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Towards a Sustainable Cumbria

A consultation on an energy strategy based on renewable resources

by Pete Roche

June 2013

West Cumbria & North Lakes Friends of the Earth

For more than 40 years we've seen that the wellbeing of people and planet go hand in hand – and it's been the inspiration for our campaigns. Together with thousands of people like you we've secured safer food and water, defended wildlife and natural habitats, championed the move to clean energy and acted to keep our climate stable. Be a Friend of the Earth – see things differently.

Acknowledgement

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Foreword

This paper sets out to challenge the idea that the nuclear industry offers the only means for sustaining and developing the West Cumbrian economy.

It is linked to Friends of the Earth's national Clean British Energy Campaign, and is part of our own local campaign for the safe storage of nuclear waste. It follows on from our March 2013 Briefing 'Towards a Safer Cumbria', also by Pete Roche, which shows how the government, regulators and Nuclear Decommissioning Authority have neglected nuclear waste in Cumbria.

It is not a 'report' in the usual sense. Instead it is a 'work-in-progress' and invites comments from anyone and any institution interested in Cumbria's future. It poses a series of questions at the end. All ideas are welcome, and when we have received responses we will produce a final report. But we hope the process will not stop there. We believe it should be the start of a county-wide conversation about the future of one of the most beautiful places in the country.

We are extremely grateful to Pete Roche for producing the paper for us, and for his willingness to help us make what we feel is a constructive contribution to the debate over renewable energy, nuclear power, nuclear waste, and the future of Cumbria.

Please get involved !

Dr Ruth Balogh

Nuclear issues campaigner

West Cumbria & North Lakes Friends of the Earth

Introduction

In this paper it is argued that the widely held assumption that new nuclear developments are the only way to provide enough jobs in West Cumbria in the coming years is incorrect. And it further argues that there is ample scope for West Cumbria to grow and develop a clean, green economy built on principles of sustainability instead.

Although West Cumbria is where the nuclear industry is located in Cumbria, its impacts on the wider Cumbrian economy are recognised across the county as a whole. For example, at the 'Cumbria 2012 and Beyond' conference in November 2012, Carlisle MP John Stevenson talked about how "*Construction of a new nuclear plant [at Sellafield] would give a once-in-a-lifetime opportunity to transform our county, providing growth right across Cumbria*"¹.

The Labour MP for Copelandⁱ Jamie Reed is wholly supportive of new nuclear developments and goes so far as to say "*there is no Plan B for the West Cumbrian economy without nuclear support*"². He was speaking in at a 'fringe' meeting during the October 2012 Labour Party Conference sponsored by Britain's Energy Coast and Nuclear Management Partners. Plan A is the West Cumbria Economic Blueprint³ put forward by Britain's Energy Coast - a public/private partnership made up of local authorities and nuclear groups in the area. This estimated the possibility of generating a further 3,000 jobs over the next 15 years. Reed says Cumbria's plans "*need to include three new nuclear reactors (on land just north of Sellafield at Moorside), a new Mox facility at Sellafield, and an underground repository*"⁴.

In a recent Britain's Energy Coast newsletter, Copeland Borough Council Leader, Elaine Woodburn says she is hoping for a new plutonium fuel fabrication plant, which she calls Mox 2, to be built at Sellafield and she certainly wants new reactors to be built. While she admits that Copeland shouldn't be "*putting all our eggs in one basket*" she sees future economic development coming on the back of more nuclear investment and maximising the opportunities this will present⁵.

But the prospects for new nuclear reactors at Sellafield are not encouraging. A company called NuGen, which is owned by the French company GDF Suez and the Spanish company Iberdrola, is currently planning to build up to 3.6GW of new nuclear capacity on a site called Moorside, which is immediately adjacent to Sellafield. Despite denials to the contrary, *the Sunday Times* continues to insist that the NuGen consortium has disintegrated because the Spanish utility, Iberdrola, has pulled out⁶. Industry insiders are, in fact, reported to be more concerned that Iberdrola's partner, GDF Suez, might eventually be the one which chooses not to proceed with NuGen⁷. Most recently *The Times* reported that Iberdrola is close to appointing an investment bank to advise on its exit from NuGen, and may sell its share to Toshiba⁸. There appears to be some serious doubt about whether the Moorside project will ever go ahead, and in any case an investment decision isn't expected until 2015.

Cumbria County Council's decision to pull out of the search for a nuclear repository site was unanimously upheld at a meeting of the Council scrutiny committee on 19th February 2013⁹. Councillor Stewart Young, Leader of the Council's Labour Group (and leader of the Council since May 2013) argued among other things that a repository would not in fact bring many

ⁱ The Copeland constituency includes all of the Copeland Borough Council area, but also four wards from Allerdale including Keswick.

jobs. The Nuclear Decommissioning Authority (NDA) estimates that the average annual employment over 140 years of operation until closure would be 555¹⁰.

As to the building of a new MOX plant at Sellafield, the NDA is clearly in no hurry to do this, and the question of what to do with the UK's plutonium stocks held at Sellafield is still under review. NDA spokesperson Adrian Simper recently told the BBC "*we don't have any reactors that we could sell it to ... that's why we're not proposing that we start building a MoX Plant this afternoon ... only when new reactors are becoming available and the marketplace has confidence in new nuclear build will there be the opportunity to have the conversations about the use of MoX fuel*"¹¹.

The nuclear basket is beginning to look like a pretty uncertain place to be putting Cumbria's eggs. If Cumbria is dependent for its future economic well-being on the nuclear industry, the County could be heading for a very bleak future. Since some of Cumbria's leading politicians seem to be abdicating their responsibility by not considering alternative economic pathways, West Cumbria and North Lakes Friends of the Earth commissioned this report to begin sketching out what a Plan B might look like. We think this provides an inspiring vision of a sustainable economic policy for the future of Cumbria.

Despite the politicians focus on nuclear development, the precursor body to Britain's Energy Coast - Cumbria Vision published a report in 2009 called "*The Scope for Renewable Energy in Cumbria*". This envisioned the creation of up to 5,000 jobs by 2020 and almost 8,000 by 2050 from developing renewable energy¹².

The Cumbria Vision report highlighted the fact that Cumbria is a national centre of expertise in small-scale hydro-power and has local enterprises able to build and maintain small-scale wind energy installations, solar systems and heat pumps. The county also has major potential for anaerobic digestion of farm and food wastes and for wood-burning boilers, supplied by the large tracts of woodland that are currently scarcely managed or not managed at all. The Study concludes that by 2020 the county could be producing enough renewable energy to match the demand of its population. By 2050 it should be a significant exporter of renewable energy. And this can be achieved without damaging Cumbria's magnificent landscapes or harming its important tourist industry.

This was followed in August 2011 by a report by sustainable economic and social development consultants, SQW, for Cumbrian local authorities called "*Cumbria Renewable Energy and Capacity Deployment Study*"¹³. The study involved a detailed assessment of the resources available for generating renewable energy by 2030.

The SQW assessment shows a total potential onshore resource of 4,542MW by 2030, (See Table 2) of which commercial onshore wind provides the largest proportion at 62% followed by microgeneration at 30% (which in this case means solar photovoltaics, solar water heating and ground, air and water-source heat pumps.) SQW then goes on to look at the realistically deployable capacity by 2030. Firstly it uses a reduced ceiling of 1,623MW for commercial onshore wind to take into account the landscape's capacity. Taking this and other constraints into account SQW concludes that Cumbria has a deployable onshore renewable energy resource of 606MW by 2030 – which is comparable with the sort of numbers given in the Cumbria Vision report for onshore renewables in 2050. This capacity

has the potential to generate around 1,861GWh of energy compared with an estimated energy demand of 18,000GWh in 2007 and between 14,000 and 18,000GWh in 2030.

	2010	Jobs	2020	Jobs	2050	Jobs
Onshore Wind	115MW	57	250MW	112	400MW	80
Offshore Wind	240MW	96	2000MW	720	2400MW to 3500MW	384 to 560
Hydro	3MW	150	6MW	270	10MW	200
Tidal	0	0	150MW	135	250MW to 300MW	100 to 120
Wave	0	0	0 to 25MW	0 to 2	0 to 500MW	0 to 20
Solar (PV and thermal)	<1MW	25	20MW	594	40MW to 100MW	528 to 1,320
Geothermal (includes GSHP & ASHP)	0.5MW	200	5MW	1,800	50MW to 520MW	2,000 to 4,160
Landfill/Sewage	10MW	190	25MW	427	25MW	190
Farm wastes	2MW	42	20MW	378	50MW	420
Wood	10MW	200	10MW to 40MW	180 to 720	20MW to 60MW	160 to 480
Totals	381.5MW	960	2486MW to 2541MW	4,616 to 5,158	3245MW to 5465MW	4,262 to 7,550

Table 1. “The Scope for Renewable Energy” Cumbria Vision 2009.

Technology Group	MW
Wind (Onshore)	2885.6
Biomass	212
Hydro	69.7
Microgeneration	1374.7
Total	4542

Table 2: Potential Technical Renewable Energy Resource Capacity in Cumbria by 2030 (SQW Report)

SQW also concludes that Cumbria will need to significantly increase its currently level of renewable deployment (295MW) if it is to reach 606MW by 2030. It says microgeneration represents an exciting opportunity in terms of jobs and economic development; and continued deployment of commercial wind is likely to be required.

This new sustainable energy plan for Cumbria draws not only on some of this earlier work done by Cumbria Vision, and SQW, but also lots of other sources. It casts the net more widely than just energy, to set out not just a list of alternative options to a nuclear future for Cumbria, but a better alternative – one that doesn’t involve producing yet more nuclear waste, which after sixty years of nuclear development the industry still doesn’t know what to

do with. It is an alternative future which is better at tackling climate change; better at creating jobs and better at tackling fuel poverty.

One compelling model of such a future is being worked out in Germany, where nuclear power is being phased out and renewables are gradually taking over. The country is in the process of completely transforming its energy sector at a pace unmatched by other industrialized nations¹⁴. Ulrich Beck, German Professor of Sociology and member of the special expert commission appointed by Chancellor Merkel in the wake of the Fukushima disaster, says Germans sense the economic opportunities of their Energy Transition. To them “energy revolution” is spelled j-o-b-s. *“Supporters of nuclear energy block their own access to the markets of the future because they are not investing in energy-saving products, renewable energy, “green” professional training, and research institutes”*¹⁵.

Catherine Mitchell, Professor of Energy Policy at Exeter University says Germany’s energy transition or *energiewende* is unlocking the next stage of the sustainable energy transition:

*“We cannot know what that ‘new’ system will be but all the evidence points to smaller, nimbler, more integrated approach to energy provision. It may take a decade. It may take 40 years but without doubt the future is some system more related to the German *energiewende* than it is to that of Britain’s electricity market reform”*¹⁶

But we don’t have to go to Germany to find a sustainable vision for Cumbria. This report draws inspiration from Local Authorities, Community Energy Projects and others around the UK. From Energy Co-operatives in Bath, Bristol, Sheffield, and Brixton; to solar schemes for social housing in Wrexham and Birmingham; district heating schemes in Dundee and Aberdeen, and innovative plans to establish Glasgow as a centre of excellence in the development of sustainable energy technologies.

Before outlining the alternative, we need to examine what the nuclear industry consists of in Cumbria, and future employment projections for existing plant and decommissioning.

The nuclear industry in Cumbria

Sellafield is the largest industrial site in the UK¹⁷. It is a large and complex nuclear chemical facility located in West Cumbria which has played a pivotal role within the nuclear industry since the 1940s and is now essentially a nuclear waste plant. Currently site operations include waste spent fuel reprocessing, storage of radioactive waste, including spent waste fuel and storage of plutonium¹⁸. An enormous amount of public money—some £1.6 billion—is spent at Sellafield each year¹⁹.

The nuclear facilities on the Sellafield site include:

- Calder Hall - the world's first commercial nuclear power station. It started generating electricity in 1956 and ceased in 2003. Since then no nuclear electricity has been generated on the site. Defuelling of these reactors is expected to be completed in 2014 with the site entering a care and maintenance phase in 2024.
- Two Windscale pile reactors, used to generate plutonium for the UK’s nuclear weapons programme which were shut down in 1957 after a fire in one of the reactors.

These reactors are expected to enter a care and maintenance phase in 2030 with fuel and isotopes removed.

- The Windscale Advanced Gas-cooled Reactor (WAGR) operated between 1961 and 1981. The reactor within the WAGR has already been decommissioned.
- The Magnox Reprocessing Plant, B205, which opened in 1964, is used to reprocess waste fuel from Britain's oldest reactors, known as Magnox reactors. Most of these have now closed. Reactor 1 at Wylfa is the last remaining operating Magnox reactor. It is expected to close on 30th September 2014. The NDA expects the Magnox reprocessing plant to complete the reprocessing of waste spent fuel from these reactors anytime between 2017 and 2028 depending on how well it operates²⁰.
- A second reprocessing plant - THORP – the Thermal Oxide Reprocessing Plant opened in 1994 to reprocess spent fuel from the UK's newer Advanced Gas-cooled Reactors (AGRs) and overseas Light Water Reactors. This plant is expected to close in 2018.
- Sellafield MOX plant – This plant was built to convert foreign owned plutonium, separated from spent fuel during reprocessing at Sellafield, into a fuel, known as Mixed Oxide Fuel or MOX, which can be used as a fuel in some nuclear reactors. The Plant, which began operating in 2002, cost the taxpayer £1.3 billion to build and run. It was designed to produce 120 tonnes of MOX fuel each year, but was beset by technical problems and managed only 13.8 tonnes in its entire lifetime. It was closed in August 2011²¹.

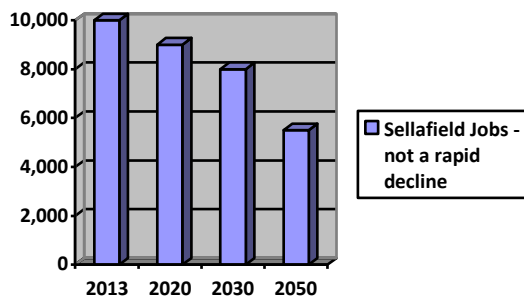
The vitrification (solidifying in glass blocks) of the liquid high level waste (HLW) stored on site is expected to be complete by 2021. The NDA says it expects to start transferring Intermediate Level Waste (ILW) to a Geological Disposal Facility (GDF) in 2040, with HLW following in 2075.

Final site clearance is expected to take place in 2120, over one hundred years from now. So, there are going to be jobs at Sellafield for a while yet, but the profile will be one of reducing employment over the next century.

Cumbria had a population of 499,900 according to the 2011 census²² with 368,880 people economically active²³. The Sellafield site employs over 10,000 people and, of course, will support other jobs in the local supply chain. So Sellafield employs about 2.7% of the economically active population of Cumbria.

As the main focus of activity at Sellafield began to change from reprocessing to decommissioning, it was feared that thousands of jobs would be lost in the West Cumbrian economy. However, the 2011 Sellafield Plan envisages an acceleration of decommissioning and the maintenance of relatively high employment levels. This will allow Cumbria more time to adjust and invest in retraining and re-skilling of the workforce²⁴. According to Britain's Energy Coast, without nuclear new build the number of jobs in the nuclear industry will fall by 1,800 by 2027²⁵. The Sellafield Plan shows that in 2020 there could still be between 8 - 10,000 working on site and by 2030 between 7– 9,000. This is not a rapid fall off in numbers at all. Indeed there are still likely to be 5 - 6,000 working on site in 2050²⁶. There is clearly

going to be some uncertainty over future numbers employed because it depends partly on political whim. Despite the current Government's austerity measures, the publication of a highly critical National Audit Office (NAO) report on Sellafield in November 2012, has prompted the NDA to announce that it would recruit 500 extra workers to help grapple with some of the most hazardous parts of the site²⁷. A further 142 jobs were announced in March 2013²⁸.



Nuclear Influence in Cumbria

Under the Energy Act 2004, the NDA is expected to give “*encouragement and other support to activities that benefit the social and economic life of communities living near*” its nuclear sites. Doubts have been expressed about whether this type of funding is good for the community and good for the economy. There is already a feeling of dependency on the industry for well-paid jobs and training, but there is also a feeling that many local social facilities and events would be unviable without sponsorship by the NDA and Sellafield. There is a sense of unease at this comprehensive dependency on the nuclear industry, not just for jobs, but as the provider of social existence and identity²⁹.

During 2011/12 the NDA made grants totalling £7m across the UK in accordance with its socio-economic remit. In Cumbria, the Sellafield Ltd Socio-Economic Development Plan focuses on “*the comparative advantages afforded by the nuclear sector [to] provide a springboard to regenerate the area*”. Over recent years the NDA and Sellafield Ltd have concentrated on the delivery of the Energy Coast Masterplan, which says the prospects of developing the nuclear industry in Cumbria have significantly improved since the launch of the Masterplan in July 2008. In 2009/10 £1.5m was given to the West Cumbria Development Fund and almost £0.5m to West Lakes Renaissance³⁰.

Britain's Energy Coast (BEC), the West Cumbrian economic development organisation, receives funding from the NDA, Sellafield Ltd and Nuclear Management Partners³¹. In September 2012, the NDA's socio economic programme gave a grant of £1m to BEC, which then enabled it to secure a grant of £5.6m from the Government's Regional Growth Fund. This allowed BEC to offer grants to businesses of any size, including start-ups for investment in fixed assets such as land, buildings, plant and equipment as well as Research and Development. The programme is targeted at businesses involved in manufacturing, processing, engineering and fabrication activities with special emphasis on businesses in West Cumbria's nuclear and renewable energy supply chain, and tourism attractions³². In February 2013 BEC chief executive Steven Szostak revealed that just one company had

been given money from fund – a grant of £45,000. He made an impassioned plea to a meeting of the Britain’s Energy Coast Business Cluster for more people to come forward and claim the money or it could be lost³³.

Other controversial funding decisions included a three year funding package for Cottage Hospitals³⁴; funding for the lighthouse community centre in Haverigg³⁵, there was even a suggestion in 2007 that a council staff position could be partly funded by the NDA³⁶.

No-one wants to look a ‘gift horse in the mouth’, but if this funding is fostering a nuclear dependency and stifling innovation and the development of alternative strategies, then we need to question whether it is the best way of funding regeneration in Cumbria.

Towards a Sustainable Cumbria

The Sustainable Development Commission, (closed down by the Government on 31st March 2011) defined sustainable development as

*“...development that meets the needs of the present, without compromising the ability of future generations to meet their own needs”.*³⁷

This means, for example, not producing waste which we don't know how to 'dispose' of, which may pose a risk for future generations. It means not damaging the climate by continuing to release large quantities of carbon dioxide into the atmosphere, and it means using the resources we have in the most efficient way we can so that there are still resources available for use by future generations. But it is also about ensuring a strong, healthy and just society. This means meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity.

So, rather than relying on new nuclear facilities, which will produce yet more nuclear waste, to provide future employment opportunities in Cumbria we should be looking for developments which can use the County's natural and renewable resources as efficiently as possible and which can contribute to the area's wellbeing in perpetuity, rather than increasing the county's stock of nuclear facilities whose lifespan can be measured in only a few decades but which leave a legacy which requires careful stewardship for centuries afterwards.

Energy Efficiency

There are several reasons why energy efficiency should be central to any Plan B for Cumbria:

- cost effectiveness
- meeting climate change objectives
- tackling fuel poverty in Cumbria
- macroeconomic benefits

1. Cost Effectiveness

Firstly, energy efficiency is probably the most cost-effective way of satisfying the demand for energy services compared with other measures such as building new power stations. This is advocated by Secretary of State for Energy and Climate Change, Ed Davey, who said *“...measures that reduce demand can contribute in a more cost-effective way to meeting our energy and climate goals than supply-side measures.”* The Government's own Energy Efficiency Strategy estimates that the equivalent of 22 power stations could be saved with socially cost-effective investment in energy efficiency³⁸. A Draft Report for the Department of Energy and Climate Change (DECC) by McKinsey estimates that up to 40% of electricity demand could be saved by 2030. Most of these energy savings would also mean an overall financial as well, even before considering the reduction in carbon emissions³⁹. Measures could include: replacement of incandescent light bulbs with compact

fluorescents; replacing consumer electronic equipment and white goods with more efficient appliances; and retrofitting buildings to reduce consumption for heating purposes.

2. Meeting Climate Change Objectives

Secondly, energy efficiency could help meet the UK's climate change objectives. Our homes are responsible for 27% of UK carbon emissions. Most of the dwellings standing today will still be in use in 2050 (25 million out of 25.8 million across the UK.) In order to achieve an 80% cut in carbon dioxide emissions in the UK by 2050, we are going to have to cut emissions from the domestic sector by around 80%. To do this every home will need to have excellent insulation and some form of low and zero carbon technology (LZCT). This might mean installing some sort of small-scale renewables like solar panels or a small wind turbine, or installing a ground-source or air-source heat pump which can transfer heat from the ground or air into a building to provide space heating in a similar way to the way a fridge works. Or it could mean replacing a central heating boiler with a micro combined heat and power (micro-CHP) boiler which can generate electricity as well as provide hot water. (These technologies are together known as microgeneration). Alternatively homes could be connected to a district heating network which provides hot water to a group of buildings through a network of pipes from a central boiler which usually generates electricity as well.⁴⁰

Prime Minister, David Cameron, wants “to make Britain the most energy efficient country in Europe”⁴¹. Yet the Government's National Policy Statement on Energy foresees a need for a doubling or even tripling of total installed electricity generating capacity by 2050 because of an increased demand for electricity in the transport and domestic heating sectors⁴². Yet Germany, which is planning an entirely non-nuclear route with the same 2050 objective of an 80% reduction in greenhouse gases, expects electricity demand to be 25% below present levels by implementing an energy efficiency programme⁴³. The UK Government relies on a model called the ‘Pathways Analysis’ to reach its conclusion that electricity demand will double. But this consists of various scenarios for 2050, some of which are quite pessimistic. For example none of them look at the possibility that more than 1 in 3 homes might install basic energy-saving measures like solid wall insulation. Similarly, it is assumed that the commercial sector can only improve its energy efficiency by just 20% over the next 40 years – an aim so much below what has been achieved historically as to be inexplicable⁴⁴.

On the other hand, Cumbria could choose to emulate Europe's most successful economy. Germany's plan is to be partly achieved by renovating 2% of the total building stock every year. The minimum efficiency standards for buildings will be gradually raised and a long-term modernisation plan developed for the existing stock of buildings. Overall, primary energy demand from buildings should fall 80% by 2050. But as well as tightening up regulations the Government will also enhance the economic incentives for energy efficiency modernisation. Since 2001 loans have helped insulate and seal over 2m homes, employing 200,000 people a year in the process. The key is very low interest rates, currently 1-2%, compared with the UK's Green Deal which charges around 7%. In the UK Green Deal loans of up to £10,000 are available. German home-owners can borrow up to €75,000 – enough to provide a very cosy and efficient home often including some domestic low-carbon power generation. In the German scheme, the higher the aim, the better the deal. For the most efficient homes –

Passivhaus standardⁱⁱ - the householder gets up to 12.5% of the loan handed back to them. Householders who don't like loans can get grants of up to 20% of the cost. It all adds up to a massive commitment to energy efficiency⁴⁵. In Germany around 40% of homes are owner occupied, 35% are rented from small landlords, and around 25% are rented from larger commercial landlords. Private landlords include various non-profit making companies and homeowners associations. All these bodies are eligible to apply for loans⁴⁶.

3. Tackling Fuel Poverty in Cumbria

Thirdly energy efficiency is one of the few effective ways to tackle fuel poverty – something the Government has committed itself to eliminate by 2016. Statistics published by the Department of Energy and Climate Change (DECC) show the total number of households suffering from fuel povertyⁱⁱⁱ in the UK in 2010 was 4.75 million, with 3.5 million of those in England. Of this 3.5 million, 3 million were defined as vulnerable⁴⁷. The Government has a statutory duty under the Warm Homes and Conservation Act 2000 to eradicate fuel poverty in England by 2016 as far as is reasonably practical. It also had an interim target to eliminate fuel poverty among vulnerable low income households (pensioners, disabled people and families with children) by 2010. It has clearly failed to meet this, yet it says it still intends to meet the 2016 target⁴⁸.

Current Government policies, such as the Green Deal and the Energy Company Obligation are expected to remove between 125,000 – 250,000 households from fuel poverty by 2023. At best, this represents only 5% of the current number of fuel poor households⁴⁹.

All districts in Cumbria have a higher proportion of households living in fuel poverty than the UK average^{iv}. Parts of Barrow (Barrow Island, Hindpool and Central) and the Eden Valley (Crosby Ravensworth, Askham and Hesket) have some of the worst affected areas in the UK⁵⁰. According to Cumbria County Council more than 61,161 households in Cumbria were living in fuel poverty in 2011 or around 28% of the total number of households in the county. This is a 130% increase since 2005⁵¹. There are estimated to be around 300 cold related deaths in Cumbria each winter as a result. Fuel poverty is particularly bad in rural areas where properties are older, unsuitable for cavity wall insulation, off the gas mains network and reliant on oil, solid fuel or electricity for heating. The cost of heating a rural home off the gas mains is much higher than heating a home with mains connection. In cold weather, a third of people living on a low income will cut back on food and two thirds will cut back on heating. This has a direct impact on people's well-being⁵².

The permanent solution to fuel poverty would be to ensure that all homes are so energy efficient that they are 'fuel poverty proof'. In practical terms this means:

- Improving the energy efficiency of homes - reducing heat loss by improving insulation;

ⁱⁱ Meaning the heating requirement in a Passivhaus is reduced to the point where a traditional heating system is no longer considered essential <http://www.passivhaus.org.uk/standard.jsp?id=122>

ⁱⁱⁱ Defined as households that need to spend more than 10% of their income to maintain an adequate level of heating.

^{iv} Read some of the Case Studies here: <http://www.cumbriafoundation.org/winter-warmth-fund/case-studies>

- Installing energy efficient heating systems and ensuring that they are used effectively;
- Using the most energy efficient appliances, lighting and electrical equipment.

The operation of such schemes is analysed in the next section.

4. Macroeconomic Benefits

Finally, spending on improving energy efficiency, particularly in fuel poor households, provides macroeconomic benefits, by stimulating the economy with increased spending by those who are spending more than they should on heating, and by creating jobs in the energy efficiency industry. A comprehensive energy efficiency programme for Cumbria could be a particularly effective way to stimulate employment in the places where it is needed most, and to employ people who have the greatest trouble in finding jobs. In terms of direct employment, the energy efficiency in buildings sector is labour intensive, engaging many small, geographically dispersed installation companies. Many of the jobs created would be in manual occupations in areas of high unemployment. Where schemes are designed to include quality training, skill levels for the workers involved can be increased. Furthermore, lower fuel bills mean more money to spend on non-energy items⁵³.

A Report by Cambridge Econometrics & Verco for the statutory consumer protection organisation Consumer Focus, shows that there are clear benefits from spending revenues expected to be raised by the Government from various carbon taxes on improving energy efficiency in fuel poor households. Around £63 billion will be raised from electricity consumers between 2012 and 2027 via the EU Emissions Trading Scheme and the Carbon Floor Price mechanism. If the revenue from these new carbon taxes is invested in energy efficiency programmes it could create up to 71,000 jobs by 2015 in the UK and up to 130,000 jobs by 2027⁵⁴.

Crucially, the results suggest that investing in such a programme generates greater macroeconomic benefits – more jobs and greater growth – than the same injection of spending through other Government spending programmes or cuts in VAT or fuel duty.

Investment in energy efficiency means there is less spending on natural gas imports. If households spend less on energy imports, they are able to spend more on other products and services, which are in part supplied domestically. Energy security is also improved.

An Energy Efficiency Programme for Cumbria

If an energy efficiency programme similar to the one proposed in the Consumer Focus report mentioned above were implemented in Cumbria - assuming the jobs are spread proportionately across the UK - this could mean almost 600 new jobs in Cumbria by 2015 and over 1,000 by 2027.

‘Staple’ energy efficiency measures

The simpler or ‘staple’ energy efficiency measures include loft and cavity wall insulation, and the installation of new boilers and central heating controls. Installing these simple measures can make a big difference to the thermal efficiency of a house. Yet according to UK

Government statistics, in January 2012 only 60% of households with lofts had insulation of at least 125mm and only 59% of homes with a cavity wall had insulation⁵⁵.

The Cumbria housing condition survey published in September 2012⁵⁶ estimates the cost of completing the installation of the simpler measures in all suitable properties in Cumbria at £84.5m.

BOX 1 Birmingham City Council has partnered with Carillion Energy Services to form Birmingham Energy Savers. The £3 million partnership is still in development but it expects to create up to 360 new jobs. By the time the scheme was officially launched on 1st February 2013 it had received over 1150 calls and completed over 200 energy assessments. Carillion expects 60,000 households across the city to receive energy and carbon efficiency improvements. Carillion doesn't get a fee from Birmingham City Council – it has to make its own money. But through Birmingham Energy Savers the Council has lent its brand to Carillion. Carillion is trying to use the community to create a momentum. The company has also made a commitment to use local labour and local small businesses. It is committed to keeping 90p of every pound spent within Birmingham. Swinney says this isn't just about energy, it is also about helping to kick start the economy and generate local wealth and local economic regeneration. Carillion has engaged with over 200 businesses in Birmingham.

See <http://www.birminghamenergysavers.org.uk/index.html>

Carillion 30th January 2013 <http://www.carillionplc.com/news-media/news/2013/birmingham-energy-savers-gets-official-launch.aspx>

Watch John Swinney talking at the Eco Build 2013 Conference. <http://www.stnlive.info/talks/green-deal-or-no-deal.aspx>

BOX 2 In Manchester the community based Carbon Co-op, and urban design co-op, URBED, launched their 'Community Green Deal' project in September 2012. The project worked as a test for the Government's Green Deal energy efficiency scheme and works in association with the Greater Manchester Authority. Carbon Co-op have received £250,000 of funding from DECC for their pilot programme. The ten local authorities in Greater Manchester are now working together through a partnership approach with the Greater Manchester Energy Advice Service (GMEAS) in readiness for a 'GM' Green Deal offer due to be available in early January 2014.

Co-operative News 1st October 2012 <http://www.thenews.coop/node/10135>

See <http://manchesterismyplanet.com/green-deal-and-eco>

Recommendation 1: Local Authorities in Cumbria need to build on the progress already made with the Cumbria Warm Homes Project⁵⁷ by completing the so-called staple energy efficiency measures - loft and cavity wall insulation, installation of new boilers and central heating controls –as soon as possible. Funding could be provided from the Energy Company Obligation and the Government's carbon tax revenues⁵⁸.

Recommendation 2: Parish Councils and community groups could work together with Cumbrian local authorities to ensure that Cumbria is getting all the grants it is entitled to complete basic insulation measures. Every extra loft insulated or cavity wall insulated means more money stays in the area to boost the local economy, rather than going outside of Cumbria to one of the Big 6 utilities. Resistance to accepting free insulation offers in the past was quite possibly due to a suspicion of large companies. Locally organised projects are ideally placed to build up more trust locally and overcome this resistance.

Solid Wall Insulation

Uninsulated solid brick walls are the poorest performing wall type in the English housing stock. For an individual typical solid wall mid terrace house, solid wall insulation is the single most significant building fabric improvement. When used with roof insulation, reduction in heat losses of over a third can be made⁵⁹. Insulation can be added externally or internally to walls, whichever is most appropriate. This type of insulation is still unfamiliar to most people. The best way to understand how it's done is to watch a video.

BOX 3. Stroud's Eco-Renovation Open Homes weekend organised by Transition Stroud showcases **internal wall insulation**: <http://www.youtube.com/watch?v=k5zKI03kZDc>

Bristol Green Doors video report on its **external wall insulation** project: <http://www.youtube.com/watch?v=Oj2DgdT1vyE>

The housing condition survey for Cumbria doesn't attempt to quantify the cost of solid wall insulation in pre-1919 terraced houses, but it says that of the 238,700 domestic residential dwellings in Cumbria, 34% or 81,158 are terraced houses. Solid wall insulation can be quite expensive – the Energy Saving Trust gives a figure of £5,500 to £8,500 for internal wall insulation and £9,400 to £13,000 for external wall insulation⁶⁰.

In England as a whole 3.5m houses will require solid wall insulation during the 2020s⁶¹. The Committee on Climate Change in their 2009 Report, '*Meeting Carbon Budgets – the need for a step change*' recommended that 2.3million solid wall homes will need solid wall insulation by 2022 in order for the UK to be on track to achieve carbon budgets⁶². If a similar proportion of Cumbrian homes are treated this means around 21,000 houses should receive some form of solid wall insulation by 2022 – that means around 2,333 houses per year.

BOX 4: Doncaster Council has awarded a contract to Anesco to manage the installation of external wall insulation in 100 privately-owned 'priority group' homes. The upgrades will be completed at no cost to homeowners or the local authority, with funding being provided through the national Priority Group Flex (PGF) scheme. PGF funding is available to low income private sector households where the occupier is in receipt of certain benefits. The upgrades to the Doncaster homes are expected to bring annual savings for residents of around £475 per year, helping to lift many households out of fuel poverty. Anesco 7th November 2012 <http://www.anesco.co.uk/site/en/news-folder/anesco-secures-second-contract-from-doncaster-council>

BOX 5: Hull's dramatic facelift for 200 terraced houses: Some of the oldest and most rundown housing in the city is undergoing a dramatic facelift. Just over 200 Victorian terraced homes in west Hull are having external solid wall insulation installed. The facelift work is being carried out by Hull

City Council with a mix of local and national government funding, even though the properties are still privately owned. Hull Daily Mail 19th October 2012 <http://www.thisishullandeastriding.co.uk/Dramatic-facelift-200-rundown-homes-Hull-s/story-17060676-detail/story.html>

BOX 6 Bristol Tackling the Terrace: Bristol Green Doors, a Community Interest Company, was awarded a grant of £78,000 from the Department of Energy and Climate Change's (DECC) Local Energy Assessment Fund (Leaf) in January 2012. The fund has allocated £10million to community based schemes across the UK that actively promote energy reduction or renewable energy production. The "Tackling the Terrace" Project involved fitting a micro-terrace in the St Andrews area of Bristol with external wall insulation. The terrace comprises four houses, 3 of which are owner-occupied, whilst the fourth is divided into 3 privately rented flats. This project was probably the first of its kind in the country, where individual property owners worked together to install external insulation to make their homes more thermally efficient.

See <http://www.bristolgreendoors.org/news-item/tackling-terrace> and <http://www.bristolgreendoors.org/blog/the-terrace>

Watch this video: <http://www.youtube.com/watch?v=4lZYWwglOZM>

Recommendation 3: Cumbria County Council could work together with the Borough Councils to implement a solid wall insulation programme. Funding could be provided from the Energy Company Obligation and the Government's carbon tax revenues. A co-ordinated programme would make it easier and cheaper to install external wall insulation along whole streets of Victorian terraced houses at the same time.

Recommendation 4: Cumbria Community Groups concerned about fuel poverty could establish a fuel poverty forum which would investigate the feasibility of establishing a community co-operative to carry out insulation work and establish a solid wall insulation installation service.

Electrical Appliances

UK households could save millions of pounds a year if they all switched to the most energy efficient appliances, according to a report from charity Global Action Plan (GAP)⁶³. Large appliances, such as washing machines and fridges, account for 42% of household electricity use. But we're not always buying the most energy efficient appliances, which could save us hundreds over the lifetime of an appliance. For instance, if all the consumers who bought an A rated fridge freezer in 2011 had bought an A+++ rated one instead, there would be a collective saving of £24 million a year, and £16m if they had bought an A+++ washing machine instead of an A-rated appliance. If the savings were spread proportionately across the UK this would mean an extra £320,000 retained within the Cumbria economy. The Which? fridge freezers energy costs calculator⁶⁴ reveals that the best annual running cost for a fridge freezer is £15 and the worst is £76, that's a potential £610 saved over ten years.

Recommendation 5. Cumbria County Council Trading Standards to encourage appliance retailers to properly label electrical appliances with information about electricity consumption. Cumbria local authorities and community groups could investigate the possibility of establishing a project to give A+++ fridge freezers free of charge to householders living in fuel poverty. SSE ran a free A rated appliance scheme for vulnerable customers between 2011 and 2013 spending around £2.5m per year⁶⁵. Community Projects, such as the Climate Challenge Funded Greenhouse project in Edinburgh can help householders apply for these schemes⁶⁶.

Low and Zero Carbon Technology (LZCT)

Despite the decarbonisation of electricity production Cumbrian houses will also require, where possible, the installation of some form of low and zero carbon technology (LZCT), if the domestic sector is to contribute its fair share to UK efforts to reduce carbon emissions by 80% by 2050. In the context of domestic properties, providing LZCT can mean installing some form of microgeneration or connecting homes to a district heating network which provides hot water to a group of buildings through a network of pipes from a central boiler which usually also generates electricity. Microgeneration means small-scale renewables like solar panels or small wind turbines, ground-source or air-source heat pumps (which transfer heat from the ground or air into a building to provide space heating in a similar way to the way a fridge works) or it could mean a micro combined heat and power (micro-CHP) boiler, which would be used instead of a central heating boiler but which would generate electricity as well as provide hot water for central heating.

There has been a massive growth across Europe in small-scale onsite energy generation or “distributed energy” as it is known. The primary focus of this growth, especially in the domestic market, has been the installation of solar photovoltaics (PV) which can generate electricity on an individual house level⁶⁷. Solar PV was the most installed energy source in Europe during 2011 according to the European Photovoltaic Industry Association (EPIA). The EPIA reports that solar PV installation across the EU rose by 63 percent to reach 21.9GW last year. The German and Italian solar markets dominated the year, accounting for 60 percent of all solar installs with 7.5GW and 9.3GW respectively⁶⁸. Total installed capacity across Europe by the end of 2011 was almost 52GW with 25GW in Germany⁶⁹. By mid 2012 German capacity had risen to almost 30GW⁷⁰.

In the UK solar is now a priority industry in the Government’s Renewables Roadmap. It is recognised as having a future as one of the key renewable technologies in the UK’s energy mix. Almost 2GW has been installed in this country so far and by the 2020s Energy Minister Greg Barker says he wants to see 20GW installed⁷¹.

Despite the highly publicised cuts in the feed-in tariff available to householders who install solar PV panels, the current level of feed-in tariff continues to represent good value. Because system costs have come right down, rooftop panels can yield the same return on investment in percentage terms as they did before the cuts. When the likelihood of increases to wholesale electricity prices is factored in, self-generation can offer a good deal of financial security⁷².

Other forms of LZCT might include:

- solar water heating,
- ground and air source heat pumps,
- biomass boilers and wood stoves,
- micro-combined heat and power (CHP) boilers,
- small-scale wind turbines,
- micro-hydro systems,

but also district heating schemes which provide hot water to a group of buildings which is often generated by a combined heat and power station⁷³.

LZCT could be installed throughout Cumbria by three different vehicles:-

- Local authority action.
- Community and co-operative organisations.
- Action by individual building owners and householders.

Local authority action

Local authorities across the UK are beginning to take control of their own energy future and are starting to invest in decentralised networks that bring down prices, improve energy security, cut carbon and make communities more prosperous and resilient. The scale of the challenge is huge, but so is the opportunity. Public bodies all around the country are looking into what decentralised energy can do for them. If every local authority in the UK with a potentially viable scheme found a way to bring that project to market then we would trounce all current targets and predictions⁷⁴.

BOX 7 Social landlord, Riverside and partner Keepmoat, have started work on installing solar photovoltaic panels in one of the largest 'rent a roof' schemes in the country. Riverside's contract with Consensus Capital Private Equity will result in 6,000 of its properties, starting in the North West and Carlisle, having solar panels fitted. The project is one of the first to be given the green light by banks, following government cuts to similar projects within the social housing sector. Tenants may save, on average, over £200 each year on their electricity bills, while environmental savings will be nearly one tonne of carbon per property. 24 Dash 13th November 2012
<http://www.24dash.com/news/housing/2012-11-13-Solar-energy-to-reduce-Riverside-tenant-fuel-bills>

BOX 8 Wrexham Council has fitted almost 3,000 houses with solar Photovoltaic (PV) panels in the largest social housing PV scheme in the UK. The multi-million pound project has been delivered through partnership working with H.T. Forrest and Sharp Solar, and completed in record time – taking only six months from start to finish. The project is innovative in its design and acts as the flagship Solar PV scheme for the whole of the UK. Its benefits are multiple and far reaching and include:

reducing the councils CO₂ footprint by 3,000 tonnes annually
sustainable long term income for the Council via Feed in Tariff (FIT) payments

addressing issues of fuel poverty by saving tenants up to £300 per year on energy bills stimulating the local economy through the creation of jobs, training and investment into the Wrexham area showcasing the Council as a leader in the renewable energy market.

Housemark 23rd January 2013

<http://www.housemark.co.uk/hmkb2.nsf/1/BFA0C0129876FFD080257AFB0057CDF1?OpenDocument>

BOX 9: Birmingham City Council has announced plans to install PV panels on 10,000 council houses. With high levels of unemployment, the project to improve the council's housing stock will also create and provide training and protect jobs, and support the growth of green industry in a city still heavily dependent on manufacturing. The next phase of the programme will involve using the proceeds from the first 10,000 retrofits for a refinancing of the scheme that will deliver funding of £2bn, enough to refurbish 200,000 homes.

Guardian 3rd October 2010 <http://www.guardian.co.uk/environment/2010/oct/03/birmingham-solar-panel-council-proposal>

BOX 10: Rhondda Cynon Taf Council: RCT Homes, which manages local authority homes on behalf of the Welsh council, has agreed with Nationwide Solar to fit free solar PV arrays on 1,000 of its rented properties. There will be no financial outlay for the tenants, but they will save around £120 per year on their energy bills. Solar Power Portal 1st February 2013

http://www.solarpowerportal.co.uk/news/nationwide_solar_to_fit_1000_homes_across_south_wales_with_pv_2356 and 24 Dash 7th February 2013 <http://www.24dash.com/news/housing/2013-02-07-RCT-Homes-announces-multi-million-pound-funded-solar-PV-deal>

BOX 11: Mid-Devon Council: 1,000 council houses are being fitted with solar PV panels to help the financial situation of tenants by generating savings of around £150 a year on electricity bills. Anesco 20th March 2012 <http://www.anesco.co.uk/site/en/news-folder/anesco-solar-project-achieves-milestone-1000th-property>

BOX 12 Warwick District Council has won national funding of £118,000 to install wood-fuelled heating (biomass) systems for 25 tenants currently living in rural properties which are still heated by solid-fuel and with no availability of natural gas. Warwick District Council 18th December 2012

<http://www.warwickdc.gov.uk/WDC/Your-Council/News/Warwick+District+Council+Archived+News/News+-+2012/State+of+the+art+heating+systems+in+council+homes.htm>

BOX 13 Dundee City Council: An £8 million scheme is being planned for multi-story and low-rise flats in Dundee. The buildings will be coated in new insulation and a gas-powered district heating system installed. The council will pick up £5 million of the cost, with £2.8m coming from Scottish Gas and another £250,000 from the Scottish Government. Dundee Courier 9th January 2013

<http://www.thecourier.co.uk/news/local/dundee/warm-front-for-tenants-thanks-to-8m-scheme-1.63835>

BOX 14: Leicester City Council - The Leicester District Energy Scheme is a 25-year £15m partnership between the City Council and Cofely District Energy (a GDF Suez Company). Spanning six city estates, the system will use a combination of over 5MW of low carbon gas-fired combined heat and power (CHP) and upgraded biomass boilers. Renewable Energy Focus 12th December 2012 <http://www.renewableenergyfocus.com/view/29800/uk-s-largest-single-phase-district-energy-scheme-completed-in-leicester/>

BOX 15 Nottingham City Council: EvoEnergy has signed a deal to install up to 8,000 solar panels on council buildings across the city. The £3m project will see solar panels fitted to 50 buildings, including schools and council offices. Up to 2MW of generating capacity will be installed in total. Construction Index 3rd October 2012 <http://www.theconstructionindex.co.uk/news/view/nottingham-starts-solar-project>

Recommendation 6: All Cumbrian local authorities could start by carrying out an audit of council property, including council houses, schools, and land, to assess the potential for renewable technologies. A programme of investment could then be drawn up with a view to achieving a target of 100% of buildings to be provided with some form of low and zero carbon technology by 2050.

Community and Co-operative Organisations

A £15m renewable energy fund for rural communities will be launched in May 2013. This will offer funding to community groups in rural areas (England) for feasibility studies and planning applications for renewable energy projects. A range of heat technologies, including biomass, anaerobic digestion, ground and air source heat pumps will be eligible. A key objective of the fund is that local technologies deliver benefits for local communities where the installation is sited⁷⁵.

Community Energy is about much more than just producing low carbon energy - it's about 'energy democracy': a changed relationship between people and energy, from one where consumers are at the mercy of large profit-making energy providers and fluctuations in the market, to one where communities control, generate and benefit from their own energy supply. Many communities in Britain are fractured by social divisions and low collective self-esteem, and community energy projects can help address this malaise. Taking control of one's own energy can be highly empowering, boosting a sense of what's possible among individuals and the community as a whole, and bringing a host of economic benefits to boot⁷⁶.

A new Community Energy Coalition, which includes some of the best known and trusted national organisations, including The Co-operative Group, The National Trust, The National Federation of Women's Institutes and The Church of England, wants to start a revolution with communities at its heart which will drive a clean, affordable and secure energy system. Their vision for community energy in 2020 is "*communities across the UK owning, generating and saving energy together for the benefit of all*"⁷⁷.

BOX 16: Brighton Energy Co-operative In June and July 2012 Brighton Energy Coop funded and installed the largest solar system in Sussex. The Co-op raised £200k through a share offer. Solar PV panels will be installed on 8 large buildings incl 2 churches. See <http://www.brightonenergy.org.uk/>

BOX 17: Bristol Power Co-op is hoping to raise £268k to install solar PV panels on community centres, private houses, and businesses in Bristol. Investors will earn up to a projected 6% return on their investment. See <http://www.bristolpower.coop/get-involved/bristol-power-share-offer-november-2012/> and Watch the video here: <http://www.bristolpower.coop/bristol-areas/lockleaze/>

BOX 18 Brixton Energy Co-op has installed 152 solar PV panels on the roof of Elmore House. Eighty-one investors stumped up a total of £58,000 towards the project in three-and-a-half weeks. Most of them live in Brixton, but one donor lives as far away as the Isle of Man. A second scheme has been installed in Styles Gardens. See <http://brixtonenergy.co.uk/>

BOX 19: Bath and West Community Energy Co-op has issued shares to fund the installation of solar PV panels on schools and community buildings. The Co-op has installed panels on eight schools, a Rugby Club, Business Park and a Farm. Total installed capacity 612kW. See <http://www.bwce.coop/>

BOX 20: Sheffield Renewables The co-op is issuing shares to build community-owned small-scale hydro schemes around Sheffield. See <http://www.sheffieldrenewables.org.uk/>

BOX 21: Westmill Solar Co-operative - A 5MW solar park covering 30 acres of land across Westmill Farm which launched a share issue after it was built. See <http://www.westmillsolar.coop/projects.asp>

Clearly, some of these schemes, for example the Bath and West Community Energy Co-operative, require an unprecedented level of co-operation between the local authority and the community organisation, but the rewards are numerous. In the case of Bath, eight schools will be benefitting from reduced bills and the council has supported the establishment of a new form of social organisation, which can only help to knit together the community.

BOX 22: The SustainEden partnership, led by local charity Cumbria Action for Sustainability (CAfS), is one of only 12 communities awarded up to £1million pounds from The Big Lottery's Communities Living Sustainably fund. With 71% of the population living in rural areas, Eden has the lowest population densities in England at 25 people per square kilometre compared with 13,886 in the London Borough of Islington⁷⁸. Transport links are often dependent on exposed routes which are closed during extreme weather and a high proportion of solid walled properties, which are not on the gas grid, contribute to Eden's fuel poverty rate of almost 30%, the highest in England. The £955k SustainEden project will deliver a three year programme of work to help local communities become more resilient to the impacts of climate change. The scheme will include test draught proofing for hard

to treat older homes, advice on efficiency savings, and the development of a social enterprise energy supply company to set up a 'green tariff' to reduce local energy costs. The project will also raise awareness on local resource use, implement emergency planning and support residents living in rural isolation through a trial bus service and car sharing schemes.

<http://www.cumbriagreenbuild.org.uk/index.php/what-we-do/sustaineden/>

<http://www.cumbriagreenbuild.org.uk/wp-content/uploads/2012/07/SustainEden-Executive-Summary.pdf>

Recommendation 7: Local authorities in Cumbria could encourage community organisations, including Parish Councils, to establish community energy projects. Local authorities should be prepared to work with community organisations, by for example, making available the audit of council properties discussed in recommendation 3.

For further information on community energy projects see section on Wind.

BOX 23 Solar Schools sit somewhere between local authority and community action. Solar schools is a new project set up by the 10:10 campaign to help schools generate their own power from the sun. When a school joins the Solar Schools campaign they are given their own special website where students, parents and businesses can sponsor solar panels. When they have raised enough money and the panels are installed schools find they have more money for extra things like after school clubs. Not only do the panels help cut carbon but they also help teach the pupils about energy and climate change. See <http://www.solarschools.org.uk/> At the time of writing St Gregory & St Patrick's Catholic Community School in Whitehaven has raised £818 towards a target of £10,000 to go solar. Evidence from a Solar Schools project in Cambridge suggests that community energy projects can also stimulate energy efficiency measures. Newnham Croft school in Cambridge installed PV after raising £10,000 with Solar Schools. With the backing of the entire community the project has since been able to carry out a whole host of energy efficiency measures, including installing insulation and efficient lighting, initiatives they had been trying to get off the ground for many years. Environmentalism is now woven inextricably into the school's image of itself, from the pupils to the staff and the management team. Microgeneration turns the current electricity system paradigm on its head. Instead of being passive recipients of electricity, schools, homes and businesses that generate their own become actively engaged in the dynamics of energy production and consumption.

Energy Desk 9th April 2013 <http://www.greenpeace.org.uk/newsdesk/energy/analysis/how-do-you-create-energy-energy-efficiency>

Action by individual owners

Individuals and businesses who generate their own energy may be eligible for a feed-in tariff or renewable heat incentive. If individual buildings generate their own electricity (eg with solar panels or a wind turbine) the energy supplier might pay money back through a 'Feed-in Tariff' (FIT)⁷⁹. The Renewable Heat Incentive (RHI) helps businesses, the public sector and non-profit organisations meet the cost of installing renewable heat technologies. Household holders may be eligible for a renewable heat premium payment, but eventually a domestic RHI is planned⁸⁰.

Alternatively, individuals who are unable to generate their own energy for whatever reason, and don't have a local community scheme they can invest in, might want to invest in community projects elsewhere. Abundance generation has been set up to link up communities and individuals with Renewable Energy Projects and make it possible for them to share in the benefits of energy production directly. This is a regulated investment company that revolutionises the way people invest for their long term future. See <https://www.abundancegeneration.com>

Recommendation 8: The first step for individuals is to have an assessment carried out on their property. A Green Deal assessor or provider can arrange this.. You can search for assessor or provider companies here <http://www.greendealorb.co.uk/find-a-green-deal-supplier?DECC=true> or you can call the Energy Saving Advice Service on 0300 123 1234.

A Renewable Heat Strategy

The production of heat is responsible for about half the UK's total CO₂ emissions, so, if Cumbria is going to play its full part in reducing carbon emissions it is important to look at ways to generate renewable heat as well as renewable electricity.

The National Policy Statement on Energy expects doubling or tripling of total installed electricity generating capacity by 2050, because of an increased demand for electricity in the transport and domestic heating sectors⁸¹. However, the Government does say that its ambition is to have 12% of heating coming from renewable sources by 2020⁸².

Diversifying heat technologies

Government policy seems to be moving towards an all-electric future. In the Overarching National Policy Statement for Energy (EN-1)⁸³ it argues that, despite major improvements in overall energy efficiency, demand for electricity is likely to increase as significant sectors of energy demand (such as industry, heating and transport) switch from being powered by fossil fuels to using electricity. As a result of this electrification total electricity consumption (measured in terawatt hours over a year) could double by 2050, and if there is a high level of dependence on intermittent electricity generation, then the capacity (measured in Gigawatts) of electricity generation could need to triple.

But a study for the Combined Heat and Power (CHP) Association undertaken by Imperial College and Surrey University says that while the virtually all-electric future, as proposed by the Government, could be low carbon, it isn't necessarily the best way of doing things. Heat is a very important end-use of energy in the current energy system and is expected to remain so in 2050. In 2007, heat represented 41% of total final energy consumption in the UK. Over half of this heat demand comes from the domestic sector, highlighting the significant challenge associated with decarbonising heat on an individual household basis. No route to low carbon heat is without challenges, but the all-electric future would not necessarily be optimally efficient, since thermal losses from power generation are large⁸⁴.

District Heating

A district heating scheme comprises a network of insulated pipes used to deliver heat, in the form of hot water or steam, from the point of generation to end users. The heat is generated in a centralised location, often in a combined heat and power (CHP) station which also

generates electricity. These CHP stations are often powered by gas but increasingly biomass, and heat-only boilers, geothermal heating and central solar heating are also used.

An integrated approach might use a range of heat options, including CHP, both gas and biomass-fired, in more built-up areas, but once district heating networks are established geothermal heat, waste heat from industrial processes, heat pumps using boreholes or rivers, solar heat, and so on can also be used.

Heat mapping (a spatial matching of potential supply with demand) has been highlighted as a key tool to encourage local planning authorities to maximise opportunities for local heat use. The Scottish Government funded a heat mapping pilot in the Highland Council area which was published in June 2011. The methodology used in the pilot is being replicated by other local authorities in order to help embed renewable energy at the centre of local strategic planning. Fife and Perth and Kinross councils have been using the methodology from the pilot to undertake mapping in their areas⁸⁵.

Recommendation 9: Cumbrian local authorities could secure funding to carry out a County-wide heat mapping exercise and use the findings to develop a renewable heat strategy based on diverse technologies.

Renewable Heat Incentive

The Renewable Heat Incentive (RHI) is a UK Government scheme set up to encourage uptake of renewable heat technologies among householders, communities and businesses through the provision of financial incentives. The RHI for non-domestic generators is already in place, and the domestic RHI was expected to launch in summer 2013, but this has now been delayed to spring 2014⁸⁶. RHI will make a significant contribution towards the 2020 ambition.

The current proposals are that the domestic RHI will support:

- biomass boilers heating the whole house
- pellet stoves with back boilers heating the whole house
- ground source heat pumps
- air to water heat pumps
- solar water heating⁸⁷

Recommendation 10 Cumbrian local authorities should work to ensure maximum take-up of these schemes in Cumbria by making sure that people are well informed about their availability.

A Wood Fuel Strategy

Modern wood burning stoves and boilers offer an affordable and attractive way to provide heat for domestic and commercial properties particularly in an area like Cumbria. Burning wood grown and harvested in Cumbria has huge benefits. Harvesting wood for burning helps to create thriving woodlands, encourages better woodland management, allows younger trees to be planted and existing trees and habitats to be looked after. The latest research into climate change suggests that the best way to protect the forests we have is to manage them, so that there is a diverse range of species and ages. Less than half of Cumbria's woodlands are managed, the rest are fallow. Burning wood creates a much larger market for woodland owners to sell their trees and timber and in turn manage more woodlands⁸⁸.

A report of a recent visit to Germany by a team from Cumbria Action for Sustainability (CAfS) costs a Short Rotation Coppice system to heat an average farm house. This might need around 6 hectares of land to provide wood from 2 hectares each year on a three year rotation⁸⁹.

BOX 24: The Village - Accommodation at Newton Rigg, University of Cumbria, Penrith The University decided to install a 300kW biomass boiler for its student accommodation. The project comprises of a series of detached residential blocks, which are connected by a district heating network of underground pipes from the energy centre. The scheme is expected to burn around 300 tons of wood a year. The capital cost of the scheme is expected to be £300,000, but fuel savings will be £40,000 per year. http://www.cumbriagreenbuild.org.uk/wp-content/uploads/2011/05/Cumbria_Factsheet_District_Heating_FINAL31.pdf

BOX 25 Cumbria Woodlands was launched in 1991 in response to widespread concern about the neglected state of the County's woodlands. Current support comes from Cumbria County Council, the European Social Fund (ESF), the Forestry Commission, GreenWays to Work, the Lake District National Park Authority, Natural England and the Woodland Trust. We now have a team of five to deliver our work programmes. The work of Cumbria Woodlands today focuses on developing wood fuel supply and demand and promoting appropriate woodland management, and falls into four main areas:

Provision of free help and advice to woodland owners focusing particularly on ecologically important woodlands.

Promoting the benefits of using wood as a sustainable source of energy thus driving woodland management.

Developing deer management within the county so that woodlands can thrive.

Providing accessible, high-quality training in a variety of areas that helps to ensure that woodlands are well managed.

Cumbria Woodlands

http://www.cumbriawoodlands.co.uk/index.php?option=com_content&task=view&id=12&Itemid=26

Biomass

There is a danger that the UK Government's extremely ambitious plans for large scale biomass plants will divert wood fibre away from more efficient uses such as the provision of heat or combined heat and power to less efficient uses such as electricity generation.

The use of locally sourced sustainable timber and wood waste for energy production via small-scale use of biomass for heat and in combined heat and power stations has an important role to play. But the use of large quantities of biomass in large power stations which burn the material at around 30% efficiency to generate electricity looks unlikely to be sustainable.

The Scottish Government's Wood Fuel Taskforce concluded that there is no spare capacity to support large scale electricity generation biomass plants from the domestic wood fibre resource. It would be far better to keep domestic wood supplies to help deliver renewable heat⁹⁰.

According to Carbon Commentary, the ambition of meeting the 12% renewable heating by 2020 solely with wood would require about 24 million tonnes of dry wood or about 40 million tonnes when first cut down before drying. The UK currently produces about 9 million tonnes of forest products a year – somewhat less than 25% of what we will need for wood for energy⁹¹. There is clearly considerable scope for greater use of wood for fuel in Cumbria.

Recommendation 11: Cumbria County Council to work closely with Cumbria Woodlands and other agencies to galvanise the wood fuel market with a view to providing a high proportion of the 12% renewable heating target by 2020 from locally sourced sustainable forests as possible.

Recommendation 12: Cumbria Woodlands could convene a conference with farming and land-owning bodies, National Park authorities, conservation groups and community organisations to give a progress report on its wood-fuel strategy; explain barriers and aspirations for the future. Community groups could be encouraged to take on the management of unmanaged woodland; organise tree-planting projects and promote wood as a renewable heat source.

A Farm Energy Strategy

A quiet revolution is underway in the British countryside as more and more farmers are investing in renewable energy. According to the National Farmers Union, one in five of its members had produced clean electricity from solar or wind by the end of 2012⁹². Between 2011 and 2012 there was a 28% increase in the number of biogas plants, capable of providing both renewable electricity and heat from farm waste.

But the current on-farm renewables capacity in Britain is tiny compared with Germany. By the end of 2010, German farmers owned over 10% of the country's renewable energy capacity, equivalent to over 5,700 MW. Compared with the UK's 78 biogas anaerobic digesters, there were 6,000 digesters in Germany by 2010, with plans to double capacity by

2020. But the German example just shows the potential that could be realised here. The income from feed-in tariffs can provide a lifeline for farmers struggling with poor harvests in bad weather.

Farming Wind

The late Gordon Proven of Proven Energy, now part of Kingspan Wind pointed out that if one of his small wind turbines, either a 3kW or 6kW model, were installed on every farm in Britain, they would be able provide about 50% of Britain's electricity.⁹³ Gaia Wind, the UK's eighth fastest growing company based in Glasgow, is keen to take advantage of a 10-fold Capital Allowance Increase for renewable energy technology purchases that will allow farms and rural businesses to gain an increase in the annual investment allowance, giving 100% tax relief on investments from £25,000 to £250,000 for the next two years. The company is rolling out a new turbine model targeted at rural homes, businesses, crofts and farms, which cannot access three phase power. Thousands of potential wind turbine owners have, up until now, been hampered by only having access to single phase electricity⁹⁴.

Small scale wind turbines can generate a significant income for farmers and rural landowners by producing electricity for specific applications or the entire farm. At the same time the farm land is not affected by the turbine and can still be used for crops and grazing livestock. Land owners are ideally placed to maximise the benefits of small scale wind power with an enviable availability of open aspect land that complements the installation of multiple small scale wind turbines⁹⁵.

The "*Post 2013: A sustainable future for Cumbria*" project advises farmers that although large-scale wind farms face opposition in terms of visual effects on the landscape, small-scale turbines on farms or estates can be installed without impact on current land-use⁹⁶.

As well as wind, solar photovoltaic panels could be installed on roofs or disused land, wherever there is space.

BOX 26: Osborne's incentives: Farms and rural businesses with renewables in mind have been given a quarter million pound window of opportunity over the next two years. Businesses will see an increase in the annual investment allowance (AIA) giving 100% tax relief on investments from £25,000 to £250,000 for the next two years. Johnnie Andringa, CEO of Glasgow based Gaia-Wind said: "This is a fantastic opportunity for those looking to invest in small wind. The allowance comfortably covers an investment in one or even several small wind turbines and means that a farm or rural business could offset the entire cost against their income tax in year one." Investing in one turbine at around £45,000 would mean the net cost of the turbine for a 40% tax payer would be £27,000: Payback time on a Gaia-Wind turbine based on the current Feed in Tariff drops from 5.3 years to 3.4 years; and the level of investment required for say, two turbines, drops to around the previous cost for one – with double the return. Farming UK 1st March 2013
http://www.farminguk.com/news/Gaia-Wind-praises-Chancellor-s-windfall-for-turbine-buyers_25092.html

BOX 27 Welsh farmer Alwyn Roberts says his wind turbine has been positive for him, local jobs, and the environment. Even the ramblers like it. Situated in the southern end of Snowdonia National

Park near the village of Tywyn, Mr Roberts' 130ha organic farm is benefiting from a new 5kW, 12m-high turbine. Erected in July this year using local contractors, the turbine has already produced more than 6,500 kWh, saved 10 tonnes of carbon, and generated £1,820 from Feed-in Tariffs. This extra income has allowed Mr Roberts to concentrate on his 600 sheep and 30 breeding cows. "I wouldn't have much spare time for other diversifications, but the turbine doesn't take up any time," says Mr Roberts. "Plus it doesn't affect the farm at all and the livestock are allowed in the field with the turbine." Farmers Weekly 17th December 2013

<http://www.fwi.co.uk/articles/17/12/2012/136785/benefits-of-small-scale-wind-for-snowdonia-mixed-farm.htm>

BOX 28 Solar Chickens: Devon farmer Louise Down has strengthened her green credentials even further after South Molton-based Source Renewable installed solar panels to power her chicken barn. Forty solar PV panels on the barn's roof now provide carbon-free electricity for her 4,000 chickens, powering everything from the belts carrying eggs to the ventilation system and lighting. North Devon Journal 19th January 2012 <http://www.thisisnorthdevon.co.uk/story-14974290-detail/story.html>

Recommendation 13: Cumbria County Council, in conjunction with the Lake District National Park Authority, could encourage farmers to investigate the feasibility of installing small-scale wind turbines, or other forms of renewable energy.

Recommendation 14: Farmers in Cumbria who have yet to investigate the feasibility of renewable energy on their farm could contact the NFU Farm Energy Service. The Service has just celebrated its first year during which time it advised more than 1,550 farmers. It is interesting to note that more calls have come in from farmers asking how they can make their business more efficient – around 900 – not just businesses looking to invest in renewable energy. <http://www.nfufarmenergyservice.com/>

Anaerobic Digestion

Anaerobic digesters (AD) break down organic waste naturally into a solid that can be used as fertiliser and a gas that can be burnt to generate heat or electricity. The UK Government hopes an agreement with the National Farmers' Union will lead to the use of 1,000 anaerobic digesters by 2020. The digesters are expected to make many farms self-sufficient in electricity. Any excess could go to the national grid⁹⁷. But the methane gas could also be fed into the gas grid, rather than being burnt (inefficiently) to produce electricity. The National Grid says waste could be used to generate enough gas to heat half our homes⁹⁸.

West Cumbria is well suited to establishing Energy Farms because of large cattle and dairy herds which produce substantial amounts of slurry, which is an important feedstock for AD plants. They have large herds because the areas are good for growing grass, which is a very high energy feedstock for AD plants⁹⁹.

BOX 29 Using crops grown for the specific purpose of feeding a digester, the £4M Anaerobic Digestion (AD) plant at Dryholme Farm, near Silloth is producing around 1.2MW of electricity. This project is part-funded by Nuclear Management Partners, through Britain's Energy Coast. Farmgen has received a £350,000 grant from Nuclear Management Partners to help connect the green energy plant to the national grid. Farmers Guardian 7th November 2011
<http://www.farmersguardian.com/home/renewables/%C2%A34m-ad-plant-starts-up-in-cumbria/42780.article>

BOX 30 A 250 kW anaerobic digestion plant is being planned at Ponsonby Old Hall Farm near Seascale. The joint venture developing the project is formed of Yorkshire based on-farm biogas developer JFS & Associates and a family run Farm in Cumbria. JFS will act as a development partner and construct the biogas plant, while the farm will supply the feedstock from existing farm wastes such as manure and slurry, supplemented with energy crops. Waste Management World, 8th February 2013 <http://www.waste-management-world.com/articles/2013/02/funding-for-anaerobic-digestion-biogas-plant-ono-cumbrian-farm.html>

Apart from farmers, the water industry - which has to deal with 1.73 million tonnes of sewage sludge annually, businesses which produce food waste, and local authorities, could all make use of digesters. If all the organic waste in Britain were recycled in this way, enough energy would be generated to provide two million homes with heat and electricity. Cumbria Councils are encouraging householders to use food waste digesters, rather than organising separate food waste collections as in other parts of the UK with the collected waste dispatched to an anaerobic digester. It is possible that in rural areas this is the best way forward given the carbon implications of organising food waste collections. But individual household food waste digesters can be a lot of work, so may only be taken up by a very small minority. It may be more effective for local borough councils to work with farmers to develop a network of anaerobic digesters, especially if food waste collections can be done in conjunction with other recycling collections.

BOX 31 The City of Edinburgh (which has a population about the same size as Cumbria) is working with Midlothian Council to build an anaerobic digester for food waste. The project will create around 50 jobs during construction and nine full-time jobs when complete. The plant will generate electricity which will be used by Scottish Water to help power water and drainage services across Scotland. Caledonian Mercury 6th March 2013 <http://caledonianmercury.com/2013/03/06/councils-lead-the-way-with-major-project-to-recycle-food-waste/0038019>

BOX 32 Scottish & Southern Energy already operates an Anaerobic Digestion plant at Barkip, North Ayrshire, capable of processing 75,000 tonnes of waste a year, and a £7.5m digester for Scottish Water Waste Services in North Lanarkshire, able to recycle 30,000 tonnes of waste food a year, is also operational. Let's Recycle 17th June 2011 <http://www.letsrecycle.com/news/latest-news/compost/sse-to-openscotland2019s-largest-ad-facility> and Scottish Water Deerdykes Anaerobic Facility, Chartered Institution of Waste Management, 18th May 2011 http://www.ciwm.co.uk/web/FILES/ScotlandRDO/website_info_-_deerdykes_site_visit.pdf

There are three main uses for biogas produced by a digester - onsite Combined Heat and Power (CHP), gas grid injection and vehicle fuel. In North West England United Utilities (UU) has teamed up with National Grid to inject methane from the wastewater treatment process into the local gas pipeline network and fuel for a fleet of sludge tankers. The ground-breaking initiative is centred on one of the country's largest wastewater treatment plants at Davyhulme in Manchester¹⁰⁰.

The Anaerobic Digestion and Biogas Association says the Government should be pushing for more green gas generated from waste as a sustainable alternative to shale gas. Green gas is something of a no-brainer, ticking boxes for energy policy, environment and the economy. It should lead the future of unconventional gas in Britain. Putting it at the centre of the Government's energy strategy would deal with the hurdles to deployment, and allow gas to be part of energy decarbonisation rather than a challenge to it. Green gas has the potential to deliver £2-3bn of green gas a year and create 35,000 jobs. The maximum potential of biomethane from anaerobic digestion (AD) is equivalent to 10 per cent of domestic gas demand - not a dissimilar figure to that which the Institute of Directors suggests for shale gas potential in the UK alone¹⁰¹.

Alan Whitehead MP, a member of the House of Commons Energy and Climate Change Committee, compares the economics of the two methods of putting that gas into the grid. One shale gas well costs between £6 -10 million to drill and frack. It is difficult to assess total output of gas, but the average well in Texas at the moment is producing about 2 million cubic meters of gas per year for only about five years of production. One large farm size Anaerobic Digestion plant costs about £2million to build and then provides a steady stream of gas from then onwards, varying only to the extent that cows stop producing manure or people stop eating food. The first plant currently operational and injecting gas into the grid (the Poundbury plant in Dorchester) produces a bit more gas in a year than the average shale gas well¹⁰².

Recommendation 15: Cumbria County Council, in conjunction with the Borough Councils and Cumbria farming organisations should study the feasibility of food waste collections operating in tandem with a network of farm-based anaerobic digesters.

Small Hydro-power

Small scale hydropower is one of the most cost effective means of generating renewable electricity, generally with a higher efficiency, reliability, and capacity factor than solar or wind.

With the availability of improved technology and new financial incentives, it is likely that a large proportion of previously rejected schemes could now be economically viable. The British Hydro Power Association has estimated that the potential for small-scale hydro power ranges between 130 - 185MW of capacity in England with around 32 – 37.7MW at 284 sites in the North West¹⁰³.

According to the “*Post 2013: a sustainable future for Cumbria*” report¹⁰⁴ Cumbria contains many of the UK's fastest flowing waterways, and more than half of the North West's potential for small-scale hydropower generation - so probably about 16MW in Cumbria. Careful planning of design and location means small-scale turbines can be installed with minimum impact to the natural environment.

BOX 33: The Lake District's biggest hydro-electric project has been installed using a small weir on a tributary of the River Duddon. The £1.5 million green energy scheme located at Logan Gill was one of the first renewable energy schemes in the UK to benefit from the feed-in tariff. The development has been undertaken by Ellergreen Hydro located in the county. Logan Gill – a 450kW scheme - was conceived and designed locally by specialist hydro consultants Inter Hydro, built by local contractors, and using a hydro-electric turbine made by Gilkes of Kendal, who have been global hydro industry leaders for over 150 years. It was financed by The Co-operative Bank, which has dedicated expertise in supporting small to medium scale renewable energy projects. See Ellergreen Hydro website <http://www.ellergreen.com/hydro/about-us>

Renewable Energy Focus 10th September 2010

<http://www.renewableenergyfocus.com/view/12413/cumbrian-stream-at-heart-of-new-hydro-electric-project/>

Other schemes in Cumbria by Ellergreen Hydro include:

Docker Nook – a 15kW Micro Hydro Scheme on a hill farm.

Kilnstones – a 30kW project on a farm in Longsleddale.

Kentmere Hall – a 60kW high head scheme on an historic hill farm.

Burnside - a 100kW project on the River Kent using an Archimedes Screw to produce power for a paper mill.

Broad Oak – a 100kW farm diversification scheme.

Cunsey Beck – a 60kW scheme to revive an old water mill.

According to the Britain's Energy Coast website, Cumbria could become a national hub for small-scale Hydro power generation¹⁰⁵, yet the West Cumbria Economic Blueprint doesn't mention small hydro once¹⁰⁶. The single page on the website entitled "Hydro- Cumbria Potential for a National Hub" says there are 15 operational plants in Cumbria generating 2.4MW. Studies have identified around 400 weirs and 70 dams which could be harnessed for small-scale hydro schemes – large developments being "inconceivable" as many of the prospective sites are found in environmentally protected areas. Developing a reasonable number of these sites could see a capacity of 6MW by 2020, rising to 10MW) by 2050.

The employment potential of hydro is significant, and could support an additional 270 jobs by 2020. Cumbrian companies are well placed to deliver hydro schemes and include Gilkes & Gordon and Inter Hydro Technology, of Kendal; Ellergreen Hydro, Burnside; Lakeland Marine Construction, Levens; Agrilek, Barrow; Grant Ltd, Penrith; and Turbines Services of Lorton, near Cockermouth. Lancaster-based Askam Construction also specialises in hydro engineering and is capable of managing several installations a year. Given the relative short timescale of two to three years from concept and planning to construction, hydro could stimulate a burst of activity in the coming years. The Environment Agency has issued guidance for would-be hydro developers¹⁰⁷.

Tim Farron, Liberal Democrat MP for Westmorland and Lonsdale has campaigned for the Government provide financial support and grants for small hydro schemes as well as

allowing them to be installed under permitted development, with certain caveats attached for wildlife and biodiversity. He says despite the fact that Cumbria has Britain's fastest flowing water ways, there are only a few working hydro schemes in our county. He wants to see the Government, public and private sectors to work together to build a hydro-power industry to help create well paid jobs in Cumbria¹⁰⁸.

BOX 34: Sheffield Renewables was formed by a group of volunteers in late 2007. It is a social enterprise which operates as a business but any surplus earnings are re-invested to support new work as well as benefitting people and communities in Sheffield. It is incorporated as an Industrial and Provident Society for the Benefit of the Community (IPS BenCom). This status enables them to finance work by selling shares, primarily to people and businesses within Sheffield. The company is working hard to develop renewable energy projects across Sheffield. So far it has raised around £217,000 which will be invested in a hydro power scheme. <http://www.sheffieldrenewables.org.uk/>

BOX 35: Balerno VillageTrust's Harlaw Hydro Ltd launched a share offer in April 2013 after presenting its plans for a hydro-electric scheme at Harlaw Reservoir in Edinburgh. The prospectus and forms are available on line. A great deal of preparatory work has been completed and the project is now ready to move onto the next stage. <http://www.harlawhydro.org.uk/>

Recommendation 16: Tim Farron MP and Cumbria County Council could work together to establish a “*Cumbrian Small Hydro Commission*” made up of representatives of industry and politicians, which would aim to turn Cumbria into a national hub for small hydro.

Wind

Wind power is the most available and economically viable source of renewable electricity in the UK. It will play a big role in delivering on our targets to achieve 15% of our energy needs from renewable sources by 2020. Government National Policy on Energy states:

*“Onshore wind is the most well-established and currently the most economically viable source of renewable electricity available for future large-scale deployment in the UK. As part of the UK’s need to diversify and decarbonise electricity generation, the Government is committed to increasing dramatically the amount of renewable generation capacity (see Section 3.4). In the short to medium term, much of this new capacity is likely to be onshore and offshore wind.”*¹⁰⁹

The SQW consultancy Cumbria Renewable Energy report¹¹⁰ concludes that continued development of commercial wind is likely to be required in order to meet required targets.

Onshore wind turbine proposals have sometimes become costly, protracted and are often contentious affairs. Too often the debate becomes polarised between developers and anti-wind campaigners. It is a debate guaranteed to produce a logjam. Without the right to own the scheme, or have first use of the energy they generate, communities invariably get drawn into fending off 'land grabs' rather than becoming providers of their own energy security. This debate can be changed by setting community ownership as a precondition of development.

National opinion polls show around 49% of people would support a wind turbine being erected within two miles of their home, with 22% against. But if the project were community-owned, support rises to 68% and opposition plummets to 7%. In Germany opposition to wind farms is much rarer than in UK¹¹¹

Clearly, community ownership can help build local support for planning applications for onshore wind as well as other renewable projects – which will be crucial if the technology is ever going to gain a real foothold in the UK.

The Department of Energy and Climate Change tends to think of community energy as only small-scale. Cumbrian-based environment and sustainability consultant, Rebecca Willis, has compiled a list of 112 of larger community-owned energy projects at around 5MW or more – quite a significant scale. In fact most of these involve onshore wind. The list shows that there is ambition and appetite for community ownership. A quick tally shows there's already around 35MW in operation, and a further 170MW being considered. Separate research by Camco and Baker Tilly shows there could be 3.5GW of community-owned renewables, if they have access to finance. Community Energy Scotland thinks this estimate is too low¹¹³.

Recommendation 17: Cumbrian community organisations and local authorities to launch a study with energy4all (<http://www.energy4all.co.uk/>) to investigate the feasibility of further community-owned onshore wind projects. See also http://www.baywind.coop/baywind_home.asp

Other Action by Cumbrian Local Authorities

Street Lighting

The Convention of Scottish Local Authorities (COSLA) has been highlighting work by two Dunbartonshire councils to identify where savings can be made on street lighting. This work is now being used as the basis for a business case by other Scottish authorities. Dumfries and Galloway Council is rolling it out a programme over the next eight years and, in doing so, will save millions of pounds¹¹⁴. COSLA has also published information on how local authorities can fund energy efficient street lighting¹¹⁵. Now the Scottish Government has revealed it is considering a pitch to the Green Investment Bank (GIB) for funding to pay for a nationwide rollout of energy-saving LED street lighting, which could serve to slash energy use by up to 60%¹¹⁶.

Recommendation 18: In Cumbria street lighting may fall under the responsibility of the Highways Agency, Carlisle City Council or Cumbria County Council. Carlisle and Cumbria should initiate a study with a view to implementing a similar programme to Dumfries and Galloway Council with funding from the Green Investment Bank.

Transport

The government has set an ambitious vision for almost every car and van to be a zero emission vehicle by 2050¹¹⁷. Due to the time needed for fleet turnover, this requires almost all new cars and vans sold to be near-zero emission at the tailpipe by 2040. These Ultra Low-Emission Vehicles (ULEVs) could be powered by batteries, hydrogen fuel cells, sustainable biofuels, or a mix of these and other technologies¹¹⁸. The Department for Transport estimated in 2007 that electrification of the whole transport sector (not including

aviation and shipping) would add 16% to overall electricity demand but given much re-charging of electric vehicles (EVs) would take place during the night, this would not require massively more capacity in practice¹¹⁹.

A study¹²⁰ for WWF published in March 2011 shows that at least 1.7 million EVs will be needed by 2020 and 6.4 million by 2030 in order to achieve the UK's climate change targets. EVs would then represent 6% of all UK cars in 2020 and 18% in 2030. In order to achieve this, the UK will need to become 'EV ready' which means the roll-out of charging infrastructure, and the development of 'smart grids' which optimise EV charging for grid stability and at times of lowest carbon intensity. The study estimates that even with very high EV uptake, EVs would only add a maximum additional load of about 9% of total forecast demands in 2030.

EVs will have to be an important part of the solution as they are a much lower carbon alternative to conventional cars, which produce 14% of the UK's CO₂ emissions. EVs are much more energy efficient, with 75% efficiency compared to the 20% efficiency of fossil fuel-powered cars. But EVs are not carbon-free. Ultimately, the scale of the contribution they could make to a low-carbon transport sector depends on the carbon intensity of the electricity that powers them. That's why EVs need to go hand in hand with decarbonisation of the grid. But EVs only make sense in the context of a new, more sustainable approach to transport. If we end up driving more because EVs have lower operating costs then we'll need far more of them to achieve the carbon reductions we need to achieve. People will need to consume and travel less by car – and more intelligently – if the UK is to meet its climate change targets. We need to make the right set of choices to bring about fundamental change if we're to reduce our oil dependency and make the transition to a low-carbon economy.

Therefore there will also need to be greater support for walking and cycling, car sharing and more attractive public transport options to help to bring down car kilometres and reduce the need for private car travel. Other measures which help to curb demand might also be needed. While there is evidence of significant energy savings and reductions in carbon emissions, there is some uncertainty about other impacts of EVs when compared to conventional vehicles. For example battery technology for cars will drive a massive increase in demand for lithium, most of which is currently mined in South America and China. The extraction of lithium has local environmental impacts but studies vary in their assessment of the severity of these. This underlines the importance of the need for a significant overall reduction in car use.¹²¹

BOX 36: Plans to turn parts of the Lake District into a 'hub for sustainable transport' will bring 100 new jobs to the area, according to Cumbria County Council. A £5m government project has gained another £2m from operators in the area, bringing the budget to £6.9m. The four year plan will see new public transport and better traffic management to tackle congestion, the council said. The money will be spent on joining up passenger transport services, creating safe networks for walking, cycling and wheelchair use and also developing a system of pay-as-you-go electric bikes and low-carbon vehicles for hire. It will take place across the tourist hot spots of Windermere, Bowness, Coniston, Ambleside, Grasmere and Kendal. BBC 6th July 2011 <http://www.bbc.co.uk/news/uk-england-cumbria-14041998> Guardian 11th July 2012 <http://www.guardian.co.uk/uk/the-northerner/2012/jul/11/lakedistrict-sustainable-development>

Cumbria Transport Plan Strategy 2011 to 2026

Recent research shows that 32% of carbon emissions in Cumbria are due to transport. The Cumbria Transport Plan¹²² describes its purpose as being to “*secure and steer investment for the county so as to support the development of the local economy, reduce carbon emissions, and ensure a high quality environment for residents and visitors.*” The plan says it reflects the Government’s vision for a sustainable transport system as set out in the 2011 White Paper which will be achieved through, amongst other things encouraging behaviour change by making walking, cycling and public transport more attractive; and in the longer term increased use of electric vehicles.

The Transport Plan is very general, and relies heavily on road improvements, there are no plans to investigate the introduction of an electric vehicle infrastructure and it wants the Nuclear New Build project, which is looking increasingly unlikely, to help fund required improvements to the road and rail network in West Cumbria. This is an example of the expectations and dependency which are generated by the nuclear industry’s community benefit funds (mentioned above).

Transport Infrastructure

Apart from the frequent mentions of the need to improve cycling facilities, the Cumbria Transport Plan fails to give the sense of urgency required to implement the changes required and the move to a zero carbon transport infrastructure. This will require a big shift of emphasis to improving public transport, which probably means some major infrastructure developments. County officials need to design a rural equivalent to the tram networks being developed in some of England’s urban areas. The Allerdale Borough Council Transport Plan is seeking improvements to the West Cumbrian Coastal Railway service without being specific¹²³. This should be investigated further.

Campaigners have been calling for the re-opening of the Keswick to Penrith railway line – which could cost between £40m and £100m. They say the case to reopen it now is stronger than ever. The Keswick to Penrith railway track bed is largely intact. Less than 10 per cent of the earthworks and bridges have been removed and most of the alignment is unobstructed.¹²⁴ The North West Regional Development Agency concluded that re-opening the Keswick-Penrith Railway appears likely to generate economic benefits in excess of its costs¹²⁵. The feasibility of further developing rail infrastructure should be investigated.

BOX 37: Nurture Eden the award winning responsible tourism organisation seeking to encourage visitors to stay longer, spend more and show concern for the local environment when holidaying in Eden, is getting visitors to explore Eden on two wheels through its new ‘Cycling Eden’ project. Cumbria 24 19th December 2012 <http://www.cumbria24.com/eden-valley/2012/12/19/cycle-eden-project-manager-flying-start> Rent an e-bike at one of the Electric Bicycle Network hire points and glide through the wonderful scenery of the Lake District. In the Lake District National Park, a 35-strong fleet of electric bicycles for hire are bringing the simple pleasure of cycling within everyone’s reach. It’s cycling, but not as we know it. Electric bicycles dismiss headwinds and flatten hills. Now everyone can enjoy the great outdoors on two wheels. Cumbria 24 28th May 2012 <http://www.cumbria24.com/lake-district/2012/05/28/see-more-lakes-help-35-strong-fleet-electric-bikes>

Recommendation 19: There needs to be a step change in thinking on transport. Plans need to be drawn up for transport system which is virtually zero carbon by 2050. This implies making the County EV ready by 2030, and much greater support for walking and cycling, car sharing and more attractive public transport options. The County Council should produce a Cumbria Transport Plan which looks at the longer term 2013 to 2050.

Additional sectors which can contribute to Sustainable Cumbria

This document offers an analysis of potential energy futures for Cumbria that could be developed without reliance on the nuclear sector. It shows the enormous potential not only for developing sustainable and local energy systems, but also the potential for these to create the employment opportunities that Cumbria will need following the planned wind down of nuclear plant. It shows that there are alternatives to nuclear development in West Cumbria.

As such it aims to open debate among Cumbrians, businesses, the public and the voluntary sector, and in Cumbrian politics. It does not cover the full range of sectors that could make a contribution, focusing as it does on energy alone, along with transport. It invites further analysis from others including for example:

tourism

sustainable food production

biodiversity

education

financing of local energy schemes and systems

eco-housing schemes

How to respond to this consultation

These steps are some of the first things we think should be done to move Towards a Sustainable Cumbria. We want this draft report to kick-start a conversation in Cumbria about how to get there, and so before we publish our final report, we want to know what Cumbrian people, businesses and institutions think of the ideas we present.

Please read this report, and share it with others. Most important, let us know what you think.

Do these ideas take us in the right direction?

How feasible do you think they are?

Are you willing to actively support any of them? Which ones?

Have we got anything wrong?

Is there anything else that needs to be considered?

Can you give us any more examples of initiatives in Cumbria that are worth publicising and building on ?

Please get in touch with us and get involved:

- by email to Pete Roche rochepete8@aol.com
- OR by mail to Pete Roche c/o Loweswater Hall, Cockermouth, Cumbria CA13 0SU

We welcome all comments and will use them for our final report.

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