Sustainable Blewbury

www.sustainable-blewbury.org.uk

No. 31 **February 2019**

For the latest news and more information, please see our website

Sustainable jet fuel from rubbish – how does that work?

A talk by Dr. Neville Hargreaves

Monday 1st April at 8.00 pm, in the Melland Room, Blewbury Clubhouse, Bohams Road

Reducing the greenhouse gas emissions from aviation is tougher than for any other form of transport - and emissions are growing fast. Neville is working with British Airways and others on an exciting project to build the UK's first commercial sustainable jet-fuel plant. This will convert household waste into jet fuel – reducing greenhouse gases and converting hundreds of thousands of tonnes of waste that would otherwise be incinerated or put into landfill. He will describe how the process works, what it can do for the environment now and in the future, and the many practical challenges of bringing a really big industrial project to fruition.

Tickets £4 from Blewbury Post Office, or on the door (if not sold out). Drinks available from the bar.

Electric cars follow-up

On 25th February we had an excellent talk on electric cars from Anthony Simpson, and it has led to a lot of interest in what's currently available. There is a very good website listing current and

forthcoming electric (and plug-in hybrid) models, with details of range, efficiency, price, company car tax, etc. in a table that allows selection according to various criteria. Each entry is backed by a page giving more detailed information. Go to ev-database.uk.

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'How the world got hooked on palm oil'

Eric Eisenhandler

On holiday travelling south to north in Malaysia a few weeks ago, Claire and I saw almost nothing but palm oil plantations growing in the countryside for most of journey (see photo below). Palm oil is now used in an amazingly diverse and growing range of products, from processed food to fibreboard and detergents to biodiesel.

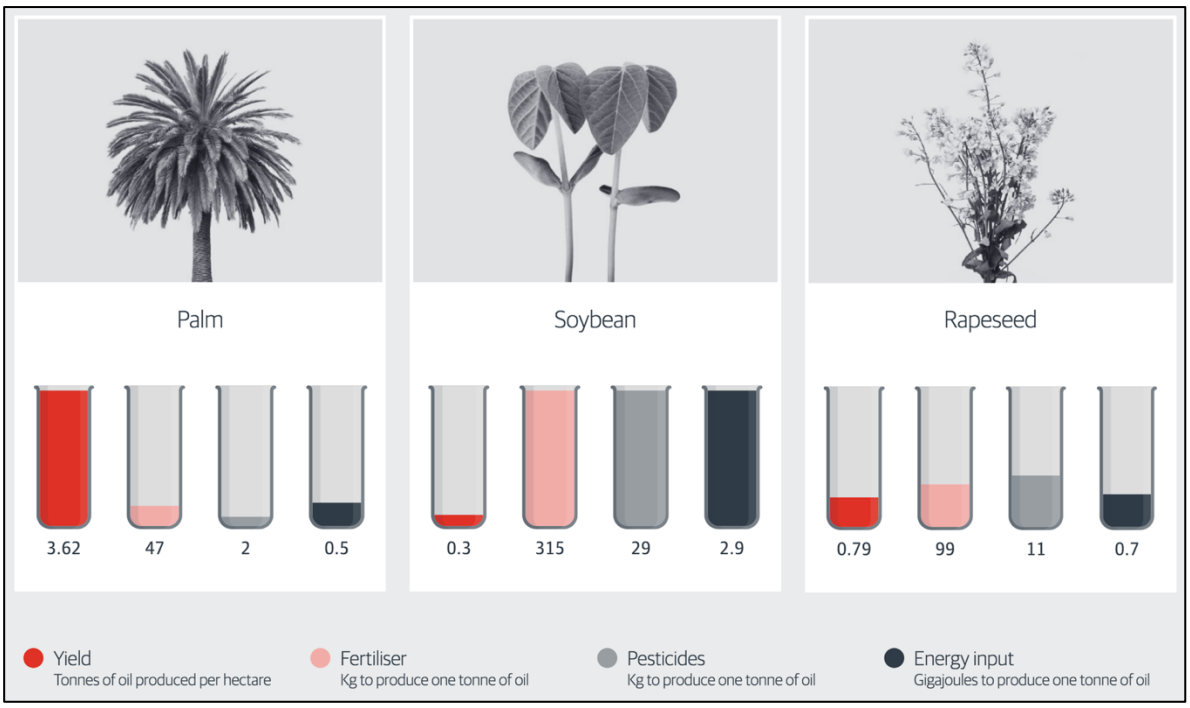
Oil palms, as far as the eye can see

Why has palm oil been so widely adopted? A number of reasons: it's not only easy and inexpensive to produce – it is also healthier to eat, and has other properties that make it better to use than the various other types of oil and fat it has replaced. As a result, palm oil production quadrupled from 1995 to 2015 and is still growing rapidly, and it now covers about 10% of global cropland.

But far too often, palm oil production is very damaging. The two largest producers are Malaysia and Indonesia, where it has greatly helped their economies. But especially in Indonesia, much of the land for palm oil is being cleared by burning tropical forests. This emits huge quantities of greenhouse gases, pollutes the air over much of south-east Asia, and endangers wildlife, including orangutans, tigers and rhinos, by destroying their habitats.

Some palm oil claims to be sustainable, but can you believe the claims? Organisations such as Greenpeace have campaigned to get companies using palm oil to use environmentally friendly and accountable sources, while also pointing out that sustainable palm oil schemes need to be strengthened.

A very interesting and informative long-read article in the Guardian on 19 February explains 'How the world got hooked on palm oil'. It also goes into why some of the proposed alternatives to palm oil would be even worse – for example see the picture below. You can find it the article at bit.ly/2NcZD3j. You can also see some of the key palm oil issues in a very clear, interactive presentation (from 2014) that is well worth a look. It's linked in the margin near the end of the main article, or just go to bit.ly/2hlXRQF.



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Power in divestment

Jo Lakeland

We see the word divestment a lot in the news at the moment, but what is it and can we personally do anything to encourage it? The traditional meaning of divestment was shedding, as in divesting oneself of one's clothes, but in the 21st century it has come to mean 'the action or process of selling off subsidiary business interests or investments'. And the particular subsidiary business interests or investments that are of interest to us, as people who believe that climate change must be minimised, are investments in the production of fossil fuels.

So what can we do? Our personal divestment should start by switching to green energy providers. Unfortunately, most switching services are designed to find the cheapest deal, and the penalty for switching to a green energy provider can be that it is not the cheapest option. But there are not

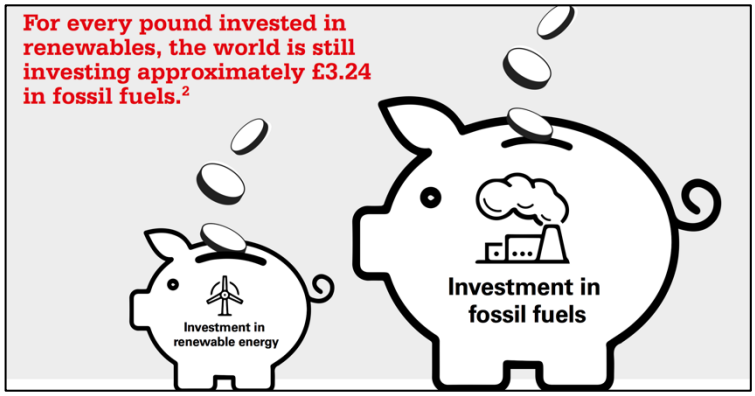
many green energy providers, so if you have a look at their websites it is fairly easy to choose a couple for comparison and ask for quotes. You will need to be prepared to be asked for details of your current provider(s) and to know how much energy you have used in the latest billing period.

Electricity production will gradually switch from generation by burning fossil fuels to generation by sustainable sources such as wind power. When this happens we could avoid using fossil fuels like gas to heat our houses by switching to all-electric heating and cooking. But that is still in the future.

The other thing we can do is to choose the investments we make and those made by our pension providers etc., and if they include fossil fuels we can put pressure on them to divest from these in favour of sustainable investments. Unfortunately, some of the biggest investors in funding oil exploration, coal mining, fracking etc. have been the big-name high street banks, and on an even bigger scale the World Bank. Charities have been exposing this, for example over the last two years Christian Aid has targeted Barclays, HSBC, RBS and Lloyds and asked them to make the Big Shift out of fossil fuels and into clean energy. There's been some great progress, including Lloyds and RBS pulling out of coal altogether and HSBC committing to invest $100 billion in green energy by 2025.

But the banks are still not moving fast enough. HSBC is still willing to fund new coal projects in Bangladesh, Vietnam and Indonesia, three countries extremely vulnerable to the impacts of climate change and with massive potential for renewable energy. And despite claiming to be a climate leader, HSBC continues to invest heavily in fossil fuels."

You can download a pdf: *'The Big Shift: Banks must invest our money in a cleaner future'* at bit.ly/2GLYLCz. Christian Aid is increasing the pressure on HSBC in the period before Easter by publicising the investments and encouraging people to email the CEO of HSBC.



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New nuclear power for the UK?

Eric Eisenhandler

How we got here

Nuclear power is a low-carbon – not no-carbon – source of electricity. Although the actual generation process is relatively 'clean', mining and processing the uranium fuel, dealing with the radioactive waste and dismantling old reactors do produce carbon dioxide emissions. The UK was the first country to have commercial nuclear electricity generation, although those first reactors were built primarily to produce plutonium for nuclear weapons. In recent years nuclear has produced roughly 20% of our electricity.

Calder Hall, the first commercial nuclear power station, 1956 to 2003.

About a decade ago, when the need to minimise climate change by phasing out the use of coal, oil and gas had become very clear, the UK introduced subsidies for renewable energy sources – mainly solar and wind. However, due to the intermittent nature of solar and wind power it was thought that the electricity grid could only handle up to about a third of its electricity coming from these renewable and (at the time) expensive sources. So it seemed that we also needed reliable, always-

on, low-carbon and affordable nuclear power as a baseline, especially as it was also thought that having more and more appliances and electronic gadgets would raise the demand for electricity.

Nuclear reactors then were expected to cost £3–4 billion each, and as nuclear was a 'mature' technology (unlike renewables) the coalition government said that nuclear energy would not need to be subsidised. The aim was to replace the UK's ageing reactors, all but one of which were nearing the end of their working lives, and also to increase the amount of nuclear-generated electricity.

Not everyone agreed, due to long-standing and well-known problems with nuclear:

- long-term disposal of radioactive waste has still not been implemented,
- the long and delicate process of dismantling old reactors has become increasingly expensive,
- countries in areas of conflict could use nuclear reactors to produce nuclear weapons, and
- the danger of rare but very damaging and expensive nuclear accidents.

The safety issue was brought into focus by the destruction of four nuclear reactors at Fukushima, Japan in 2011. Although the initial cause was an earthquake and tsunami, the reason those reactors failed, unlike others nearby, was due to the owners not heeding multiple warnings to improve the tsunami protection of their backup generators. It still isn't known how to clean up the destroyed and dangerous reactors, the cost is clearly going to be colossal, and well over 100,000 people lost their homes and in many cases their livelihoods.

Abandoned shop and house in Fukushima

Fukushima led to tighter safety requirements that added to the already rising cost of new reactors, and a number of countries (e.g. Germany, Italy, Switzerland, Japan and South Korea) have decided not to build any new nuclear power stations. However, the UK has attempted to carry on with the programme to build new nuclear power reactors, despite rising capital costs and long construction times.

Current status of new reactors for the UK

Hinkley Point C

The only project actually underway is for two EPR pressurised-water reactors, each generating 1,600 MW, at Hinkley Point in Somerset. Now in the early stages of construction, they are the first new reactors in the UK for more than 20 years and could supply about 7% of the UK's current electricity needs. Originally proposed nearly a decade ago, the original cost estimate has already tripled to about £20 billion, and the timescale for completion has been delayed from the end of 2017 to 2025, but with serious hints that it could slip to 2027. These two reactors would be the most expensive nuclear power reactors ever built.

The project is run by a partnership: two-thirds EDF Energy, the company that also owns and operates the UK's existing reactors and is 85% owned by the French government, and one-third China General Nuclear, which owned by the Chinese government.

EPR reactors are an as-yet untested design, claimed to be safer and more fuel efficient than currently operating reactors. However, they have a rocky history. Hinkley Point has been preceded by four other EPRs that have all suffered from safety-related technical and construction problems.

The first, in Finland, was started in 2005 and was scheduled to start up in 2009. Its original costing has tripled and it is now scheduled to start up in 2020. The second EPR, in Normandy, was started in 2007. Planned to start operating in 2012, it is now also supposed to start in 2020 and its cost has more than tripled.

EPR at Olkiluoto, Finland

Construction of the other two EPRs, in Taishan, China, was started in 2009; they were supposed to be operating in 2013. One reactor finally began operating in

December 2018 and the other is due to start this year. The cost situation is not clear. No other EPRs have been sold, despite world-wide efforts by EDF.

All these problems have left EDF in a very precarious financial state. The company has needed considerable help from the French government, and in 2016 many of its senior management and staff urged abandonment of the Hinkley Point project.

Construction underway at Hinkley Point C

The UK government persuaded EDF, in its new partnership with China General Nuclear, to carry on by promising them a guaranteed electricity price of £92.50 per MWh at 2012 prices, roughly double the wholesale price and indexed for inflation, for the first 35 years of operation. It is estimated that this subsidy would cost the British public between £30 and £50 billion pounds. (So much for a 'mature' technology that would not need subsidies.)

Compare this with offshore wind power, once thought to be too expensive to be worth supporting. New installations can produce electricity for roughly half the Hinkley Point price. The government has since admitted that this deal was too generous and would not be repeated.

Sizewell C

This proposal, also by EDF and China General Nuclear, would duplicate Hinkley Point C. They say that re-using the Hinkley Point design would lower the cost and speed up construction. A public consultation is underway, with building claimed to begin in 2022 and completed in 2031.

However, there are environmental objections to the project as well as problems of access in a rural area. And crucially, there is not yet an agreed deal with the government.

How Sizewell C might look

Moorside

The only proposal for a site that has not already been used for nuclear reactors is near Sellafield, and was expected to be the next to follow Hinkley Point. The project, called NuGeneration, or NuGen, started out as a joint effort that was sold to Toshiba's Westinghouse Electric Company.

The plan was to build three AP-1000 reactors with a total capacity of 3,400 MW. The AP-1000, like the EPR, is a new design of pressurised-water reactor aimed to be safer and less expensive than existing reactors. Other AP-1000s were being built in the USA and China. The four in China recently began commercial operation.

However, in 2017 Westinghouse went bankrupt, mainly due to huge cost increases and delays to the four AP-1000s in the USA. Two of the reactors were abandoned after four years of construction, and

although work on the other two has continued under other companies there have been more problems due to delays and cost increases.

For a while it seemed as if the Korean company Kepco might take over the Moorside project and build its own AP-1400 reactor design. But negotiations stalled and in 2018 Toshiba liquidated NuGen, effectively ending the project.

Moorside, next to Sellafield

Wylfa Newydd (and Oldbury)

Wylfa, at the northern end of Anglesey, was chosen by Horizon Nuclear Power for Wylfa Newydd (New Wylfa), two advanced boiling water reactors (ABWRs) generating 1,650 MW each. Horizon was started by the German companies E.ON and RWE (owner of npower), but seeing no future for nuclear power in Germany they sold Horizon to Hitachi in 2012.

Construction was supposed to start in 2018, but was delayed while a deal was made with the UK government. Unlike Hinkley Point, where the operator only gets the subsidy when operations start, the government offered instead to invest £5 billion of public money in the project, more helpful but less generous than for Hinkley Point.

Wylfa, with decommissioned Magnox reactors

Horizon had already spent £2 billion improving access to the remote site when, in January 2019, they announced that they were suspending the project due problems attracting additional investment. There is a possibility the project might resume but It seems unlikely.

Horizon had also aimed to build a pair of ABWRs at Oldbury, but only after the construction of Wylfa was completed. That project has also been suspended.

Bradwell B

Bradwell is a former nuclear power station at the mouth of the River Blackwater in Essex. In 2016 China General Nuclear (CGN), now leading a partnership with EDF, proposed building reactors of CGN's own design, Hualong 1000 (1,000 MW each). These reactors are not yet in operation anywhere, but have been submitted for the UK's generic design approval.

There are serious environmental questions concerning the site, due to sea level rise and possible storm surges due to climate change. On top of that are questions related to control of key UK infrastructure by companies owned by the Chinese government.

Radically new designs?

There are a wide range of proposals for much more advanced nuclear reactor designs that claim to eliminate some of the problems. One proposal is for small modular reactors that can be built in factories rather than on-site, like the reactors used in nuclear submarines, which would cut the cost. But is there really a market for them, how much would they actually cost, and do we want a lot of small reactors spread around the country on a large number of sites?

Two other possibilities are the so-called Integral Fast Reactor and reactors based on thorium rather than uranium, but advanced designs like these would need decades of development and testing before we would know whether they live up to the promises, are affordable, and their difficult technologies can be mastered safely. It might well be better, less expensive and more rewarding to put a similar effort into developing improved renewables, better and cheaper energy storage, and new ways to conserve energy.

Do we really need nuclear?

At the beginning of this article I mentioned some of the thinking about nuclear and renewables a decade ago. Much of that has changed. Despite all sorts of new electronic gadgets and appliances,

total UK electricity consumption has actually decreased rather than increased. That's because energy conservation measures have led to much more efficient appliances and electronic gadgets, and lighting has undergone a revolution due to LEDs – which in many cases supply the same amount of light using just a tenth of the electricity.

A huge change has been that both solar and wind power are now much less expensive while nuclear power has become much more expensive. Although the UK has effectively stopped new onshore wind projects despite being one of the cheapest sources of electricity, we have invested heavily in offshore wind and are among the world's leaders.

For the future there will probably be an increased need for electricity due to the switch to electric cars. But as Anthony Simpson explained in his recent talk in Blewbury, the increase can be minimised using smart charging techniques rather than just allowing a large part of the population to recharge their cars as soon as they come home from work.

How to handle intermittent renewables has also moved on. Better weather predictions help, and by using several types of renewables spread over a much larger area, including interconnections to other European countries, a lot of the variation can be smoothed out and handled. Denmark already gets well over 40% of its electricity from wind, and with smarter grids it is now thought that an electricity supply mainly supplied by renewables seems feasible.

To handle the ups and downs of both supply and demand, much-improved battery technology, pumped storage and other storage methods will be part of the solution. However, some sort of generation capacity will also be required, but it has to be able to turn on and off rapidly, and it would not often be needed.

Nuclear reactors are not a good fit this role: they run best when going flat out all the time, and switching them on and off or up and down quickly is difficult. In addition, to pay off their huge capital cost the operators would want them running most of the time – but nuclear electricity is now very expensive, so that would raise electricity bills. Nuclear power now seems more and more like a huge lumbering dinosaur in a world that has changed.

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The Sustainable Blewbury newsletter is edited by Jo Lakeland and Eric Eisenhandler

We have a substantial programme of activities in and around the village. Getting involved is fun and can make a very positive contribution to village life and local environment. If you'd like to get involved in what we do, or to receive our free Newsletter, email us at info@sustainable-blewbury.org.uk or phone Eric Eisenhandler at 01235 850558.