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TOP FEATURE ARTICLE

Northern Ireland's Carbon Footprint Can't Be Ignored

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ALSO FEATURED IN THIS ISSUE

Pittsburgh Progress Report

Revolutionary Carbon Neutral Ship
to Set Sail in 2012

Energy from Waste: Methane to Market

KATP Update
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Welcome

Welcome to the second edition of the Carbon Zero NI Magazine. The Magazine is designed to offer an insight into Northern Ireland's developing clean energy sector. This edition offers insights and updates on the recent activities of Carbon Zero NI including the Pittsburgh-NI programme, we outline details of our new green prospectus and highlight our work in the crucial field of Product Carbon Footprinting. Feature articles also include the work of B9 Shipping and the development of revolutionary carbon free vessel



○ Dr John Harrison, Research Lecturer, Carbon Zero NI

Introduction

Renewable energy - using the wind, sea and sun to generate power - and smart measures to reduce carbon emissions are playing an ever greater role in addressing climate change and improving energy security for future generations.

What we do with our waste is also important. Producing energy from what we throw away can also deliver a practical solution to the complex challenges we face.

With at least 66 countries, including 27 European Union countries having already set clear targets for the reduction of CO2 emissions and development of renewable energy, the challenge is on. The EU baseline target is to have 20% of its energy created by renewable technologies by 2020 and the UK Government has committed itself to a 60% reduction in carbon dioxide emissions by 2050.

This, of course, requires an enormous change in society across all sectors, but it also brings significant opportunities for new, cleaner industries to emerge in Northern Ireland.

Launched in 2010, Carbon Zero NI is a direct response. It is a major programme aimed at accelerating Northern Ireland into

a leading position in the global 'clean and green' revolution.

Financed by the Department of Employment and Learning (DEL) through its Innovation Fund Employer Support Programme and led by the South West College, it is a collaborative college programme developing best practice green educational and training opportunities within the Further Education sector and vital support to industry.

Designed to extend the international reach of all six FE colleges, the programme is providing vital industry-linked R&D services, innovation support, technology development, specialist training and expert advice in the area of Sustainable Development. All of which is designed to help ensure Northern Ireland can actively compete and succeed in the growing multi-billion pound international sustainable and renewable markets.

Carbon Zero NI and the Further Education sector are working hard to advance knowledge and technology in key areas such as energy from waste, wind power and energy storage.

Investing in green job training will underpin Northern Ireland's long-term success in one of the world's fastest-growing industries and will allow us to build a position as a leader in sustainability.

The Carbon Zero NI Magazine focuses on the people and organisations working at the forefront of developing a lucrative sustainable and greener future. This edition offers insights and updates on the recent activities of Carbon Zero NI including the Pittsburgh-NI programme, the launch of a major new green-prospectus and our work in Product Carbon Footprinting. We also focus on the work of B9 Shipping and the development of revolutionary carbon free vessel for the biomass industry.

If you have any ideas or suggestions on future content within the magazine, have stories you would like to see us cover, or would like to highlight and promote your company's initiatives, within, why not get in touch with us via enquiries@carbonzeroni.com.

Dr John Harrison
Research Lecturer
Carbon Zero NI.

KATP Update


Set up in March 2010, to identify international market opportunities in the areas of sustainable development and clean energy and assist local companies to exploit these opportunities, much progress has been made by the Clean Energy Knowledge and Technology Platform (KATP).

With representatives from companies including NIE, Bombardier and B9 Energy, the KATP aims to play a leading role in developing strategy for industry and government, providing specialist guidance for developing R&D programmes and identifying essential new curricula for the education sector.

Carbon Zero NI talks to Dr Leslie Bryans from NIE and Ciarán Prunty from QUESTOR to hear how things are progressing.

Ciarán Prunty, Applied Technology Unit, QUESTOR Centre, Queen's University Belfast



 **Ciarán Prunty**, Applied Technology Unit, QUESTOR Centre, Queen's University Belfast

Why did you get involved with Carbon Zero NI?

I got involved to contribute to the development of renewable energy expertise and skills in Northern Ireland. At the QUESTOR Centre we have a research programme focussed on renewable energy and wastewater treatment. We have a lot of experience in dealing with the needs of local industry and have participated in many international collaborative research projects. Carbon Zero NI is a way of transferring that knowledge to others and further developing the local renewable energy sector.

How does the KATP work in practice?

The KATP allows key renewable energy sector stakeholders to share experience and develop the ideas needed to help Carbon Zero NI deliver a training programme that will give Northern Ireland the potential to expand its renewable energy capability. Members discuss the needs of the renewable

energy sector in Northern Ireland, drawing on their own experience and use this to steer the programme. Each member of the KATP has a different perspective on the sector and this helps Carbon Zero team decide on the best direction for the programme to take.

What do you think you bring to the team?


I bring our experience of working with local companies, collaborating with international research institutions and also our technical knowledge of anaerobic digestion and wastewater treatment.

What is your outlook/hopes for the development of NI's clean tech sector?

NI is well placed to develop a healthy renewable energy sector featuring a range of technological solutions to current challenges. We have the ability to draw on wind, wave, biomass and other natural resources as well as the experiences of others and new technologies to meet the needs of our rural and urban areas. Our size allows us to adapt quickly to change and we have many highly motivated and innovative manufacturing companies who want to deliver products for the local and international markets.

Dr Leslie Bryans, Manager, Transmission Planning at NIE



 **Dr Leslie Bryans**, Manager, Transmission Planning NIE

Why did you get involved with Carbon Zero NI?

NIE was asked to provide a senior member of staff with knowledge of the various factors involved in renewable energy

penetration. We have invested heavily working to incorporate renewable energy at NIE and the KATP is a useful forum for sharing our experience and learning from others.

How does the KATP work in practice?

Local businesses must be given the very best resources, training and facilities if they are to capitalise on the fast-emerging opportunities in this lucrative sector. The Clean Energy Knowledge and Technology Platform provides a competitive advantage for local firms working in this international space. By enhancing the quality and availability of training, the education sector will increase collaboration and inject the latest technical advances and knowhow directly into businesses operating in the frontline. This programme represents a major commitment from all sectors involved and will create an effective strategy for the green sector.

What do you think you bring to the team?

NIE is exposed to a wide range of issues presented by the changing generation and end use bases and patterns, so we have developed understanding of some of the cleaner energy sector. I have worked to develop the methodology and quality control for the All-island Grid Study which provided the basis for the two Governments' renewable energy targets and have recently been part of the Technical Committee looking high renewable energy penetration in the State of Hawaii which has similar problems to Ireland.

What is your outlook/hopes for the development of NI's clean tech sector?

Of course, the highest level hope would be that Government energy strategy can be achieved in a timely fashion and that the application of the new generation and control technologies gives rise to wealth creation and improved disposable income across the province when compared with the do-nothing alternative. However, there is a real threat to all of these objectives, if there is not sufficient co-ordination of Government objectives such as to facilitate planning permission for the infrastructure needed to connect and operate renewable generation. In that case, Renewable Generation cannot be connected, and the social benefits cannot be realised.

Northern Ireland's Carbon Footprint Can't Be Ignored

Launched jointly by the Carbon Trust; Defra and the British Standards Institute in 2008, the Carbon Reduction Label is a green scheme designed to provide consumers with confidence to choose products which are genuinely environmentally friendly and provide industry with a uniformed 'eco-label'.

Carbon Trust estimates some £2bn worth of goods sold in the last year carried carbon footprint information.

The world's first standard for measuring a product's carbon footprint, its use has been widely adopted in food production and other industries are rapidly following and recent figures released by the Carbon Trust estimates some £2bn worth of goods sold in the last year carried carbon footprint information.

FOOTPRINT EXPERT™

Dr John Harrison, a Product Carbon Footprinting (PCF) expert with Carbon Zero NI, is assisting a number of Northern Ireland companies to establish a competitive advantage by enabling them to measure and display the footprint of their goods and business activity.

"If businesses that produce products want to cut carbon and take advantage of a growing desire for green goods, then carbon footprinting and labelling is one of the best ways to get ahead of the game and be recognised," he says.

"Major retailers including ASDA and Tesco are leading the way with clear commitments to lower their carbon emissions and are now asking suppliers to come on board.

"There are incentives for those who take part and display the carbon footprint of each product," says Dr Harrison.

"The concept of product carbon footprinting is based around the premise that consumers will differentiate and buy your product because it has a lower carbon footprint than a similar product. But with retailers such as Tesco offering rewards and merchandising opportunities to firms who reduce their carbon footprint, it also means that green goods stand a better chance of being offered to consumers in the first instance."

The Product Carbon Footprint (PCF) process takes account of all the energy and potential CO2 emitted in the lifecycle of any product and includes the sourcing of raw materials, through to its disposal by the consumer.

The PCF, for example, of a frozen ready-meal would include any CO2 emitted during the growth of ingredients, processing and delivery to shops, production of packaging, energy used for keeping the item in frozen storage, CO2 emissions during preparation and, finally, recycling of the packaging.

"Establishing a Carbon Footprint provides a lifecycle appraisal undertaken specifically and accurately for each product and provides detailed data that can be used to closely evaluate the performance of a

range of carbon sources including: energy use, transportation, refrigerant losses from air conditioning units and waste," says Dr Harrison.

"This provides a valuable opportunity for companies to capitalise greatly in other ways", he adds.

"By identifying inefficiencies in the supply chain, many of the best market performers, such as a Coca-Cola and Walkers, have found that generating a carbon footprint can also reduce costs and boost their bottom line.

"The systematic approach maps inefficiencies and waste in the supply chain which, if acted on, can ultimately translate into direct long-term cost savings and increased production. Though the approach is tailored for each business and product, the process can be applied for companies of any size to help them and make savings from lowering carbon emissions," he said.

The service offered by Carbon Zero NI is based on the Publicly Available Specification 2050 (PAS 2050), the code of Good Practice and the certification measurements of Footprint Expert to ensure consistency and maximise comparability in certified product carbon footprints.

To qualify for certification a company has to complete an assessment of the product's carbon footprint and make a commitment to reduce it within two years.

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Toomebridge-based manufacturer Creagh Concrete recently engaged Carbon Zero NI to assess the Carbon Footprint of one of its sites in Tyrone. Welcoming the initiative, the company's Director, Neil Ward, said Carbon footprinting was one measure of best practice the firm is introducing.

"I see the facility in Ardboe as somewhere we can begin to initiate best practice in reducing our carbon footprint, developing expertise locally and being in a position to attract the best local talent especially at a time when the options for solid employment are limited," he said.

Working closely with The Carbon Trust, a not-for-profit company with the mission to accelerate the move to a low carbon economy, provides bespoke consultation and auditing services that are carefully tailored to each client's requirement, resources and budget.

"We provide a range of tools, services and information to help businesses implement a number of energy and cost saving measures" says Dr Harrison.

"In calculating or assessing a product carbon footprint, it's vital to think carefully about how the company intends to use the data, the level of detail required and the resources available for the audit," he says.

"We have the expertise to calculate the Carbon Footprint of any product or process, but also we can provide consultancy to help guide firms through the Carbon Trust's Footprinting process if they wish to carry it out internally.

For more information on Carbon Product Footprinting or to request a free preliminary consultation contact Dr John Harrison at Carbon Zero NI on 028 8676 0493 or email John.Harrison@swc.ac.uk.

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many of the best market performers, such as a Coca-Cola and Walkers, have found that generating a carbon footprint can also reduce costs and boost their bottom line.

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PRODUCT CARBON FOOTPRINTING IN NUMBERS

80% Over target for UK to reduce emissions by 2050

£2bn - Value of goods sold in the last year carrying carbon footprint information.

£1.4bn - the total cost savings Carbon Trust customers are estimated to have made

5,000 - the number of product carbon footprints certified

81,000 Tonnes of Carbon reduced by Sainsbury's

£40,000 costs saved by Pepsico by undertaking product carbon footprinting and labelling process

CARBON ZERO NI COLLEGES

SOUTH EASTERN REGIONAL COLLEGE

Environmental Skills Centre officially opened



A new Environmental Skills Centre was officially opened by Sir Reg Empey, Minister for Employment and Learning at South Eastern Regional College's Newtownards campus. The Centre is to become a hub for sustainable development and renewable technology, which will include standalone curriculum and services as well as embedding new developments into existing areas such as motor vehicle, plumbing and engineering.

At the opening event the Minister said: "This state-of-the-art facility provides an ideal

environment in which further education and business sectors can cooperate to their mutual benefit. The cutting-edge skills honed here will provide a huge boost to both the local community and economy, whilst also helping to drive the sustainable energy and renewable technology agenda forward."

The Principal and Chief Executive, Ken Webb said "Sustainable energy and renewable technologies now penetrate all industries and there is an exciting opportunity to explore the solutions we need to find for the environmental challenges we face. Ultimately there will be job creation from this sector along with the need for the existing workforce to upskill and so we all must work together to maximise this for the benefit of the NI economy."

SERC is part of the Carbon Zero NI initiative, along with the other 5 FE colleges and local universities, which provides a range of training and services to develop a skilled workforce in renewable or 'alternative' energy in Northern Ireland. The Centre is to become

the hub for this specialist training and support.

SERC provides specialist training and support in Heat Pump Installation, Biomass and Solar Technologies, Energy Assessment, The Code for Sustainable Homes, Wave and Tidal Energy, Deep Geothermal Power, Energy Storage and Passive and Zero Carbon Homes. It is the only provider of the Building Research Establishment Energy Assessors (BREEAM) training in Northern Ireland.

SERC works with bodies such as BPEC, City and Guilds, Edexcel and organisations including the Global Maritime Alliance, Action Renewables, local councils, Dundalk Institute of Technology and CAFRE to deliver innovative industry qualifications.



BELFAST METROPOLITAN COLLEGE

Sustainable success

The Sustainable Development Commission in Northern Ireland, in partnership with Belfast Metropolitan College and W5, held a seminar on the 15th September to discuss and debate one of the biggest issues facing the island of Ireland – a sustainable and secure energy future.

The issues of climate change, energy security and the current economic recession remain at the top of the business and political agenda, the seminar specifically provided an opportunity for policy advisors and decision makers to engage with and discuss a project which could contribute substantially to the island's economic future and explore the role our enormous natural energy riches can provide.

The event, 'Renewable Energy – Our Economic Future', centred around the 'Spirit of Ireland' proposals and the ambitious plans to revolutionise energy production on the island contained there in.

The seminar was opened by Alban Maginness MLA, Chairperson of the Assembly Enterprise Trade and Investment Committee. Mr Maginness commented on the need to broaden and strengthen Ireland's renewable energy resource base. He also pointed out that projects such as Spirit of Ireland had the capacity to be catalysts for growth in not just the energy sector, but in construction, engineering, and tourism. He concluded his remarks by saying:

"We cannot continue on a 'business as usual' model, we must look at every possibility to responsibly develop our energy mix, but we should also always remain aware that the actions of our generation can and will have many implications for future generations."

Striking this balance is the challenge for all involved in moving our society towards a low carbon future and one which we should all remain conscious of.

'Spirit of Ireland' was launched by a consortium of business leaders, scientists, and energy experts in early 2009.

The project aims to:

- Locate wind farms in suitable areas to harvest energy on the west coast of Ireland.
- Save the resulting energy in Hydro Storage Reservoirs.
- Release energy from Hydro Storage Reservoirs instantly - which is ideal for both domestic use and export.
- Secure energy supplies and provide for large scale energy exports.

As well as harnessing excess energy for export, the project hopes to create tens of thousands of jobs on a local and national level and lead to huge investment throughout the island of Ireland. It will also have a massive impact on carbon dioxide emissions.

A selected panel of experts, Professor Ian Montgomery and Professor Sharon Turner from Queen's University, and David Surplus from B9 Energy then teased out the options

and consequences of such a modal shift in energy production, particularly with reference to biodiversity, engineering and Northern Ireland's input into such a project. An interesting debate followed in which problems relating to European environmental legislation were raised, along with the impact on local communities near where such a massive engineering project would take place. An audience of around 100 key decision makers from the business community and public sector then had their chance to test this particular idea, and what such a shift in energy production would mean for Northern Ireland.



SOUTH WEST REGIONAL COLLEGE

South West College unveils Wind Energy Foundation Degree

South West College in partnership with University of Ulster has unveiled the first foundation degree to specifically address the needs of growing wind energy industry and commercially operated turbines.

The Foundation Degree in Engineering specialising in Wind Technology is designed to equip students for higher technician level work

within the wind technology and control industry and enable them to progress to Honours Degree level if desired.

It is ideal for those looking to Up-skill or Reskill and advance within this sector. For Further Information contact Mark McGuigan on Tel: 0845 603 1881 Ext: 5234 or email mark.mcguigan@swc.ac.uk



SOUTHERN REGIONAL COLLEGE

Dynamic New Seminar Series

On behalf of Carbon Zero NI and the Southern Regional College, John Russell recently attended a meeting of the Scottish Branch of The Environmental Association for Universities and Colleges in November. The EAUC is the sustainability champion for universities and colleges in the UK. Run by members, for its members, the EAUC seeks to work with members and partners to drive sustainability to the heart of further and higher education. John attended the meeting, which was called in order to finalise details for the formation of a Scotland-Northern Ireland Branch. Representatives from EAUC plan to visit Carbon Zero NI, the two Universities and six Colleges next January.

John also completed the PassivPassive House Design course at BRE Watford (Building Research Establishment). The core focus of PassivHaus design is to dramatically reduce the requirement for space heating and cooling. The concept of PassivHaus design has become mainstream and has seen widespread adoption around the world. PassivHaus represents one approach the industry can take as we move towards the aspiration of zero-carbon buildings. The PassivHaus design principles can be applied not only to the residential sector, but also to commercial, industrial and public buildings.



Southern Regional College

Thermal Industrial Federation Conference and the Intersolar Trade Fair, in Munich in June 2010. In relation to Waste Management the College is continuing its research with local industry to develop courses that best suit their needs, with a particular focus on programmes suitable to the local construction industry.



Carbon Zero NI exhibits at Eco Show Live



Carbon Zero NI recently exhibited at the Eco Show Live in Belfast. The event, which took place from 8th to 10th of October was the first show of its kind in Europe and was designed to give all those attending an opportunity to learn, in a fun way, about the environment and how as individuals what can be done to improve our impact upon it.



NORTH WEST REGIONAL COLLEGE

North West Regional College is preparing to deliver three courses:

Solar Thermal Designers Course

This course addresses the need to design a system in domestic space heating or to provide heat within small commercial or industrial systems. This programme trains candidates to apply more sophisticated design techniques, using a range of commercial software. Specific emphasis is given to optimise the design of solar space heating systems within passive house and carbon zero design methodologies. The integration of solar thermal with other space heating technologies both renewable and fossil fuel is covered. Co-operation with local installers to verify existing system performance will be undertaken and will be coupled to input from academic and commercial software providers in the UK and Europe to enable knowledge transfer into the course content.

Renewable Energy Schools Outreach Programme

Awareness of renewable energy within the school curriculum has developed slowly with elements being introduced within GCSE science and as options within A-level Science and Technology.

This programme will develop realistic training equipment and curriculum materials to encourage

purposeful practical-based approach to renewable energy education aimed at 15-18 year olds. Particular emphasis will be placed on developing risk analysis to provide safe practice without limiting the learning potential. The technologies to be addressed would be solar thermal, solar photovoltaic, micro-hydro and heat-pumps.

The programme will identify and source equipment and pilot its use with 6 school groups from the North West area, using the experience gained and the student input to further develop the potential of the activities. Eight pupils from each school will participate over four mornings or afternoon sessions with a follow-up day at the end to review the activities. This courses is planned for December 2010.

Introduction to Sustainable Communities

The College is offering local communities the opportunity to enrol on a valuable 1 day course that explores the basic elements of a creating a sustainable community. The course will cover energy efficiency, waste management, water conservation and environmental projects, and will allow participants to see how they can improve their own community effectively.

- Also lecturer Kevin Murray attended an international conference: European Solar



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The Northern Ireland-Pittsburgh Sustainable Leadership programme has seen twelve aspiring leaders in the green economy settle into companies across Pittsburgh, USA.
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Carbon Zero NI Interns settle into life in Pittsburgh

Set up to give 'on-the-job' training to interns from across the six NI Further Education Colleges, the programme gives each of the students the hands on experience they need along with an insight into how another country enhances the use of their green energy technology and the differences in energy consumption.

One of the twelve Interns, Michelle McAteer, has been placed with eCap Network, an Energy Management consulting company based in the Hill District, Western Pennsylvania.

Michelle's aim was to gain experience relating specifically with building energy performance so that on her return to Northern Ireland she would be much more equipped to undertake a post in this field.

Michelle's role at the company is an Energy Analyst Intern and is currently involved with conducting level I and II energy audits to create energy profiles for facilities; creating building energy models to simulate baseline scenarios to allow foresight into suitable application of clean energy technologies; and sourcing appropriate funding to help projects become a reality.

Michelle has a B.Sc. (Hons) in Environmental Science with a Diploma in Area Studies from the University of Ulster, Coleraine and has also completed an M.Sc in Environment and Resource Management at the Vrije University, Amsterdam.

Michelle is confident that her time in Pittsburgh has already been beneficial and has been a great opportunity to hone her skills further, hopefully giving her a competitive edge when returning to Northern Ireland.

She already sees the benefits that the increased use of clean energy would have in Northern Ireland, saying, "I've always been interested in climate science and how climate change is impacting our lives. Adopting clean energy technologies and making them more accessible through demonstration and appropriate application is vital if we want the sector to successfully grow and mature. Northern Ireland is abundant with free natural resources that should not only be utilised but they can potentially be extremely lucrative for our economy".

Feedback from eCap has been extremely positive and John Werling, President of the company says that Michelle has been great to work with, willing to pitch in and learn not just

the technical aspects of energy conservation and clean energy, but all the aspects of building a business in an emerging industry.

"Michelle's experience studying energy policy issues such as building codes and building energy rating certification programs which impact industry not just in Ireland, but across Europe has been invaluable and she has been able to provide the team in Pittsburgh with insights from her experiences in Northern Ireland," explains John.

The company, as John explains is really geared not towards being the most knowledgeable at cutting edge technology, but rather at being very effective in accelerating adoption of proven technologies. "Our role is to address the barriers to building owners implementing energy conservation projects. Those often have nothing to do with the technology. To do this you need broad knowledge of what it takes to run a building, make a business case, fund a project and sell the ideas to a varied audience of stakeholders. While we don't design the solutions, we need the technical knowledge to understand what works best and why, and how to bring various solutions together." He hopes that Michelle will gain a holistic understanding of all facets of the industry, and how to execute projects on the front lines.



○ Michelle McAteer



○ CZNI Participants (L-R) Mick O'Reilly, Stephen Wilson, Sarah Mackle, Michael Mageean and Michelle McAteer.

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"Northern Ireland is abundant with free natural resources that should not only be utilised but they can potentially be extremely lucrative for our economy".
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SUSTAINABLE PITTSBURGH - PERSPECTIVE FROM ECAP PRESIDENT, JOHN WERLING

Pittsburgh has a long history in the energy sector. We have been at the global center of oil and gas, coal and nuclear power since the inception of each technology. During the energy crises in the 1970s investment was made in advanced energy technologies by Pittsburgh based corporations, most notably Westinghouse. Today the fruits of that investment can be seen locally in large and small companies that make everything from nuclear power plants, to smart grid and power distribution equipment to solar panels and LED lights. Of course the downside for a region with abundant and cheap natural resources, not only in energy but also with fresh water, is that historically conservation had not been a priority as it was in places like California. But in the 90's there was a sustainability movement rooted in community development that put Pittsburgh on the leading edge of green building. As a result we have many notable LEED buildings, a progressive design and construction community and a strong and active chapter of the U.S. Green Building Council. In the last half decade, progressive State policy and incentives coupled with rising energy prices have fueled broader market interest. So clean and renewable industries in Pittsburgh are really poised to explode. As an example in the heart of the City, there is a public/private partnership to restore an old technical school to a center for green businesses and green jobs training that will be unique in the Country.

COMPANIES TAKING PART IN THE NORTHERN IRELAND- PITTSBURGH SUSTAINABLE LEADERSHIP

- Epiphany Water Purification
- AMTV/First Link
- ECap Network
- Venture Engineering
- Taggart
- Catalyst Connections
- Green Building Alliance
- Allegheny County Department of Economic Development
- Allegheny County Sanitary Authority (ALCOSAN).
- Vox Energy Solutions
- UPMC Corporate Construction



New Portfolio of Courses for 'Green' Careers



- Launching the prospectus are (L-R): Sam Knox, Invest N.I., Dr John Harrison, Carbon Zero NI, Dr John Gilliland, Rural Generation Ltd, Michael McAlister, South West College, Seated, Malachy McAleer, Director South West College, and Dr. Lorna Lawrence from Carbon Zero NI.



Northern Ireland's first-ever dedicated 'Clean and green' prospectus, which details the diverse range of courses available from universities and colleges, has been unveiled by Carbon Zero NI.

The prospectus is designed to help address the increasing demand for skills and knowledge in the area of clean energy development in Northern Ireland by offering concise information on a raft of courses, from one-day seminars up to degree and masters level, and including those specially developed by the Carbon Zero NI programme.

Dr Lorna Lawrence, Research Lecturer at Carbon Zero NI said the prospectus would help potential students to explore new and existing opportunities in the fast-growing low carbon economy.

"Across the globe the race is on to capitalise on the rapidly-developing green technology sector and Northern Ireland is already playing its part," she said.

"Based on global best practice and the latest technical know-how, these important courses are delivered by the colleges and universities and are designed to help potential students better connect with the

skills that are being demanded by the 'clean and green' sector."

The comprehensive prospectus covers areas such as Energy Awareness, Renewable Technologies, Management, Responsible Sourcing of Materials and Sustainable Construction. The courses range from intensive one-day workshops for senior managers up to four-year long full time degree courses for students keen to forge 'green collar' careers.

Dr Lawrence said that many of the courses were developed in partnership with industry, to ensure that the emerging workforce would be optimally skilled and qualified to enter the renewable industry and provide valuable capacity for research and innovation.

"Northern Ireland's colleges and universities have established strong links with industry and commerce by way of its industrial liaison network. Working closely with local industry, the University and FE College network has shaped its curriculum in line with the forecasted needs of the local market to optimise their offering and help produce a workforce with high employability."

"This will be critical to ensure we can accelerate Northern Ireland's position as a market leader and prepare the workforce with the best skills and training available," she said.

"We welcome everyone with an interest in renewable energy, sustainable construction, waste management and energy efficiency to use the prospectus to advance their career goals in this increasingly important arena."

To obtain a copy of the Carbon Zero NI Prospectus visit www.carbonzeroni.com or alternatively email enquiries@carbonzeroni.com or telephone 028 8676 0493.

Energy from Waste

Methane to Market

Today, there is no disputing that the use of renewable energy has to increase in order to reduce the carbon dioxide emissions and our dependence on fossil fuels. Carbon Zero NI is leading the field in Northern Ireland as it works to harness renewable energy sources - and nothing could be more alternative than waste to energy conversion.

Waste to energy conversion is an increasingly recognised approach to resolving two issues in one - not only providing a safe and cost-effective way of waste disposal but also helping to reduce carbon dioxide emissions.

The potential to capitalise on the energy from waste market here in Northern Ireland is sizeable and will be driven by two factors - the development of European Environmental Legislations which sets increasingly demanding targets for the diversion of biodegradable municipal waste from landfill between now and 2020 - driving up the cost of disposal to landfill sites.

In addition, our own Renewable Energy Targets here in Northern Ireland - where we

hope to source 40 per cent of our electricity from renewable sources by 2020.

Currently energy production from renewable resources within Northern Ireland is around 10% and is mainly based on wind power, solar energy and hydropower. Another important source is biomass, which may be converted by thermal or biological processes.

However, the most promising technology of biological basis is anaerobic digestion (AD), where substrates such as agricultural livestock manure or municipal waste may be converted into a methane rich biogas, suitable for heat and electricity production.

Landfill gas (LFG), composed of about 50 percent methane, is a natural by-product of decomposing organic matter in landfill sites. LFG can also be used to produce electricity with engines, turbines, or other technologies, and can be refined and injected into a natural gas pipeline. Using LFG in these ways can yield substantial energy, economic, environmental, air quality, and public health benefits.

Biogas from commercial anaerobic digestion and landfill emissions is



Methane car fuelling

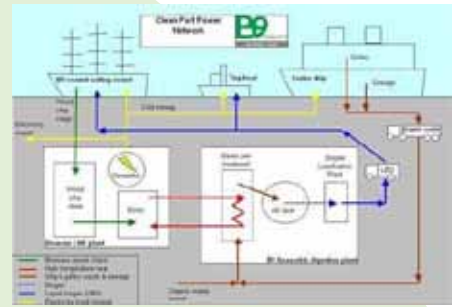
already being used for heat and electricity production, but the best upgrading solution of this clean energy should be the injection into the natural gas grid or the production of vehicle fuel. After removal of contaminants, bio-methane is the same as natural gas, and can be used as a transport fuel in the form of Liquid Natural Gas (LNG) or Compressed Natural Gas (CNG).

Gas is widely used as a transport fuel in many European countries, notably Italy, which boasts 650,000 gas powered vehicles. Sweden is a world leader in upgrading and use of bio-methane for transport, and has many 'biogas vehicles', including private cars, buses, and even a biogas train and a biogas powered touring car team.

Carbon Zero NI is currently liaising with a number of local companies and Belfast City Council to evaluate the potential for biogas production from agricultural livestock manure and municipal waste streams. For further information please contact Dr Lorna Lawrence, Research Lecturer in Energy from Waste, Carbon Zero NI.



Detail from biogas power plant (clean energy production)



○ Schematic of clean port power network



○ Artist's impression of carbon neutral ship

Revolutionary Carbon Neutral Ship To Set Sail In 2012

The development of a revolutionary carbon neutral cargo ship designed by Larne-based B9 Shipping, a subsidiary of B9 Energy Group, has reached an advanced stage with a demonstrator vessel scheduled to come into operation by 2012.

The ship will transport bio material to a number of new UK biomass power stations which are planned to open in the UK in the same year.

Developed in partnership with a broad range of industry partners, including Carbon Zero NI, the ship will be powered by conventional soft sails in a 21st century square rig configuration and Rolls-Royce spark ignition marine engines powered by biogas produced by B9 Organic Energy. The B9 Ship offers improved efficiency in terms of price and environmental performance compared with conventional oil-powered sea going vessels.

B9 Shipping, which was created in response to the emerging carbon-based challenges facing the shipping industry, aims to develop a fleet of vessels to import large quantities of biomass products from the Baltic States and anticipates as many as 50 vessels will be needed to bring the biomass industry into compliance with the Renewable Energy Directive.

Targets established by the Renewable Energy Directive Commitments require 10% of all transport to be fuelled by renewable sources by 2020.

With the International Energy Agency estimating up to 45m tonnes of biomass needed for UK power stations, the deployment of eco-friendly ships ensure the benefits of carbon neutral biomass energy are not denigrated by carbon emitted within the supply chain.

Dr John Harrison from Carbon Zero NI has been working closely with the firm and said the benefits of carbon neutral shipping would be wide-ranging.

"The UK's transition to a low-carbon economy will be a key driver of future economic success and B9 Shipping is making a valuable contribution to this transformation", he said.

"The technology represents an opportunity for shippers to gain from lower and more predictable running costs - ensuring affordable and reliable shipping solutions. Importantly firms will also be able to avoid potential taxes which new legislation is proposing to apply based on carbon emissions generated by shipping."

"It is estimated that almost 90% of everything consumed in the UK is carried by

sea, yet spiralling oil costs in transportation are translating into higher prices at the tills. Efficient transport solutions, such as this, will help lower the cost of things we enjoy and benefit everyone," he said.

B9 Shipping believes that eventually there will be opportunities to replace 10,000 coastal vessels of a similar size which operate throughout the world.

Dr Harrison said the potential to design, develop and build B9 Ships in the UK would create further economic benefits.

"The manufacture of these vessels can breathe new life into regions where the UK ship building industry once thrived, such as the Wear, the Tyne and the Tees areas, by creating new jobs and regeneration. Additionally the potential of lower operating costs will also boost exports."

B9 Energy is also currently exploring the potential to locate Clean Power Networks at ports around the UK. The proposal involves developing a biomass combined heat and power plant in the port area which would be supplied by the B9 Ship with the aim of supplying city businesses and residents with a green and, possibly cheaper, source of heat and electricity.

For further information on Carbon Zero NI please contact enquiries@carbonzeroni.com or call 028 8676 0493

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