

# bio-power news

Issue 11

February and March 2004

## So what excuses can I give you this time?

Every issue I make some comments about how hectic life has been here at Bio-power 'H-Q'. People trying to contact me by phone are amazed when they hear the phone actually ring – rather than being engaged all the time. They are even more amazed if they get to speak to me for real rather than the answer phone. How often do you send me e-mail messages to get no reply or response? Please don't tell me the answer. How many times have you asked me to send you something and it never happens? If there are still issues outstanding just keep sending me e-mails, and it will get done - eventually. The problem here is two fold, firstly just so many messages and inquiries to deal with, and secondly not enough time in the day to deal with them.



Early February I was invited to travel out to Hong Kong to speak at an International Symposium on Waste Management and Renewable Energy, run by the equivalent of our 'Environment Agency' in China. (We have Jeff Elvy in Coventry to thank for this!) For me this was the most wonderful opportunity to visit a place in the world I never thought I would go to in my life, and it was also an opportunity to make contact with people who have been trying to come from Beijing to discuss the use of our technology in mainland China. Hence no BPN in February.



## Bio-power visits Hong Kong

### Fat is Fantastic! Fat is Fabulous! Fat is forever! Fat is the fuel for the Future!

These words opened our presentation at the Symposium on Pollution control Technology in Hong Kong. It was quite a different approach to that generally encountered by staff of the 'Environmental Protection Department' which operates much like our Environment Agency to control waste issues in Hong Kong. One of the most pressing issues for them to address is the improper disposal of waste cooking oils down the sewers. I gave two formal presentations, a shortened form of which I will include in our Bio-power News in this and a future issue. However, the issues I describe will be familiar to most of you!

I had no idea what was in store for me in Hong Kong. I arrived before 7.00 am, after a 12 hour sleepless flight over Siberia and the edge of the Himalayas to be recognised and greeted by a wide smiling young man who gave me a guided tour of Kowloon and the commercial areas of Hong Kong, before taking me to the most glitzy Hotel I have ever seen. My room was the highest I have ever been in a building, and my window looked down on blocks of flats and the streets way below. I did not know that Hong Kong was a mountainous area, much like the landscape of North Wales, comprising many islands, with tree covered slopes down to the sea. The scale of the apartment blocks is impossible to describe. One block would contain the population of a medium sized town. But there seems to be no suburbia, the built up areas end and the forests begin. So even the central areas of Hong Kong city have a backdrop of wooded mountainside. I felt very safe where ever I went, despite getting totally lost on my first excursion out in to the streets on my own. The smells of cooking and the strange things people seem to eat drew me down passageways and basement shopping arcades. I think there must be a food business for someone collecting all the chicken heads and feet from slaughterhouses in the UK and exporting them, washed and cleaned to Hong Kong. I was surprised how clean the streets were, no chewing gum on the pavements, and very little litter. There were also very few cars, most of the traffic were busses, taxis and trams and a few white delivery vans. Scaffolding was always made of hand tied bamboo, even on new glass covered sky scrapers.

The food was out of this world. Mostly fish or sea food. I managed at least one banquet each day, and one was of over 20 courses. As you all know I am normally a good eater, but I found myself reaching for the menu to see just how much more I would have to eat! Jelly fish is the best thing ever! I also ate abalone, sugar coated grilled lobster, crispy roasted duck skin, and what I assumed to be the egg sized beastie from inside a giant limpet shell. Try and eat that with chopsticks! But my strongest impression was of the tremendous warmth and hospitality of the Chinese people, no matter where I was, everyone was very friendly and helpful, and of course extremely polite – except when eating soup! So, even though I am by no means a city person, I just can't wait to go back to Hong Kong again, but next time not for four days, but several weeks.

The organisation of this complicated event was very well planned. Everything worked perfectly. I was very impressed by the way that specific responsibilities were shared out, and it was clear who to ask about any problem. The whole event was photographed, and a compilation CD has been made with all the presentations, background information, and hundreds of pictures. I talked a lot about bio-fuel ideas not just for Hong Kong but also for Mainland China. However, the other speakers from Malaysia and Australia also saw enormous potential for the development of our technology, and in the Far East things can happen very quickly. Good commercial opportunities are not wasted. I look forward to travelling there again soon!

# Using Waste Fats and Oils – Recent Developments in the UK

The approximate text of my first presentation 3rd February 2004, Hong Kong

"If I am to be of any use to-day then it is in explaining some of the things that have been developing in the UK, and also describing some of the ventures that are being planned for the future. But that does not mean that everything we are doing is the right way, or the only way or even relevant or practicable here in Hong Kong. We may well have a lot to learn from each other. We live in very different parts of the world and the whole economic and cultural structure is also very different. This means that many things may be relevant, but will have to be applied in different ways.

I have long been involved in the 'Green' side of things, the environment, care of natural resources, conservation and the encouragement of 'resourcefulness' – that's making the most of what we have, wasting little. Making the most of opportunities we have, right there, all around us.

This symposium is valuable because we have speakers describing very different forms of 'approach' to the problem side of fats waste. As you will soon discover, fat for me is 'FANTASTIC'. Fat is FABULOUS. And most importantly of all, fat is the FUTURE as far as renewable energy is concerned.

## **Waste is now an expanding business**

With many, I have in the past argued for better recycling and less waste going to the tips. Very few people wish to see more tips and more waste. We all want to see less waste and less going to landfill. In the last 20 years things have changed very dramatically in the UK, and maybe even more so in other parts of Europe. Where as there used to be a lot of public resistance to recycling, there is now tremendous support. This increasing popularity of recycling has sometimes caused problems that the price of recycle has dropped to such an extent that recycling is not viable. But to-day recycling and re-processing of what was waste is certainly big business.

## **Waste is just material looking for a new use**

What is important now is not so much improving the means of collecting and pre-processing waste, but of developing a greater demand or use for waste materials. It is no good just recycling materials if there is not an economically viable use for them. This will involve extra effort to design products that can be made from or use waste materials. This is indeed a very exciting and creative task.

One aspect of this is that one can find oneself working in areas of technology in which one feels the least prepared. And this is precisely what has happened to me in the last two or three years with the rapid development of bio-fuel technology in the UK. Whilst we all appreciate the need to improve recycling, and find better ways of dealing with what is 'waste material', there is another approach which is to stop materials becoming waste in the first place. It serves no purpose to be developing all kinds of recycling ideas if this simply encourages the creation of even more waste.

## **The economics of waste collection and recycling**

I am glad that things are changing rapidly in the UK.

20 years ago the drivers for the expansion of recycling were...

- Capacity - lack of waste dumping sites
- Waste of raw materials – replacement costs versus recycling costs -> recovery

But against that the problems were

- Cost of collection
- Cost of separation technology
- Public resistance to separate or recycle waste

## **Now we have new driving themes... Global Warming and Agenda21**

In the last ten years a new driver has emerged very strongly and that is...Global Warming. Also, following the Rio Environmental conference, every local Authority has implemented a plan for Sustainable Development.

Whilst the Issue of Global Warming was always known about, it is only in the last 10 or 20 years that it has become a significant issue in most people's minds. This is added to by the fact that most people can now see – from personal experience the effects of Climate change. We have less snow, much warmer winters, more storms and flooding, very dry summers and droughts, turtles are now laying their eggs on the beaches of North Wales. These things affect people directly. Whilst scientists may have divided views

about whether Global Warming poses a real threat, tangible evidence of Climate Change is all around us.

## **New ways of working – creative partnerships**

One of the most important things to help facilitate this transformation in the public awareness of recycling issues have been the development of community led local recycling or collection initiatives. This often involves organisations that work with or assist people with disabilities, or learning difficulties, who might otherwise find it very difficult to get work. This also means that non-profit or charitable organisations are able to access grants to help with capital costs.

## **Causes of Global Warming**

Climate change is caused by two main factors....

1. Cutting down forests which are the natural cooling systems of the globe
2. Burning fossil fuels which increases the levels of CO2 in the atmosphere.

The whole issue of Global Warming is affected by many factors, and I know that there are many who argue that the globe will self regulate this dis-balance. Let's take the position of the most sceptical.....

## **Is Global Warming a myth? Will the globe self adjust?**

But for us now the question might be 'OK if the globe does re-adjust in some way then how far and how extreme will conditions get before that re-balancing mechanism trips in? How hot will we get? How flooded will we get? How many people will be displaced? how much damage and starvation will there be, before things swing back to 'normal' – if indeed they ever do.

Some suggest they will get very bad indeed. Those who will suffer the most are those in highly populated low lying areas like Bangladesh, and more locally the large low lying areas of the Chiang delta. The real drama is likely to be caused by the displacement of so many people rather than actual flooding or physical devastation. The eventual cost of the economic and social displacement is difficult to imagine. Let us hope we can indeed prevent things from ever getting that bad.

## **What can we do then? To achieve any impact will require dramatic personal change**

For most people it is very difficult to know what can be done to help redress the issues of Global warming. Plant a few trees. Buy some low energy light bulbs. Get a more efficient car. Use public transport or cycle to work occasionally. But in the face of the scale of the problem this is doing very little. Until recently people have not had an opportunity to do anything that will make a significant change to things that are known to cause Global Warming.

But now they can.....

## **But can we do anything that will make an immediate change?**

I must tell you that I came into this technology by accident rather than by design. So this part of my presentation is more like a confession than any achievement. It all started with the anger and frustration of British farmers and lorry drivers. They had enough of the high tax levels on fuels. It meant they simply could not manage to run economically viable businesses. So they decided to blockade the oil refineries as a means of direct protest.

And it was an amazingly effective protest. Within a few days the country was nearly brought to standstill. Where we live in North Wales the effect of this in terms of the shortage of fuel was worse than in other parts of the UK, and we got to the situation where nurses and doctors could not get to hospitals to deal with emergencies. My wife is a nurse, and she works in theatre. Because I did not realise there was a blockade going on I nearly ran out of diesel in our family car. On the first day of the blockades, I was only just able to get home. But my wife would need the car very early the next morning to get to hospital to prepare theatre. There are no busses at that time of the morning.

Secretly, I had to make some form of fuel to keep our VW Passat running using just the things I had about the house. What did I use? We had some paraffin, white spirit, meths, alcohol, turpentine, varnish, and the vegetable oil we use to cook chips in. I carefully tested the different materials to see if they were co-solvent, and most were. I will never forget the first time I put this mixture into my car..... It's a very strange feeling pouring your own fuel into the cars

fuel tank! All sorts of things go through your mind. Will it jam up? Will it clog up? Or will it blow up and wreck the engine forever? In fact it did none of these things. After a bit of experimentation I had a fuel that seemed to run even better than normal fossil diesel. I was able to run the car up the mountain with a new noise that was more of a grunt than a clatter. And of course the smell was out of this world!

I did not tell anything to my wife. She drove the car away early in the morning, without any knowledge that it was not running on diesel. And she came back in the afternoon, safely, and sweetly, and telling me about the chaos because other people could not get to work. And from then on we have run our family car with non fossil fuels. That's a big step! One happy family running fossil free fuel.

I then explored the web and got very interested in the making of Bio-diesel. But I found problems with solvency, it made a lot of waste glycerol, difficulty in getting methanol, it was a dirty process not suitable for the family kitchen, and it seemed very inefficient.

So I went back to experimenting with natural fuels. Instead of putting a little vegetable oil in a lot of paraffin I'll try it the other way around. How little paraffin do I need to make an engine run on vegetable oil? – not much. Then, what can I use instead of paraffin, which is just another fossil fuel? – lot's of things.

This way I started to explore the whole process by which it is possible to 'modify' used cooking oils to make a form of bio-fuel. This process is very different to making bio-diesel.

#### **What is the difference between pure vegetable oil, Bio-diesel, and Modified Waste Vegetable fat?**

The basic lipid fat molecule is a triglyceride. It looks like a balloon with three strings. The strings are hydrocarbon chains. The balloon to which they are all three attached is an alcohol. Bio-diesel is made by shattering the fat molecule to release the hydrocarbon chains from their alcohol bond. The alcohol then become a form of sugar called glycerol which is a waste by-product. It is a therefore a subtractive method. You get less fuel than the feed stock, and you create a waste by-product.

By comparison our modification process is an additive process. It keeps all the energy that is in the feed stock, and it adds more volume and more energy to it. You get more fuel, and the fuel itself also has a higher calorific value.

It is important to realise that there is not just one way to make a bio-fuel, but many. Regulators may like things close and defined but nature is not like that. Just look at the variety of ingenious ways that natural processes store energy. It's called 'bio-diversity'. We can make use of all these methods to store harness and store energy for our own needs. Bio-diesel as a free ester is in our view not the most efficient form of bio-fuel.

This simple technology has very important implications for many countries, especially for China where there are not huge reserves of mineral diesel, and any means to make bio-fuels, or to improve the efficiency of any existing bio-fuel capacity can only be a good thing.

Lets now look at bio-fuels in more detail

#### **Why are bio-fuels so important in addressing the issue of global warming?**

##### *Where the energy is stored*

It's all about where the carbon comes from. Both fossil fuels and bio-fuels are hydrocarbon chains. The energy they both contain came originally from the sun. All life forms need to capture and store energy, it is a fundamental process that makes 'life' as we understand it possible. This energy can be stored in many ways, for example as sugars, as starches and as lipid fats. Different life forms specialise in different methods of storing energy. Most seeds contain oils such as the rape seed oil used as a cooking oil. Root plants and fruit contain sugars like strawberries and sugar beet. Starches are found in grains cereals and rice and are hydrocarbons in the form of spiral chains. Cellulose, (the basic building material of all plant cells) is also a hydrocarbon and that's is why there is energy in logs or when we burn pieces of wood. Often natural processes are used to change the energy loaded molecules from one form of hydrocarbon to another. For example enzymes are used to release sugars from starch when malting, and sugars can be turned into alcohol, which can be used as a volatile fuel.

##### *When is the energy stored*

But what is so important is that this energy in a bio-fuel came from the sun last year or the year before may be. The energy stored in a

fossil fuel came from the sun millions of years ago. The reason why we have a problem now is like this.....

Within a period of a mere one hundred years, we are putting back into the atmosphere carbon deposits that have been stored by the earth's natural processes through a period of three thousand million years. So this shift in the physical positioning of carbon represents a very dramatic change.

##### *Where is the energy stored*

When we burn a fossil fuel we are throwing up into the atmosphere carbon that was otherwise buried safely below the earth's crust. It is this store of energy that has kept the earth as cool and stable as it is. So when we burn a bio-fuel we are still putting carbon into the atmosphere, but it is carbon that was pulled out of the atmosphere by the plants as they grew. So there is an equilibrium. The plants absorb carbon at the same rate that it is released by burning. We call this a 'carbon neutral' process. In fact we are now looking at a number of ways to make this a much better than carbon neutral process. It is possible by the strategic use of bio-fuel to slowly re-dress the carbon balance, and I will describe that later.

#### **What form of fuel did Rudolf Diesel's original engine run on?**

What I did in making a simple fuel largely derived from used cooking fats was not a new idea at all. In fact the very first compression ignition engine designed by Rudolf Diesel used raw pea nut oil. It is a natural vegetable oil, not mineral or fossil fuel and also not a transesterified fat. Rudolf Diesel was very concerned about atmospheric pollution, even then in the 1890's. Remember he lived at a time when nearly all motive force was provided by steam engines driven under pressure with coal fired boilers. Lubricating oil was largely derived from Whale oils. The petrochemical industry as we know it did not exist. Diesel saw a future in which all the coal fired boilers could be replaced by engines running on clean natural vegetable oils. I am sure the issue of Global warming was not understood then at all. The pollution problems were simply atmospheric, dirty buildings, fog, illness from sulphur, and the overall smell and grime of industrial areas. It was in this situation that the diesel engine was born, and in technical terms it has actually changed remarkably little since.

#### **How can we use organic fat as a fuel ?**

Many engines made to-day will run on raw vegetable oil, even now.

I have a Mercedes car that will run on cleaned raw vegetable oil. Our VW Passat runs on pure vegetable oil, but not quite so well as the Mercedes. I also ran a Volvo on pure vegetable oil that we used for a Television feature that caused quite a stir two years ago. But not all car engines will run on pure vegetable oil – at least not without some simple alterations to the fuel delivery systems.

#### **How can we use fats as a fuel?**

To make an engine run on vegetable oil you can do three things...

- Modify the fuel
- Modify the vehicle, or
- A little of both.

Just heating the vegetable oil is generally sufficient to make it perform like mineral diesel, but heating alone can eventually cause a few problems. Cutting the oil with some simple solvents – like I did at the time of the blockades – is sufficient to overcome these problems. Just adding a small amount of pure vegetable oil to normal diesel will greatly improve running efficiency, because it replaces the lubrication removed from diesels by the lowering of sulphur levels. But this does not achieve much in our journey to address Global Warming.

The best option is to make a fuel that will run in most vehicle engines like normal diesel, but to offer additional heating equipment for those desiring optimal performance on bio-fuels.

For large diesel engines as would be used to generate between 650KVA and 1.6 meg of power, ten the approach may be different. Here the cost of the fuel makes all the difference. Generators doing any kind of useful work are thirsty when it comes to fuel consumption. The lower the cost of the fuel the better the profits. Any expensive fuel will be un-profitable. It is therefore a matter of adapting the fuel delivery system or even modifying the injectors themselves to enable the engine to run on (if not actually start on) the cheapest form of organic fuel you can find. This may be the fat from slaughter houses, renderers and from sewage waste or grease traps. This fat is often very contaminated with water, or is very hard at ambient. It can be used if heated and any free water removed. Normally there is plenty of spare heat available from the engine coolant or the exhaust.

### **What are the immediate benefits for us in using bio-fuels now?**

There are many reasons why we should consider the development of bio-fuels. It is not just about any concern we may have for the future of the planet. In any case whatever disaster threatens the future, you can be fairly sure it will not happen in our life time. So let's look at this in the most selfish perspective?

#### *Engines last longer*

We already know that the use of bio-fuel makes our engines last longer. Mercedes reckon that an engine will last three times longer running on vegetable oils. Making vehicles last longer may not please the motor industry, but it does please the environmentalist.

#### *Greater efficiency leads to great economy*

Engines run more efficiently and are quieter, so there is a better fuel to distance economy.

#### *Bio-fuels are renewable*

Reserves of fossil fuels are finite. We can't make fossil fuels, and even if we could, the process would take too long. Once the reserves are used up that's it. There is no more. As we approach that point the reserves will be located in increasingly difficult places to plunder. Oil is removed from the easy places first then the more difficult ones. Consequently the cost of oil will gradually go up and up. Countries with reserves will get richer, and those without oil will get poorer. This opens up another very important debate about economic self sufficiency and political stability. But unlike fossil fuels, bio-fuels are infinitely renewable. If we are able to develop other forms of fuel or energy supply then our dependency upon fossil fuels will reduce.

#### *Means of waste disposal*

Finally, there is the problem of disposing of waste oils. At present used cooking oils are either used as an additive to animal feeds or are put to landfill. In Europe the use of used oils as an energy supplement to animal feeds has been banned. Some nations have acted quickly to implement this ban. Others (and Britain is one) have acted very slowly. It is ironic that Britain is slow in implementing this policy, when we suffered more than any other nation from the effects of the Foot & Mouth outbreak and the spread of BSE, both of which are connected with contamination of animal feed.

### **So what are the alternatives? How is fat otherwise disposed of?**

#### *Animal feed additive*

The use of oils in animal feeds has been stopped now in Ireland and Germany and Holland for some time, but it will not be banned in the UK till November. By then there will need to be an alternative pathway for this material.

#### *Sold as food*

Many caterers dispose of their fat by freezing it and putting it out for collection in their dustbin waste. This is illegal but practically unenforceable. The other remedy is to put the fat down the sewers. This is now a very serious problem for sewage treatment plants throughout the UK. Fat in the sewers is difficult to remove, and ultimately it also reverts to the landfill site.

#### *Dustbin waste*

In the UK it is illegal to put used fat out with the dustbin rubbish, but it is very difficult to enforce. Fat scraped from the sewers also eventually ends up in landfill. Fat in landfill creates gas. Basically it still gives up its energy, but at lower temperatures, and slowly releasing gasses like methane in the process. In terms of Global Warming, Methane is a far more dangerous gas than carbon dioxide.

For all of these reasons there are benefits in recycling materials like fats and other organic energy stocks. The next issue is how best can we collect and process them to benefit everyone.

### **Different types of fat**

Before I describe how we propose to achieve this in practical terms, let's look at the range of materials that can immediately be used as bio-fuels?

#### *Rape*

The fat generally used in cooking is either palm oil or rape seed oil. Some soya bean oil and pea nut oil is also used. It may well be that in China the range of cooking oils is far more sophisticated! I don't think we in Britain have much to teach here when it comes to the skills of cooking!

#### *Palm oil*

Now other oils like Palm oils actually have much more potential energy than rapeseed oils. But they are a much more solid consistency and would not flow through the sort of pipes and filters fitted in vehicles. But it is possible to adapt big engines of the sort used to generate electricity to run on Palm oil or even a mixture of palm oil and tallow – that is animal fat.

#### *Fish oil*

Another important form of bio-fuel is fish oil. Often this has great value because of the vitamins, but lower quality fish oil can be used as a bio-fuel stock.

#### *Tallow*

Then there is a vast range of fats from the meat processing industry, which can be used in many different ways to make bio-fuels. We have had great fun with duck fat, which is produced in vast quantities by manufacturers of 'crispy duck'. This runs very well in our Mercedes, almost in its crude condition.

#### *Energy crops*

Now, we have so far spoken only about oils that are available economically for another purpose like cooking, and then become a waste. In fact there are many oils that do not have any culinary application, but they make excellent fuels. These oils may be extracted from endemic plants like *Jatropha*, or grown as new energy crops like *Miscanthus*. If we were to grow a crop simply to be used for its energy, then oil seed rape would probably not be selected.

#### *Algae beat all!*

But the most important energy captor of the future, will I think be algae. Algae are the most efficient form of life when it come to turning the sun's energy into hydrocarbon chains, BUT they must have the right conditions. Given the right temperature, plenty of sunlight and an abundant supply of nitrate and carbon, algae proliferate like nothing else. This is often seen in the blooms that form in lakes in the summer or the algal froth on the sea. But in controlled situations algae can be used to make bio-fuel stock, and at the same time they can be used to recycle other forms of organic waste like tyres, and sewage waste.

### **Thinking creatively to maximise energy efficiency**

I am very interested in ways that different forms of organic waste can be used to create energy when used or mixed together. I mentioned before how it is possible to shift from being just carbon neutral to actually working towards an overall benefit so we can begin to re-dress the high levels of atmospheric carbon. This means actually taking carbon out of the atmosphere. I will finish by describing the principle of that process.

#### *Tyres*

Lets start by collecting old tyres. They are largely rubber, a natural hydrocarbon. If tyres are heated up in an oxygen restricted chamber they become self pyrating. That means they 'melt' into a volatile gas and pure carbon. The process is similar to that used by charcoal burners.

The steel wire inside the tyres does not quite melt and falls out of the chamber into water to cool and then is dried and pulled of a belt by magnets and baled for recycling. The carbon also is collected and can be used to make photocopier powder. This commands quite a good price.

#### *Turbine*

The volatile gas is fed to a turbine where it is fired with plenty of oxygen and this creates a lot of heat. The turbine generates electricity.

#### *Hot gasses*

The hot exhaust gasses are fed through a boiler which creates steam and this drives another turbine – more electricity.

#### *Steam*

The steam is also used to heat heavy fats which are then, with the hot gasses used to drive reciprocating engines. These generate even more electricity. This is already three generators producing electricity, and two income streams from recycled materials.

#### *Heat pools*

But we have not finished yet....

The exhaust from the engines (at each stage the temperature goes down a bit) can then be used to warm the pools where the algae are growing.

**Feed algae**

The carbon dioxide is dissolved into the water and this is then converted by the algae back in to new hydrocarbon chains but using sun light, but these chains are of much better quality in terms of our need for bio-fuels than the original form of hydrocarbon in the tyres. So we have a low level hydrocarbon waste being turned into a high level hydrocarbon product.

I know that was a bit of a marathon to throw at you at the end of this presentation, and you can be sure that I could describe many other similar projects in which physical materials, normally considered to be 'waste' can be recreated into useful and meaningful and valuable products. I will take up some of these themes to-morrow.

**Final comments**

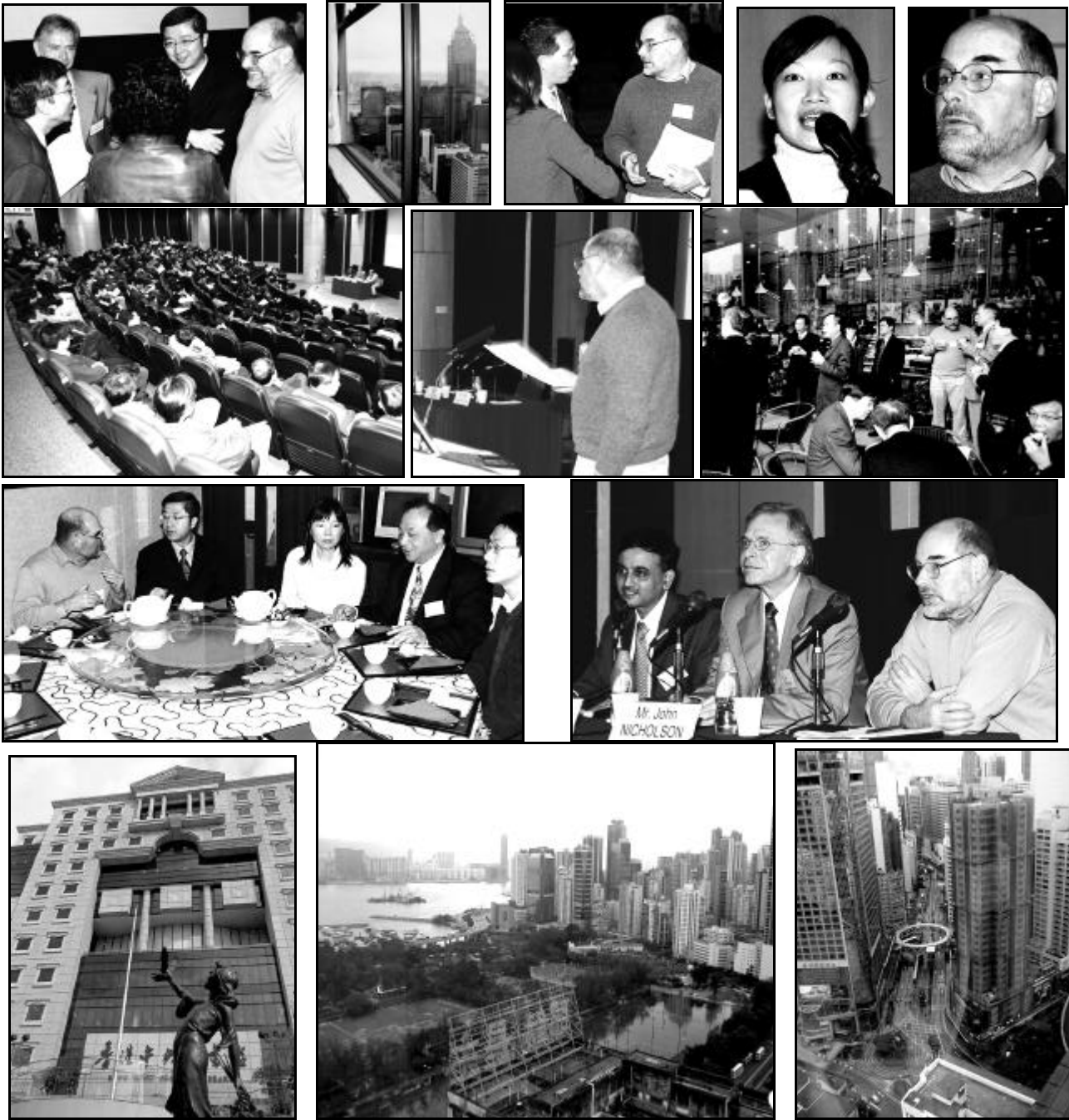
The points I hope you will take up from this 'express journey' through the development of bio-fuels are...

- 1. We all need to be considering ways to prevent the creation of waste.
- 2. We all need to be looking at the potential value of what we think of as waste. If the market value of a former waste

material can be realised (made real) then we can create a situation where there is a beneficial commercially motivated pathway for material that was otherwise a waste problem.

- 3. Most waste is not waste at all, it is a commodity just waiting for a new market.
- 4. One man's waste can become another man's fortune.
- 5. In the past we have thought largely about the material value of waste, in the future we may be thinking as much about the energy potential of waste. There is nothing shameful about burning natural hydrocarbons as a alternative to fossil fuels.
- 6. It is essential to maintain a sense of creativity in our better use of waste materials.
- 7. Develop second use markets.
- 8. You do not have to be an expert to get involved in this industry
- 9. But it does help if you enjoy having fun!

*Text taken from the presentation given at the Symposium on New Pollution Control Technology, Hong Kong, February 2004*



*The venue, Central Library*

*view from the hotel dining room*

*view from my room*

## Bio-power News

### Tan y Draig, Dragon's Fire

8<sup>th</sup> to 19<sup>th</sup> July



Bio-power will partake with Energy21 in a Renewable Energy event in Llanberis North Wales to be called Tan y Draig, or the Fire of the Dragon. This is being planned as a major public awareness event to help promote the understanding and use of bio-fuels. It will include a wide range of activities aimed at local children, visiting children, local people, government officers, environmental groups, funding bodies, charities, and of course trade users of deriv. It will also include Bio-power Renewable Energy Workshops, Bio-power Seminars, a Conference on all aspects of renewable energy, the Bio-power AGM, and elections, Networking meetings, and a full range of children's activities including an Energy Circus. This promises to be an infinitely better and more professionally run event than anything we could have arranged at this stage in our development. It is also an event that we have a lot to prepare for. Firstly, we will need plenty of Bio-power fuels to sell and demonstrate at the event.

We will also need everyone's help with the running of the event. This will include things like helping with cooking or catering, acting as stewards, issuing tickets and passes, helping with children's events, and car parking, and generally showing a welcome and hospitality comparable to the Hong Kong event. (sadly no jelly fish on this occasion?).

The dates will be, from Thursday 8<sup>th</sup> July, to Monday 19<sup>th</sup> July, but the important period for most Bio-power members will be from Wednesday 14<sup>th</sup> to Sunday 18<sup>th</sup>. Do your best to be available for these dates. Further information will be found in BPN Supplement.

### Introducing Energy 21. - Jackie Carpenter

Energy 21 is the UK Network of grassroots renewable energy groups, with the aim of "Uniting Action for Renewable Energy" We took on this national role at our AGM in October 2002 when our members voted that we should undertake this work, following a workshop in Doncaster attended by 40 representatives of such groups. For some time before that, we had carried out the role of Eurosolar UK, the UK representative of Eurosolar, the European Solar Energy Association which has its HQ in Germany.

Now our member groups include the Centre for Alternative Technology; the National Energy Foundation; local agenda 21 groups such as Bedfordshire Renewable Energy Forum; visitor centres such as Heeley City Farm and Brocks Hill Visitor Centre; and small UK companies which work to promote renewable energy at the grassroots level such as Proven and Iskra. We currently have 48 member groups and many individual members as well. Our mission is "*uniting action for renewable energy*".

We have known about the Bio-power Network since early in 2003 when we began correspondence with them by e-mail. We receive Bio-power newsletters and hold discussions with John Nicholson, their representative, on various issues. Like Bio-power we are both a networking organisation, and we also operate as a not-for-profit company, limited by guarantee. We are very pleased to be able to work with and support Bio-power at this early stage in its development, and we are delighted to be able to combine our resources in a summer event in North Wales.

Energy 21 runs the Eurosolar Awards for inspiring renewable energy projects each year, and in 2003 our independent judges picked out the Bio-power Network as the winner in the Non-Profit category.

Jackie Carpenter BSc CEng MIMechE FRSA

Managing Director, Energy 21, President of the Women's Engineering Society 2002 – 2003

### Bio-power Presentation to APSE – Manchester Town Hall.

Thanks to Rob Scully, Brian Barnes and Garry Armstrong for a very well prepared presentation to the Association for Public Sector Excellence meeting at Manchester Town Hall. This was our first attempt at a powerpoint presentation, and with help from Brian and Garry we had a short video clip showing the process used in Garry's workshop, and also an interview with a customer. Ironically I was stuck in traffic jams approaching Manchester and when I eventually arrived Rob had started the show, and it seemed to run very well. There was a lot of interest in our approach and the form of fuel we make. It is now important to consolidate this interest into contracts with local authorities whilst their interest maintained.

A number of members have asked to use this Powerpoint presentation for local meetings. Unfortunately it was very much tailor made for the APSE event, and there are a lot of things that need to be changed or up-dated. I very much hope that Brian Barnes will be able to help us further with the development and use of simple media techniques, to improve our ability to present short features on Bio-power in any situation.

### Manchester, Hong Kong, Spain, and South Africa, where next?

Bio-power is engaged in projects in many overseas countries. Form a Global perspective it makes no difference where people can be helped to change from the use of Fossil fuels to non-fossil fuels. It all helps to address the issue of Global Warming. It may be that we need to travel to Argentina and Brazil soon, and also in the near future to Serbia Montenegro. Both of these areas are working with us on plant that will take a high percentage of animal fats. We are also working with a co-operative in the ba

## **Other news from around the world, through ABI**

Volkswagen AG and Archer Daniels Midland Company announced on 5 January the creation of a joint research agreement aimed at further developing and utilizing Biodiesel fuels for the automotive industry. This Agreement marks the first time that one of the world's leading automakers has joined forces with a major global agricultural company to cooperate on the development of next-generation clean renewable fuels.

Biodiesel is a fuel mixture made by combining diesel petroleum with natural, renewable resources such as rapeseed oil or soybean oil. The use of such cleaner burning Biodiesel, which can power conventional diesel engines, is environmentally friendly and substantially reduces emissions of carbon monoxide and particulate matter. As an alternative and renewable fuel, Biodiesel can also reduce overall global dependence on fossil fuels.

"Given the tremendous environmental, economic and quality-related benefits of increased Biodiesel usage, we believe this Joint Research Agreement will go a long way toward advancing and furthering the development of this vital renewable fuel choice," said Dr. Bernd Pischetsrieder, Chairman of the Board of Management of Volkswagen AG. He added that, "Volkswagen has been a leader in the development of advanced clean diesel engines and this Agreement represents Volkswagen's commitment to introducing clean burning and renewable fuels into the automotive industry."

Mr. G. Allen Andreas, Chairman and Chief Executive of Archer Daniels Midland Company, said, "Biodiesel is one of the most promising renewable fuels on the horizon. This Agreement clearly demonstrates the shared commitment of both our companies to developing environmentally friendly next-generation alternative fuels that address global energy needs. We are proud to enter into this agreement together with Volkswagen and believe that advances in Biodiesel will benefit the automotive industry, the driving public, farmers and the environment as a whole."

Archer Daniels Midland Company (ADM) is a world leader in agricultural processing. Headquartered in Decatur, Illinois, ADM has over 26,000 employees, more than 270 processing plants. ADM's Web site at <http://www.admworld.com>.

ABI's COMMENT:

Volkswagen has been the icebreaker in 1996 with issuing first warranties for pure Biodiesel usage, but - having become slightly Biodiesel-hesitant on the European market with its highly challenging emission regulations (Euro IV) - Volkswagen wants now to exploit obviously the American growing interest for efficient TDI-driven cars. ADM runs already two large Biodiesel-plants in Germany; the scene is set for a strong Biodiesel development in the USA and other oilseed producing countries.

## **Britain plunged into an ice age within our lifetime by global warming.**

A study, which is being taken seriously by top government scientists, has uncovered a change "of remarkable amplitude" in the circulation of the waters of the North Atlantic. Similar events in pre-history are known to have caused sudden "flips" of the climate, bringing ice ages to northern Europe within a few decades. The development - described as "the largest and most dramatic oceanic change ever measured in the era of modern instruments", by the US Woods Hole Oceanographic Institute, which led the research - threatens to turn off the Gulf Stream, which keeps Europe's weather mild.

If that happens, Britain and northern Europe are expected to switch abruptly to the climate of Labrador - which is on the same latitude - bringing a nightmare scenario where farmland turns to tundra and winter temperatures drop below -20C. The much-heralded cold snap predicted for the coming week would seem balmy by comparison. A report by the International Geosphere-Biosphere Programme in Sweden - launched by Nobel prize-winner Professor Paul Crutzen and other top scientists - warned last week that pollution threatened to "trigger changes with catastrophic consequences" like these.

Scientists have long expected that global warming could, paradoxically, cause a devastating cooling in Europe by disrupting the Gulf Stream, which brings as much heat to Britain in winter as the sun does: the US National Academy of Sciences has even described such abrupt, dramatic changes as "likely". But until now it has been thought that this would be at least a century away. The new research, by scientists at the Centre for Environment, Fisheries and Aquaculture Science at Lowestoft and Canada's Bedford Institute of Oceanography, as well as Woods Hole, indicates that this may already be beginning to happen.

Dr Ruth Curry, the study's lead scientist, says: "This has the potential to change the circulation of the ocean significantly in our lifetime. Northern Europe will likely experience a significant cooling."

Robert Gagosian, the director of Woods Hole, considered one of the world's leading oceanographic institutes, said: "We may be approaching a threshold that would shut down [the Gulf Stream] and cause abrupt climate changes.

"Even as the earth as a whole continues to warm gradually, large regions may experience a precipitous and disruptive shift into colder climates." The scientists, who studied the composition of the waters of the Atlantic from Greenland to Tierra del Fuego, found that they have become "very much" saltier in the tropics and subtropics and

"very much" fresher towards the poles over the past 50 years. *This is alarming because the Gulf Stream is driven by cold, very salty water sinking in the North Atlantic. This pulls warm surface waters northwards, forming the current.*

The change is described as the "fingerprint" of global warming. As the world heats up, more water evaporates from the tropics and falls as rain in temperate and polar regions, making the warm waters saltier and the cold ones fresher. Melting polar ice adds more fresh water.

Ominously, the trend has accelerated since 1990, during which time the 10 hottest years on record have occurred. Many studies have shown that similar changes in the waters of the North Atlantic in geological time have often plunged Europe into an ice age, sometimes bringing the change in as little as a decade.

The National Academy of Sciences says that the jump occurs in the same way as "the slowly increasing pressure of a finger eventually flips a switch and turns on a light". Once the switch has occurred the new, hostile climate, lasts for decades at least, and possibly centuries.

When the Gulf Stream abruptly turned off about 12,700 years ago, it brought about a 1,300-year cold period, known as the Younger Dryas. This froze Britain in continuous permafrost, drove summer temperatures down to 10C and winter ones to -20C, and brought icebergs as far south as Portugal. Europe could not sustain anything like its present population. Droughts struck across the globe, including in Asia, Africa and the American west, as the disruption of the Gulf Stream affected currents worldwide. Some scientists say that this is the "worst-case scenario" and that the cooling may be less dramatic, with the world's climate "flickering" between colder and warmer states for several decades. But they add that, in practice, this would be almost as catastrophic for agriculture and civilisation.

*Information provided by John England.*

*Original article by Geoffrey Lean, Environment Editor The Independent, 25 January 2004*

## **The Disclosure Project announces new Energy Disclosure Initiative**

The Disclosure Project has announced that it will be pursuing a disclosure on the existence of new and alternate energy systems that have been deliberately and illegally suppressed.

The Disclosure Project, in cooperation with Space Energy Access Systems Inc., has discovered that over the past 75 years a number of important breakthroughs in energy efficiency, alternate forms of energy generation and propulsion have been deliberately withheld from the public to prop up the oil, gas, coal, public utility and nuclear power industries. These significant technological breakthroughs that have been suppressed range from modifications of the internal combustion engine to get significantly higher miles per gallon to new electromagnetic generating systems that extract energy from the so-called Quantum vacuum. Current intelligence gathered by The Disclosure Project and SEAS indicates that a shadowy operation connected to covert government and intelligence programs but run primarily by US and foreign corporate interests have resulted in this suppression. Actions taken to effect secrecy and to neutralize the public availability of these technologies - which by now could have completely replaced the need for fossil fuels - include:

- Threats, intimidation and on occasion the murder of scientists and inventors originating these energy breakthroughs;

- Corporate acquisition of technologies with subsequent 'black shelving' - that is the deliberate suppression of the technology by owning the rights and then refusing to release the technology to the public;

- The illegal application of section 181 and related sections of the Patent Law to force inventors to keep the technology secret or face substantial fines and jail time;

- The bogus and illegal use of other so-called national security provisions to intimidate inventors and suppress technologies;

- Sabotage of inventor labs, prototypes and facilities in order to cause the loss of the technology or to intimidate inventors and colleagues.

It is clear that human society will continue to be harmed by the deliberate and illegal withholding of such technologies and that a thoroughly documented and sourced Disclosure of the matter is urgently needed. The widening gap between poor and rich nations, the worsening situation in the Middle East and elsewhere, the relentless decay in the environment, global warming, intractable world poverty and many other pressing problems facing humanity are directly related to the suppression of these energy breakthroughs. We call on all concerned citizens to assist us in identifying and securing the cooperation of the following:

- Scientists and Inventors of high credentialed credibility who have been the target or victim of such suppression;

- Corporate Whistleblowers who have observed or been part of the acquisition or suppression of such technologies;

Government, military and intelligence whistleblowers who have witnessed or been part of such actions. These include current or past whistleblower witnesses from the Patent Office, Department of Defense, CIA, NASA, NRO, NSA, Executive Branch/White House, Congress or any other branch of the military and government;

Non-US whistleblowers associated with foreign governments, particularly western Europe, Great Britain, Russia/former USSR, and Japan;

Foreign corporate or institutional whistleblowers. Whistleblowers associated with government labs or para-governmental institutes, universities and research centers.

Any person who has or can acquire documentation, whether government or private/corporate of such suppression and acquisition of technologies and who can establish the authenticity of said documents.

The Disclosure Project will coordinate an international release of such whistleblower testimony and documents once there is sufficient credible named sources and evidence to establish beyond any doubt the reality of the existence and suppression of such technological developments. Please help us identify such witnesses and evidence. It is time the world knew the truth about energy, oil and why humanity continues to be held down by our artificial addiction to oil and fossil fuels. The time for change is now.

Further information may be obtained from the Disclosure Project web site: <http://www.disclosureproject.org>

## **News from our members....**

Read the latest from Kaye Angus and the Oil Matters Team on <http://www.oilmatters.co.uk/om019.html>

### **Bio-fuels on airports**

Hello, I was wondering if you knew what fuel is used for airport ground crew vehicles, you can't help but notice the protest about the UK's growing airports. As someone who used to live near Stansted airport, I know that ground crew vehicle emissions is a major pollution issue. Now they probably all run on gas but if they were all diesel powered, I believe it would be worth looking into a proposal to offer a cheaper, cleaner alternative. It would definitely placate one major pollution issue. And be something that if the public were aware of would be hard for the government not to support. Also, all these major airports are located in or very close to large urban conurbations, offering a plentiful supply of base material. The naivety of this will probably make you laugh, if it does then that's great, if it interests you then I guess that's better and don't hesitate to contact me.

*Bob Fynan*

### **Greeting from the Basque Country in Spain**

Hi John, I hope this message finds you well and not too exhausted from all your activities.

Just must say many thanks for stimulating and very effective (Feb) seminar, I am just sorry that couldn't stay longer to chat with you and talk more about industrial apps including the water treatment and algae systems for Spain. Still even as it was, my head was buzzing with ideas and I think it has changed my direction quite a bit! Even thinking of changing my thesis area to deal with issues related to Bio-fuels here! I am serious about this - there might be European dimension that needs academic study that could be of help to Bio-power UK?

On return to Basque Country I set about getting in contact with various authorities about a study to set up a small plant.

In Oñati (my town). The planning officers and the enterprise dept. have been helpful, at the moment I am engaged in approaching fat users and trying to plan a collection strategy. Nuff said.

Again, maybe this is related to info on the members section - but could you let me have the contacts of Bio-power members here in Spain? Also would appreciate some details and dates for the more in depth seminars that you mentioned. I also feel that I need to discuss with you about the my business plan here, especially as we will have an additives problem if they are going to be produced by the group in UK - or perhaps being here will just create opportunity for more collaboration etc. This could be pursued at another seminar I guess.

Meantime should I keep you and anyone else who is interested informed about my efforts through the newsletter or by email? I do remember what you said about the hundreds you were receiving so this may not be such a good idea. Please don't feel you need to reply to all the points - just the seminar dates would be enough for now.

Getting you over here in summer - still a bit green, nothing special to report yet, though am having a meeting with interesting group next week about this.

All the best, Steve Carr from Spain

### **A technical challenge from Jackie Carpenter**

We are planning to provide communal cooking facilities at the camp. It is very nice for people to cook and eat together, but we think we shall not actually provide the food - they can go and buy that.

The cooking facilities might include a camp fire but what we would really like is a biofuel powered cooker. What do you think? I thought we could get an oil-burning Aga and convert it to burn on biofuel and then set it and a tank of biofuel up on site.

Please let me know soon, and also if you know anyone in the Bio-power network who could work on developing such a cooker. I am sure we can raise funds to pay for basic materials but not any R and D fees!

*best wishes, Jackie*

*Technically I'm sure it is possible, probably using the system where fat is gassified under pressure. I run a Franco Belgie wood burning stove which is used to heat water and do basic cooking. It has been converted with a drip feed burner where the fire would be, and baffles to direct the heat where it is needed. I place a dog dish on top of the kindler and drip fat into it to heat the whole stove up when it is cold weather. A splash of water makes a fearful roar! The fan assisted burners can easily be converted to run on clean fat. It is necessary to have a pressure pump to maintain a fuel supply head (Dunphy Rochdale) and also a coil of copper pipe inside the flame to heat the fat before it reaches the jet. JN*

### **Fair comment from Rob Scully..**

I was aware that Bradford were using a 5% bio-blend, but I didn't know who supplied it though, and interestingly neither did the fleet services scrutiny committee! Obviously Petro-plus market themselves better to the D&S than they do to their own customers.

More interesting was the bit about their attendance at the 'high powered' BABFO conference with government bigwigs & regulators. Petro-plus, Greenergy, Rix etc are essentially petrochemical companies moving in on a good PR opportunity and are trying to convince the government to limit the production of bio-diesel to 5% blends produced by companies like them. They wish to portray producers such as us as a liability to the industry because we are, as Greenergy put it in their submission to Government for Budget 2004, 'small unregulated cottage industry producing untested and unreliable product'. We also scare them because we offer a product that is cheaper than theirs and is not rooted in the existing fuel production sector.

These multi million pound petrochemical businesses have an obvious vested interest in keeping organisations like ours out of the marketplace and also they have the clout (£) with regulators & government. In my view ,we MUST attract some high profile inward investment into Bio-Power in order to develop our network into a reliable alternative to these operators and to have our products tested & trusted. Our current resources are woefully thin on the ground and we will end up being left behind whilst the petrochemical industry persuades the Government to bring all production of bio-fuels under the sort of tight regulation and restrictive administrative practices that only big business can afford to bullsh\*t its way through.

Rob

## **The Bio-power Seminar Program 2004**

<b>Introductory Seminar 26</b>	<b>12 13 14</b>	<b>March</b>	
<b>Local Agents Convention 2</b>	<b>19 20 21</b>	<b>March</b>	
<b>Introductory Seminar 27</b>	<b>1 2 3</b>	<b>April</b>	
<b>Technical workshop</b>	<b>23 24 25</b>	<b>April</b>	
<b>Introductory Seminar 28</b>	<b>7 8 9</b>	<b>May</b>	
<b>Technical workshop</b>	<b>21 22 23</b>	<b>May</b>	
<b>Introductory Seminar 29</b>	<b>11 12 13</b>	<b>June</b>	
<b>Introductory Seminar 30</b>	<b>12 13</b>	<b>July</b>	<b>Tan y Draig Energy Event</b>
<b>Technical workshops (Llanberis)</b>	<b>14 15</b>	<b>July</b>	<b>Tan y Draig Energy Event</b>

## **Other Renewable Energy Events**

Energy21, The National Energy Foundation, and LILI Low Impact Living Initiative will be running a two day gathering on Heat Pumps at is running a two-day gathering on 10<sup>th</sup> and 11<sup>th</sup> March at NEF Knowlhill, Milton Keynes. On Thursday 11<sup>th</sup> March there will be a special meeting for those involved with working face to face with the public in the promotion of renewable energy. There will be sessions where we share information and best practice about solar and hot water self help projects, and community owned wind projects. For further details contact *Energy 21 office: 01249 783415.*

### **Editors comment....**

*Because we did not publish a BPN for February I have compressed a lot of information into this issue. I hope you do not mind the smaller type face and the two column spacing. There are plenty more pictures of the China event, including pictures of the places visited on a compilation CD. Let me know if you would like a copy. JN*

## **Please use the information in this publication carefully**

**Bio-power News** is produced and distributed to the supporters and members of the Bio-power community, to provide information about our work, news of events and activities. Please regard this publication as confidential to the Bio-power Community and its supporters. JN.

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