectors etc) which can't be manufactured traditionally. This opens up the potential for benefits such as higher efficiencies and lower-weight components. The projects focus on the first application of ALM swirlers in GTRC's model gas turbine combustor, alongside the development of ALM liquid fuel injectors, with detailed combustion performance appraisals.

EPSRC-funded research conducted at GTRC via the FLEXEPLANT consortium, co-funded by 12 leading energy companies, has indicated a new predictor for Liquefied Natural Gas (LNG) fuel variability when the Wobbe Number is insufficient. This could serve to explain the cause of gas turbine combustion instability reported in 2012 by UNIPER, despite the Wobbe Index being within European specifications.

The research demonstrates that limited higher-hydrocarbon components within the LNG are the likely source of reported problems, due to complex secondary fuel effects (known as thermo-diffusive fuels characteristics).

Energy Storage to Power

A world-first facility demonstrating the potential use of ammonia as a flexible energy storage medium was unveiled at the Science & Technologies Facilities Council Oxford site in June.

A project between Siemens, Cardiff and Oxford Universities and Innovate UK, the demonstrator comprises a 20kW wind turbine source which supplies grid power when required and a green source of hydrogen when demand or price is insufficient. Ammonia is generated as the hydrogen carrier by the Haber-Bosch process and then utilised when needed to generate power through a converted reciprocating gas engine, running an optimised hydrogen/ammonia fuel mixture.

Whilst hydrogen conversion of course introduces a cost penalty, industrialists claim this can be offset by the advantages of significantly lower liquefaction conditions, storage-related costs and associated ease of transportation.

The demonstrator has led to a series of high-profile academic publications including an invited review in the *Progress in Energy Combustion Systems* journal. The Cardiff-based team are represented on the Royal Society Policy Review Board for Green Ammonia Energy and presented their findings at the International Energy Agency meeting in Frejus in June.

In addition, the Gas Turbine Research Centre won a project with Jacobs and Elemental Energy under the BEIS HY4HEAT competition to review the capability of UK industry to convert to 100% hydrogen systems for industrial heat.



Figure 1. The test site for the Green Energy Storage Demonstrator



Figure 2. Prof Phil Bowen with other members of the team behind the Green Energy Storage Demonstrator team

Carbon Capture and Storage - Integrated Power & Alternative Fuels

In collaboration with Rolls-Royce, Shell and others, the Gas Turbine Research Centre (GTRC) is working on a project to appraise and characterise the emission performance of aero-engine combustors operating on a range of alternative fuels.

A new rig - including a scaled additive-layer-manufactured air blast fuel-injector commonly employed in the aero-sector - has been designed and built to enable 'staged' combustion. GTRC also built and hosts the European standard reference system for measurement of ultra-fine particulate matter on behalf of the European Aviation Safety Agency (EASA) which is being used on this project.

Research into gas turbine technology requires highly specialised, expensive research and development infrastructure. GTRC is the leading centre of pressurised, high-temperature combustion of alternative fuels in the UK, and one of few such facilities across Europe.

FLEXIS has facilitated an increase in experimental operating conditions (temperature, pressure and power) of the optical combustor (up to 10bar) together with the development and integration of its suite of advanced diagnostic equipment. These enable the interrogation of the chemical and turbulent flow fields, allowing for the optimisation of combustion systems and their operation.



Figure 3: High pressure H2 test rig at GTRC

Hydrogen Energy Storage

In support of the FLEXIS Demonstration Area developments, USW staff have liaised with Neath Port Talbot Borough Council's Energy, Planning and Property teams to take forward the Hydrogen Energy Storage demonstration elements of their new Technology Centre in Baglan.

The plan is to incorporate much of the existing hydrogen energy storage and hydrogen vehicle filling equipment at USW's Hydrogen Centre, as well as attracting new project funding to use hydrogen as an energy balancing tool for the Technology Centre which will embody the 'buildings as power stations' concept.

As part of the FLEXIS investigation into practical hydrogen energy storage systems, further development of a model for simulation of a cascaded electrolyser system (compared with a single, larger electrolyser) has been conducted. The aim is system optimisation and increased flexibility. Results have demonstrated a higher hydrogen yield and increased system durability through a significant reduction in the number of stops and starts experienced by the hydrogen storage system.



Figure 4: USW Hydrogen Centre at Baglan

Sustainable Production and Purification of Hydrogen, Syngas, BioH2, BioCH4

Work on the metabolomic analysis of fermentations with IMS is ongoing. A world-leading metabolic pathway analysis tool will be developed by integrating these analytical tools with the SERCON stable isotope analyser.

An initial proof of concept has been developed for the treatment of intermediate level nuclear waste using alkali silicates, resulting in a technically viable process. Funding with industrial partners is now being investigated and there is potentially valuable IP available.

Investigation has started into the efficient recovery of hydrogen from coke oven gas using a hybrid pressure swing / electrochemical separation and compression system. Adsorption process modelling will be validated through a testing rig developed at USW Hydrogen Centre in collaboration with Tata Steel Port Talbot.

Prof Richard Dinsdale hosted an invited presentation at the Biotechnology and Biological Sciences Research Council (BBSRC)-sponsored China-UK workshop "Utilisation of C1 Gases for Green Bio-manufacturing", at the Institute of Microbiology, Chinese Academy of Sciences, Beijing in June.

Project updates

Hydrogen and Syngas: Efficient Use

USW's technical support has informed the Welsh Government (and Neath Port Talbot BC) in the publication of the planning document for the Centre for Rail Excellence in Wales. Specifically, USW, through FLEXIS, have advised on the potential for the conversion of renewable electricity to provide hydrogen fuel for the rail test facility, which would enable a unique hydrogen fuel cell test facility for the UK in the Dulais Valley.

Energy to vehicle work continues with regular hydrogen refuelling of the Mid & West Wales Fire and Rescue Service, and Swansea University fuel cell vehicles, together with Western Power Distribution's hydrogen transit vans. There has also been continued engagement with Riversimple as they develop their Rasa hydrogen fuel cell vehicle, initial fuelling station and field trial in South Wales.

The renewable hydrogen to 700bar vehicle refuelling facility is nearing completion at the Hydrogen Centre and will form the basis for ongoing hydrogen vehicle refuelling demonstration activities with local organisations.

The Hydrogen Centre has also commissioned a high pressure component test rig and the initial cycle testing of high pressure H₂ regulators has begun with Presreg Ltd.

Hydrogen Centre Director Jon Maddy presented 'Wales as a Centre for Hydrogen Innovation and Deployment: Bridging electricity and gas networks, heat, transport & industry' at the Wales Smart Energy Systems Group in July.



Figure 1. Refuelling a hydrogen vehicle at the USW Hydrogen



Figure 2. High pressure component test rig at the USW

Smart Thermal Energy Grid

The Caerau Heat Scheme evaluated whether a mine water heat network would be a viable option to heat homes and a primary school in Caerau, Upper Llynfi Valley.

Run in conjunction with Bridgend County Borough Council under the Heat Network Delivery Unit (HDNU) fund, the team established drilling of an exploratory borehole to locate the former mine workings and analyse the ground conditions. They conducted a full examination of optimum heat generation models as a comparison with the typical individual gas boiler model.

A comprehensive financial appraisal of using mine water heating for a period of over 40 years of operation gave an indication of the techno-economic viability. Key enablers within the community and political sphere were identified.

The area is also a demonstrator for the Smart Systems and Heat (SSH) supported by BEIS and the Energy Systems Catapult, which explores how to accelerate to market innovations that decarbonise domestic heating.

Unconventional Gas

A research project MEGAPlus (Unconventional Methane Production from Deep European Coal Seams through combined Coal Bed Methane (CBM) and Underground Coal Gasification (UCG) technologies) began in June.

The three-year, 2.9m euro operation will evaluate the use of deep-lying, methane-rich, coal deposits for enhanced coalbed methane recovery using horizontal wells coupled with high-pressure synthetic natural gas- oriented UCG as well as the permanent storage of carbon dioxide.

The results of the project will serve as best practice guidelines for deep CBM-UCG operations in Europe and around the world.

Co-ordinated by the Central Mining Institute (Katowice, Poland) with involvement from five European countries, Cardiff University's FLEXIS team is leading on coupled numerical modelling, small-scale experimental investigations and the preparation of best practice guidelines.

One of the project's key industrial partners, Tata Steel UK, will continue to work closely with the FLEXIS team to explore energy self-sufficiency and carbon dioxide reduction technology options within MEGAPlus.



Figure 3. Exploratory bore hole drilling at the Caerau site, Upper Llynfi Valley

Carbon Sequestration in Coal and Soil

This work package continues to be well-placed with the growing need to explore all options to reduce CO₂ emissions and actively remove it from the atmosphere. Key developments have been made to laboratory and numerical modelling capabilities, both for the study of deep coalbeds as a store of CO₂ captured at point sources and the study of soils as a landscape-scale carbon sink. Collaborative work is in progress with the National Grid and Energy Build, the owners and operators of Aberpergwm coal mine.

Coal swelling caused by interactions with CO₂ is a critical issue being studied as it restricts the rate of CO₂ injection and remains the foremost technical barrier to the use of remaining coal deposits for carbon sequestration. A bespoke pressure-tapped core holder has been designed, capable of testing CO₂ flow and storage in coal cores up to 1m in length to provide a world-leading insight into coal-gas interactions. This is paired with recent advances to the numerical model, COMPASS, which now better describes the deformation behaviour of coal. The collaboration with Energy Build enables the application of these tools in practice, with a view towards pilot scale tests conducted in situ.

Research proposals recently submitted include realising the potential of subsoils for carbon storage (NERC) and developing a new model of mixture coupling in reactive porous media (EPSRC). National Grid funding has been acquired for two projects relating to heat dissipation from underground transmission lines.

Geoinformatics and Environmental Monitoring

FLEXIS secured funding from the Welsh Government to deliver the second phase of the Zero Carbon Zone Area Demonstrator Project in Milford Waterfront. The ambition of the project is to establish Milford Waterfront as a zero carbon area by 2030.

Zero carbon status will be achieved by utilising local renewable energy resources including solar, biogas (AD), heat exchange from sea water and hydrogen generation. The main task of the project is to draw up a business plan for the Port of Milford Haven to implement in Milford Waterfront. Key outcomes include a techno-economic risk assessment, carbon calculator, environmental and social benefits as well as the digital economy and job creation.

A second project acquired funding from the National Grid to develop a smart geo grid in order to maximise the capacity of the transmission network. It will examine how sensor acquired data can be used to better predict thermal dissipation, with a view to providing the science base needed to justify de-rating.

Carbon Capture and Utilisation

Swansea University's Energy Safety Research Institute (ESRI) have found a way to convert waste CO₂ into a molecule that forms the basis of making plastics. The potential of using global ethylene derived from CO₂ is huge, using 0.5 billion tonnes of the carbon emitted annually.

Dr Enrico Andreoli leads this work package on capturing and storing harmful CO₂ emissions. An alternative to long-term storage which can be expensive, is to use captured CO₂ to produce useful materials.

Ethylene is one of the most widely-used molecules in the chemical industry and forms the starting point for the manufacture of detergents, synthetic lubricants and the vast majority of plastics, including polyethylene and polystyrene. Currently, it's produced at a very high temperature by steam from oil cracking.

By using CO₂, water, green electricity and a new catalyst, Dr Andreoli's team is able to generate a sustainable ethylene at room temperature. The catalyst is created through combining copper and a polyamide and achieves one of the highest rates of conversion ever recorded in standard bicarbonate water solutions.

The team is now actively looking for industrial partners to take the potential for this globally-relevant technology forward.



Figure 4. Swansea Evening Post article

Project updates

Energy Vectoring Through Hydrogen

Based at Swansea University's Energy Safety Research Institute (ESRI), Dr Charlie Dunnill has been researching hydrogen-enriched natural gas as a domestic fuel.

As part of the effort to reduce carbon emissions from an ever-increasing global population, it has become vital to counteract the environment impact of our domestic energy usage, given its contribution to overall carbon emissions.

Hydrogen has emerged as a foremost candidate to offset and eventually replace the use of traditional gaseous fossil fuels. Hydrogen as the universal energy carrier is easily produced from all forms of renewable or recovered energy as a storable, transportable commodity that can be used on demand. This decouples supply from demand, which is often considered the downside of intermittent renewable energy storage.

European trials have conducted an evaluation of the practical implementation of hydrogen-enriched natural gas (HENG) within a mains gas supply. Dr Dunnill and his team have examined the limitations of such a strategy based on a novel meta-analysis of experiment studies within the literature, with a focus on the constraints imposed by the phenomena of flash-back and blow-off.

A key finding is that natural gas can be enriched to a degree of approximately 30% before domestic appliances need to be changed, therefore making a significant reduction in national CO2 emissions.



Figure 1. Prototype of Textured Insulator

Environmentally-Friendly Electrical Power Plant & Insulation

Prof Manu Haddad, Director of Cardiff University's Advanced High Voltage Engineering Research Centre, is involved in ongoing discussions regarding a partnership between the National Grid and Siemens to build the next generation of GIL (Gas Insulated Lines) using lower GWP (Global Warming Potential).

During the last few months, the work package has been awarded two National Grid projects looking at Earthing (£300k) and Electric Vehicles (£213k).

Together with Allied Insulators and the National Grid, Prof Haddad has been working on a prototype of a textured insulator. The prototype was featured in the Low Carbon Networks & Innovation Conference (LCNI) in October 2018.



Figure 2. Prototype on display at LCNI

Social Acceptability and Responsible Development of Energy Systems

Work with Tata Steel Port Talbot and Neath Port Talbot BC is underway to set up a series of workshop events in Port Talbot in 2019. Members of the community will have the opportunity to discuss scenarios that set out what a decarbonised energy future might look like in Port Talbot.

The purpose is to provide social intelligence on potential sources of controversy, as well as helping FLEXIS researchers understand how energy innovation might become more responsive to community needs. This will help address the cross-cutting themes of socio-economic benefit, environmental sustainability and responsible development of energy systems.

A second round of interviews with members of the community in Caerau who are potential participants in the mine water district heating scheme has taken place. As well as contributing to FLEXIS work, this data is being used in the Fair Futures project led by Energy Systems Catapult, and commissioned by the Welsh Government. Analysis of the data will feed into workshops with community stakeholders that will look at the contribution technological innovation can make to addressing fuel poverty.

In partnership with the RESPONSE project (Delft University, of Technology University of Sussex, ETH Zurich) a grant has been won from the Lorentz Centre (Netherlands) to hold a week-long workshop in January 2019 to develop an outline of a responsible, innovation-based approach to energy system transition.

Smart Energy Management

Dr Igic, Head of Power Electronics Research at Swansea University, presented on the subject of power current transducers at the Annual World Congress of Nano Science and Technology in Berlin during October 2018.

Dr Igic's team was awarded funding by EPSRC's The Future Compound Semiconductor Manufacturing Hub supporting the development of Swansea University's patented Vertical GaN (gallium nitride) Device for more efficient energy conversion in August.

A ground-breaking development in the field of power current transducers, specifically, magnetic sensing with GaN high-electron mobility transistors, resulted in an article in Semiconductors Today. Researchers at Swansea University and the University of Nis, Serbia, created devices featuring a split drain that allowed the deviation of electron paths due to interaction with magnetic fields to be assessed.

Dr Soroush Faramehr, a Research Associate, won first prize at the UK Power Electronics Annual Conference 2018, for best EPSRC project in July.

Dr Grazia Todeschini presented a talk on harmonic modelling and stability of renewable energy systems at the IEEE Power and Energy Society (PES) General Meeting in August. Her work on power electronics with one of the leaders in the field, Dr Surya Santoso (Cockrell School of Engineering, University of Texas at Austin), continues with joint tutorials at the IEEE PES, conference proceedings and journal papers in both IET Power Electronics and IEEE Transactions on Power Delivery.

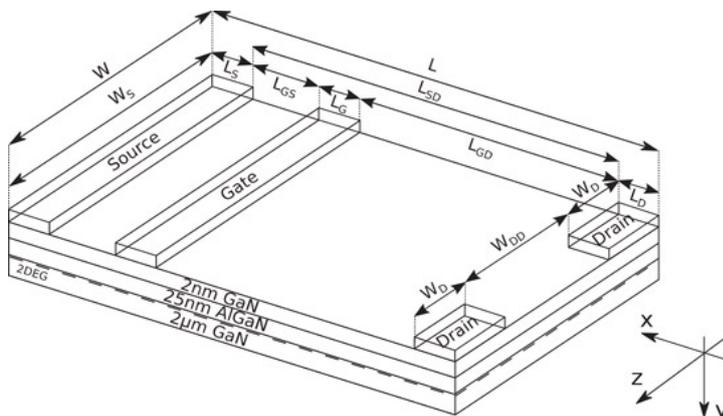


Figure 3. GaN MagHEMT (split-current sensor) schematic showing geometrical parameters used for relative sensitivity optimisation



Figure 4. Dr Faramehr (left) receives 1st place for best EPSRC project

Demonstration Area

Latest developments

Development of the FLEXIS Demonstration Area has moved on apace over the last months. A Memorandum of Understanding (MOU) is being drafted between FLEXIS and Neath Port Talbot BC and recruitment for a Demonstration Area Project Manager is underway. Discussions are taking place with Baglan Bay Innovation Centre, located within the Demonstration Area, with a view to securing a base for FLEXIS Demonstration Area activities.

As mentioned previously, the Demonstration Area will provide an opportunity to carry out full-scale demonstration projects, based on plans being made by Neath Port Talbot BC and ideas being developed by FLEXIS. Research funding will be sought to enable the projects to proceed, thus adding to FLEXIS' ability to draw down research income, as required by the contract.

FLEXISapp is a new project, currently in Business Plan development with WEFO. The objective is to complement current FLEXIS activities via the development of the demonstration site further to include the commercialisation of new products and systems emerging from FLEXIS and other academic research and development. FLEXISapp is scheduled to run for three years, from Jan 2019, with a budget contribution of some £3m from WEFO. It will have its own set of targets, related to so-called economic development indicators. It will support the roll-out and

scale-up of energy solutions, resulting in new products, energy systems and jobs.

It is planned that FLEXISapp will be showcased in a demonstration hub where the private sector and general public will be able to see at first-hand demonstration projects such as multi-vector energy modelling and optimisation. Neath Port Talbot BC are planning to create a Centre of Excellence – a smart building to showcase cutting-edge, renewable technologies - and have suggested it as a potential venue for the hub.

The core outcomes of the FLEXISapp include the full-scale development of the Energy Systems Commercialisation Demonstrator and the creation of a centralised 'fleet of foot' platform to drive forward and create new interactions between industry and FLEXIS.

To further facilitate new interactions between industry and FLEXIS, consideration is being given to the development of a not-for-profit, Special Purpose Vehicle (SPV). FLEXIS core members Cardiff University, the University of South Wales and Swansea University will be partners in the SPV, together with Neath Port Talbot Borough Council.



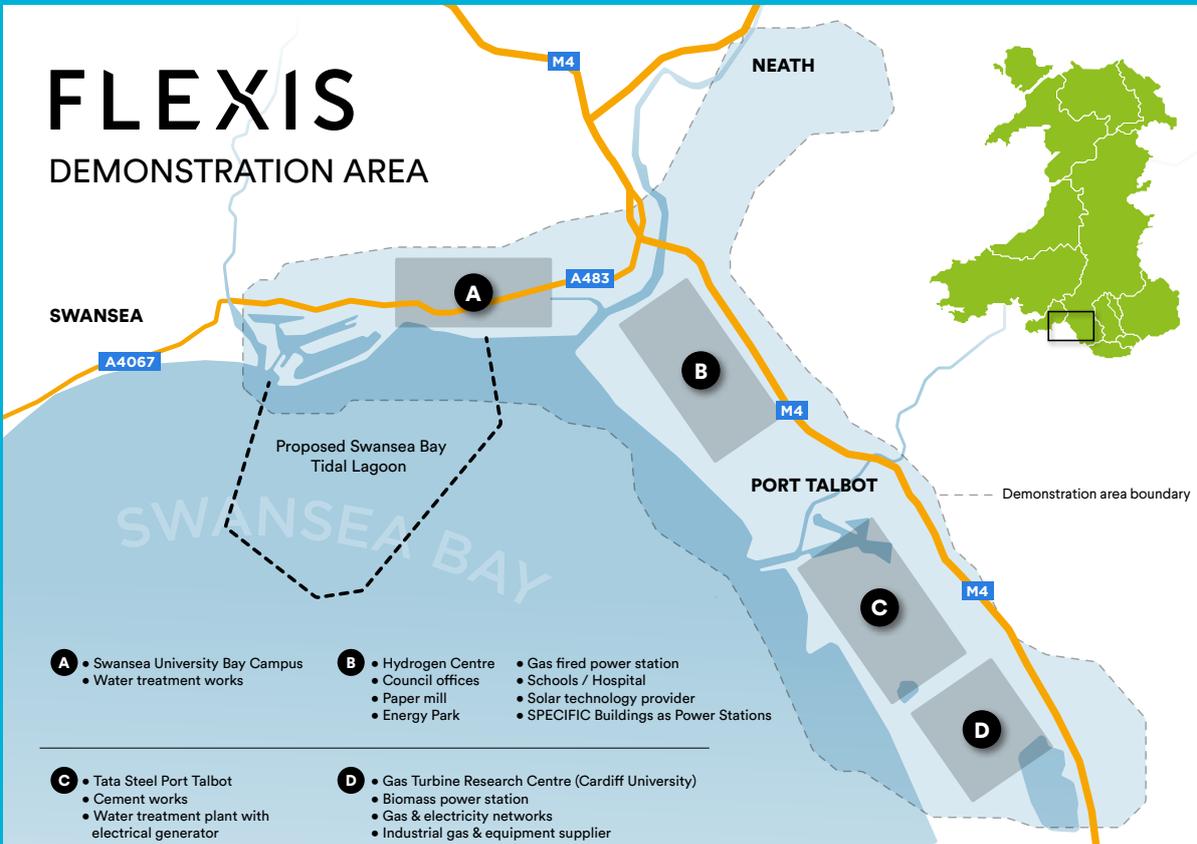
Figure 1: Baglan Bay Innovation Centre



Figure 2: Baglan Energy Park

FLEXIS

DEMONSTRATION AREA



FLEXIS Young Researchers Conference

In July, FLEXIS hosted the Young Researchers Conference.

100 attendees

Early career researchers were given the opportunity to learn more about FLEXIS and take a tour of the Demonstration Area.

49 academic posters

The researchers produced academic posters to showcase their work, identify opportunities for collaboration and win prizes based on peer and Principal Investigator votes.

A chance to hear from the project partners

Presentations were given by Steven Phillips, CEO of Neath Port Talbot Borough Council and Martin Brunnock, Manufacturing Director at Tata Steel in Europe.



FLEXIS Young Resarchers Conference July 2018

Our stakeholders include:

3M	Electronic Systems Design Centre (ESDC), Swansea University	Loughborough University	Swansea Bay City Deal
ABB Group		Low Carbon Swansea Bay	Swansea University
Akzo Nobel	Energy Systems Catapult	Materials Processing Institute	Tampere University of Technology
Airbus	Energy Saving Trust	Minister of State for Climate Change and Industry	Tata Steel UK
Amazon	Engineering and Physical Sciences Research Council (EPSRC)	National Grid	Tecnia
Bangor University	Energy Technologies Institute (ETI)	National Physical Laboratory (NPL)	The Behavioural Insights Team
BIS Group	Future Generations Commissioner for Wales	Neath Port Talbot County Borough Council	Tianjin University
Bridgend County Borough Council	Global Challenges Research Fund (GCRF)	Natural Environment Research Council (NERC)	Tidal Lagoon Power
BP	General Electric (GE)	Newcastle University	Torfaen County Borough Council
Calon Energy Baglan Bay Power Station	Gexcon AS	Port of Milford Haven	Toshiba
Carbon Conversations	Grid Solutions	Port Talbot Waterfront Enterprise Zone	TNEI
Cardiff County Borough Council	GW4 Alliance (Bath, Bristol, Cardiff & Exeter Universities)	Power Networks Research Academy (PNRA)	UCL (University College London)
CCS (Carbon Capture & Storage Association)	Honeywell	Ofgem (GB Electricity Distribution Network)	UKCCS Research Centre
Celsa Steel UK	Indian Institute of Technology Roorkee	Queen's University Belfast	UK Energy Research Centre (UKERC)
Centre for Radiation, Chemicals and Environmental Hazards (CRCE), Public Health England	Initiative for Managing Policymaker-Academic Cooperation and Transfer (IMPACKT), Swansea University	REHAU	UK Power Networks
CIIA (Centro de Investigacion e Innovacion en Ingenieria Aeronautica), UANL (Mexico)	Imperial College	Renishaw	UK Research and Innovation
Climate Change, Environment and Rural Affairs Committee, National Assembly for Wales	Innovate UK	Rhondda Cynon Taf County Borough Council	Uniper SE
Compound Semiconductor Centre	Institute of Electrical and Electronics Engineers (IEEE)	Ricardo plc	University of Bath
Cranfield University	Institute of Welsh Affairs	RICE	University of Bristol
Cyfoeth Naturiol Cymru / Natural Resources Wales	Council on Large Electric Systems (CIGRE)	Riversimple	University of Edinburgh
Department for Environment, Food & Rural Affairs (UK Government)	Integral	RMIT University	University of Leeds
Department for Business, Energy & Industrial Strategy (UK Government)	Intellectual Property Office	Rolls-Royce	University of Manchester
Department for Transport (UK Government)	International Energy Agency (IEA)	Royal Society	University of Nottingham
DNV GL	ITM Power	RRI Tools	University of Reading
Dwr Cymru Welsh Water	Jaguar Land Rover	RWE nPower	University of Sheffield
EA Technology	Khalifa University	Schneider Electric	University of Southampton
EERA (European Energy Research Alliance)	Kingsmill Industries (UK) Ltd	SSE plc	University of Strathclyde
eCORP International, LLC	KU Leuven	SP Energy Networks	University of Warwick
Ecole Centrale de Lyon	Lancaster University	SER Cymru II	Virgin Atlantic
	Life Sciences Hub Wales	Severn Trent Water	Wales Council for Voluntary Action (WCVA)
	Liverpool John Moores University	Shell	Wales and West Utilities
	Local Partnerships LLP	Siemens	WEFO (EU funds in Wales)
		SINTEF	Welsh Government
		SPECIFIC Buildings as Power Stations	Westminster Energy, Environment and Transport Forum
		SP Energy Networks	Western Power Distribution
		Stainless Metalcraft Ltd	WRAP Cymru
		Supergen Bioenergy	ZF



