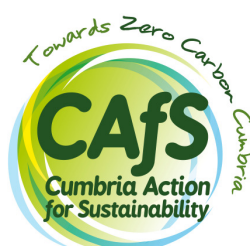


European Rural Energy - Discovering the True Picture

E-Handbook

This E-Handbook is a compilation of the report submitted by each of the **Rural Energy Ambassadors** who took part in the Anglo-German Rural Energy Skills Exchange (AGRESE) visit to Pressel, Germany in January 2013.



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Background

The focus of the project is to help drive Cumbria towards a low carbon society through training of 'rural energy ambassadors', from the Solway Border and Eden area. Nine ambassadors were selected to undergo a week skills gathering from companies that are experienced in manufacturing, installing, monitoring and improving renewable energy systems in Germany. Participants will become rural energy 'ambassadors' for a low-carbon society, disseminating their new skills to advise others, and to develop businesses.

For a long time Germany has been at the forefront of renewable technology and is often cited as the world's most innovative and successful renewable sector. They were one of the first countries to introduce a feed-in tariff as early as 1990 to incentivise the renewables market and currently runs around 25% of its energy from renewable sources (the UK currently sits at around 10%). Solar PV panels is obviously one of the areas where they have led the field, with around 36% of the world's installed capacity currently being in Germany. This has helped to create a substantial green economy in Germany, with every third solar panel and every second wind rotor produced there.

Germany also has a strong green political movement, and the Grüne Party has a long been represented at both federal and national levels. Following the Fukushima incident, for good or ill, the German government has taken the difficult decision to end electricity generation from fossil fuel and nuclear sources by 2022. They are calling this process of transition 'Energiewende'. That is not to say that the situation in Germany is an ideal one. However it will certainly provide rich pickings not only with regards to technological advancements in both innovative models and manufacturing processes, but also in terms of business practices and building businesses viable enough to deal with sometimes volatile government incentive schemes. For example, Germany has also recently cut their Feed-in tariffs for solar PV, an action repeated by the current UK government. Yet it is perhaps fair to say that German PV companies have weathered this storm better than their UK counterparts.

AGRESE Energy Ambassadors



Energy Ambassadors

Janet Addison

Independent Business and Energy Consultant

Janet is a freelance business advisor who works with a wide range of businesses and organisations across Cumbria, including Britain's Energy Coast, Cumbria Chamber of Commerce, the Rural Women's Network and Cumbria Renewables Panel.

Hellen Aitken

Development Officer, ACTion with Communities in Cumbria

Hellen is interested in community-led renewable projects, and how to incentivise communities take up of renewable energy. ACT work with a number of community groups and will deliver a number of workshops to communities in the coming months following the trip.

Michael Bryan

Low Carbon Technical Support Officer, CAfS

Michael's work at CAfS includes advising local communities, business and household in energy efficiency, retrofitting and renewables at a number of events, workshops and programmes run by the charity. Michael's background is in Architectural Technology, and is particularly interested in the integration of renewables into society at a small and large scale.

& Management Team

Paul Carruthers

Plumbing & Renewable Energy Teacher, Lakes College

Paul currently teaches on all forms of renewable energy and working together with teaching staff at Lakes College aims to disseminate all information throughout the colleges curriculum via practical and theoretical training for full time learners, employed learners and NEET learners maximising their career prospects across Cumbria.

Ewen Estill

Managing Director, Love Solar Renewables Ltd

Ewen and his Love Solar team primarily work in Solar PV, but are keen to diversify into other areas including biomass and biodiesel. Ewen is eager to witness how the German PV industry has coped with the challenges of reduced FITs and establish potential trade links. Ewen hopes to pass on information to his staff, his clients and other interested community groups.

Danny Frost

Danny Frost Ltd, Independent Renewable Energy Advisor

Danny currently provides impartial advice to households and communities with regard to biomass, woodland management and whole wood fuel supply chains. Danny also provides consultation and training through a number of organisations such as Cumbria Woodlands and the Energy Coast Business Cluster and will play an active role in the dissemination programme.

Karen Mitchell

Sales & Business Development Manager, Roland Hills Ltd

With over 10 years' experience in heat pump and solar thermal renewables, Karen is keen to expand her knowledge of solar PV, biomass systems and alternative fuels. Karen works closely with local architects and domestic, commercial, industrial and local authorities, and is eager to on energy savings to her customers and local communities

Tim Nicholson

Land Management & Conservation Advisor, Natural England

In his role with Natural England, Tim is keen to expand his own and his colleague's knowledge of biomass and renewables for advising local farmers and agri-environment schemes across the Solway, Border & Eden. Tim is also in the early stages of setting up a wood fuel business.

Michael Watts

Director, Biogas AD Ltd

Michael is joint director of Biogas AD, a consultancy firm recently established to promote and build anaerobic digestion farm plants. The genesis of the company came from first-hand experience of installing a 500kWh AD plant on a local farm, and the interest this generated from other groups in the Cumbria area looking to set up their own. As a member of the Anaerobic Digestion & Biogas Association, Michael is hopeful about promoting AD in the region and further afield.

Management Team

Caroline Turner

Development Manager, CAfS

Caroline looks after the day to day running of CAfS, the organisation responsible for putting together the AGRESE project, and moves CAfS forward through strategic planning and fund raising. She has 10 years experience of delivering environmental projects; a background in waste management and environmental education; and has delivered several local authority contracts.

Malcolm Scott

Project Manager & Carbon Management Consultant

Malcolm has been responsible for the successful funding for the AGRESE Project, planning the content of the visit and the logistical arrangement including travel and accommodation.



Images: (Above) Energy Ambassadors & Management Team (R-L) Tim Nicholson, Michael Watts, Paul Carruthers, Danny Frost, Karen Mitchell, Caroline Turner, Ewen Estill, Malcolm Scott.; (Right) Short Rotation Coppice (SRC) willow plantation.

Day One.

Small & Large Scale Biomass, Anaerobic Digestion & Energy Efficiency in Buildings

Biomass Plant

By Danny Frost

We left the hotel and travelled to our morning destination through woodlands consisting of mixed Scots pine, Birch, ash, oak and beech as well as being home to wild boar and deer. The countryside was dotted with small villages sporting an impressive display of solar thermal installations and PV. There seems to be a commitment to cover roofs, in contrast to the easily connected 4kW systems of England which often neglects to maximise roof capacity. Perhaps there are fewer restrictions on grid connections compared to home. Many houses have large quantities of logs drying outside; 1 in 4 German homes are heated by wood. There is apparently, as reported in a local newspaper, a shortage of logs this year and prices have increased by 90% over the last 7 years. There seems to be a greater awareness of stacking timber in attractive ways to dry it thoroughly to maximise energy yield; skills which have often been lost at home.

The first destination was the agricultural college of Lehr & Versuchsgut which is in many ways very similar to Newton Rigg College in Cumbria. The focus of our visit was to see how the college provides 75-80% of its heat with biomass and electric and heat from a biogas anaerobic digester.

The college has replaced its nine existing fossil fuel boilers with a district heating scheme to meet the surveyed demand of 450kW. 280kW is provided by a wood chip boiler and 80kW from a pellet boiler. Solar thermal is used for hot water in the student block.



The Wood Chip System :

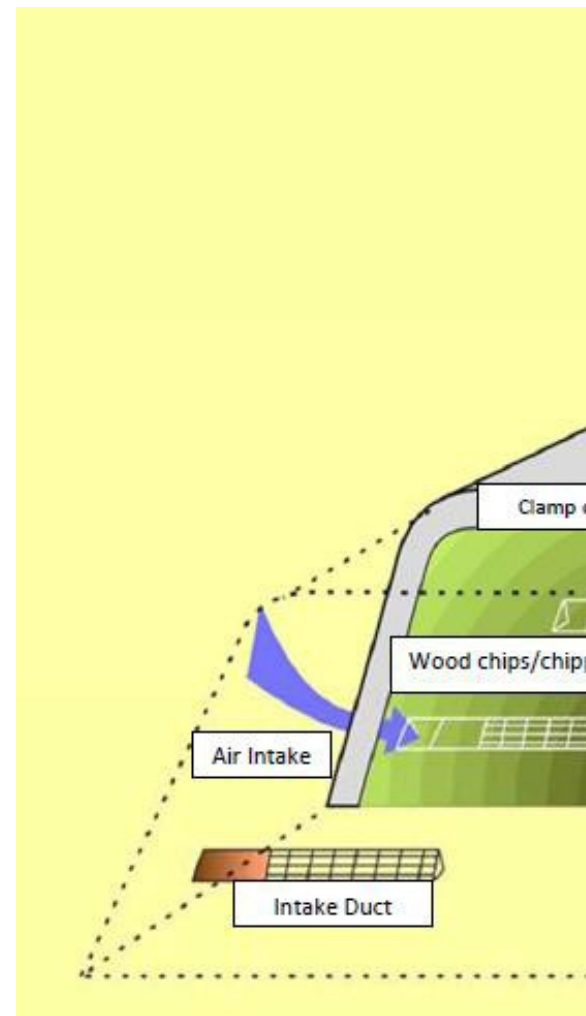
The college grows 10 hectares of short rotation coppice (SRC) willow and poplar which meets 50-75% of demand with the rest being bought in from 200km away! This is harvested on a three year rotation. The original plantation suffered from losses due to insufficient rainfall (500mm/yr as opposed to our 2-3metres).

Planting density was trialled at 700/hct and 1200/hct; the lower density was more successful. Productivity is between 8-12t/hct on a three year rotation, or 5 dry tonnes per hectare. Research is underway to assess the embodied energy in the crop. No fertilisers or pesticides have been used on the crop.

The chip is harvested with a modified forage harvester and chipped wet in one operation. It only takes about 4 hours to harvest the annual crop. The harvesting method seems to give a variable size chip and some bits are perhaps too large and may cause problems in a boiler chip feed system.

The chip is then dried using an innovative passive air drying system which could be very appropriately applied to chip systems in England; current thinking in England would suggest that chip cannot be dried from wet in a heap. The chip is kept in a silage clamp and a system of grills and pipes are used to draw air through the pile. As it heats up a natural draft is created accelerating this drying process. The chip is covered with a breathable fleece and in a winter, black plastic on top of the fleece.

Stored chip is monitored with a temperature probe so that overheating and possible combustion can be controlled.



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