

Fuels for the future

by Katie Harrison

It is now clear that we need to make some changes to the way we generate energy, in order to avoid catastrophic climate change. However government and corporations are trying to convince us that some techno fix will allow us to curb climate change without seriously reducing our energy consumption. This article will look at some of the power sources available to us, to see whether they can deliver on the promise of endless energy without environmental consequences.

The major power sources for the UK at the moment are coal, oil, natural gas, and nuclear. In the coming years it is expected that oil and natural gas will decline as these fuels become increasingly expensive, and coal and nuclear power generation will go up.

Coal

Coal is a fossil fuel, like oil and natural gas. Coal is considered to be the dirtiest of the fossil fuels as it releases the most carbon dioxide for a given amount of energy produced. As well as contributing to climate change coal burning also releases sulfur dioxide which goes on to form fine particulates, a form of air pollution which causes asthma, cardiac problems, and respiratory problems.

The use of coal in the UK is on the increase, and coal is now the largest single source of energy in the UK. As peak oil kicks in, it is very likely that the UK will switch to even greater reliance on coal for energy generation.

Nuclear

At present roughly 15% of the UK's electricity is generated by nuclear stations. However the nuclear reactors are all over 20 years old and due to be de-commissioned within the next few years. The government is currently pushing for a new generation of nuclear reactors to be built, and this is being sold as a 'solution' to climate change. While it is true that nuclear power generation results in fewer greenhouse gas emissions than burning fossil fuels, nuclear power produces deadly radioactive waste instead. Radioactive waste cannot be treated, is notoriously difficult to store, and remains radioactive for thousands of years. We have no way to get rid of it so the more nuclear power we generate, the more it piles up.

Hydrogen fuel cells

Hydrogen fuel cells sound like a great idea - you can run a car on water! The problem is that hydrogen fuel cells are really a method of energy storage rather than a method of energy generation. You still have to get energy from somewhere to hydrolyse the water.

In principle hydrogen fuel cells could be used as a method of harnessing energy derived from renewable sources such as wind or solar. The problem is that the amount of energy we currently use on transport is simply too vast to be generated from renewably sources. Some campaigners imply that by switching over to hydrogen cars (a difficult and expensive move) we can continue with the one-person-one-car scenario that we have at the moment, but this is impossible. If we are to reduce our carbon emissions meaningfully we need to travel much less than we do now, and use the most energy-efficient methods of travel (bicycles, buses, and trains, not cars and airplanes).

Biodiesel

Regular diesel comes from oil, like petrol (or gas as it is called in North America). Diesel requires less processing than petrol, which is why it is cheaper.

You can now buy a mix of 5% biodiesel, 95% regular diesel, at Asda garages. The biodiesel is

derived from crops such as oilseed rape, and has 60% lower lifetime emission of carbon dioxide than normal diesel. UK motorists currently consume 24 million litres of biodiesel a year, even though it is more expensive than normal diesel. At the moment this is a tiny fraction of the market share, but as oil prices go up biodiesel may become more of a viable option for motorists.

This all sounds wonderful. However if motorists do end up using biodiesel more in the future, vast sections of land will have to be set aside to grow the oil crops. This land will have to come from somewhere - most likely either some of the Earth's few remaining forests will be cleared to make room for biodiesel crops, or else agricultural land previously used to grow food would be given over to biodiesel production. We would likely have a situation where land which had previously been used to feed some of the world's poorest people would instead be used to grow fuel so the rich could continue to drive cars. Many nations in the South have been forced by the WTO to grow cash crops for exports rather than subsistence crops, and biodiesel crops would become another cash crop like coffee or sugar.

The idea of producing biodiesel on a massive scale is yet another techno-fix designed to lull us into the illusion that we can have endless cheap energy without consequences. If biodiesel was used on a massive scale to power the UK's current transport fleet it would lead to a human and environmental disaster.

This is not to say that biodiesel is intrinsically bad. Green and Gold Biodiesel Co-op sells biodiesel from their forecourt in Manchester. Their biodiesel is derived from recycled chip fat. The overall carbon dioxide emissions from this type of biodiesel are almost zero: burning the biodiesel in a car engine releases carbon dioxide, but if the chip fat were dumped in a landfill it would decompose and release carbon dioxide into the air anyway.

It would be impossible to run all of the cars in the UK on biodiesel derived from chip fat because there is simply not enough chip fat. However this small-scale recycling of chip fat makes sense as part of a transport strategy that also includes reducing the amount of fuel we use overall.

Big hydro

Big hydro plants are dams on large rivers, such as the one at Niagara Falls on the Canada-USA border. The force of the water pushing through the dam is used to generate electricity.

The capacity for big hydro to generate new electricity worldwide is limited as most of the best sites have already had dams built on them. In addition the dams tend to silt up, so after a few decades a dam may not give as much power as it did originally.

Big hydro dams can cause tremendous ecological damage. The Kárahnjúkar dam which is currently being built in Iceland will destroy thousands of square kilometres of utterly unique, untouched wilderness. You can see pictures of the land that is being destroyed [here](#).

Solar and wind

Solar panels and wind turbines are truly sustainable energy sources. At present these provide a tiny fraction of the energy being used in the UK. With technology currently being used in the UK it is unlikely that wind and solar could ever be our main energy sources. However there are two technologies that could change this in the future: massive off-shore wind and wave farms, and solar energy from the deserts. Both of these options would require large amounts of money to be spent initially, but they might pay off hugely in the long term. Both of these technologies require energy to be transported over long distances. Long-distance transport of energy using conventional AC power lines is inefficient, since the longer the cable, the more energy is lost, but this is not the case with high voltage DC (HVDC) power cables.

The National Grid

The electricity that lights a lamp or heats a toaster comes through your plug socket from the national grid. Energy is generated mainly by coal, natural gas, and nuclear power stations, is converted to electricity, and is distributed over the UK through a system of power lines, and power stations.

The farther electricity travels through wire cables, the more energy is lost as heat. If the amount of electricity we use drops dramatically (as it will have to, one way or another) then it will make less sense to have a large network of power lines connected over long distances. In the future, instead of having a single national grid we may have many small local electricity networks.

Fuel for the future?

There are many options for future power sources, but it is unlikely that we will find any technology that would allow us to continue consuming at our present rate without further destabilizing the climate. We need to look for the greenest possible power sources - but we also have to cut our consumption massively.

The good news is that our society is massively wasteful - which means that if we're smart about it, we should be able to drastically reduce our emissions, and still have decent and enjoyable lives (although we will have to give up a few of the luxuries we have grown accustomed to).

Using less energy does not necessarily mean that our lives will be worse, it just means that they will change. We can't afford to have one-person-per-car anymore - but if we're smart, we'll rearrange our lives so that we live near the places where we work and shop, and it won't be a problem. We are used to eating foods transported from around the world but we can stop eating bananas and mangoes and still had a healthy, varied diet. We are among the richest and best-educated people in the world - so presumably we can get rid of plastic coffee cups, heated outdoor beer-gardens, 62-inch plasma-screen TV's, and cheap flights to Europe, and still find a way to make our lives enjoyable and meaningful.

It's scary to imagine changing the way we live. Politicians, oil company spin-doctors, and others with an interest in maintaining our dependence on fossil fuels, play on our fear of change. They tell us that we can't live without consuming massive amounts of fossil fuels, that to reduce our emissions means going back to the stone age. Yet the technologies needed to switch to a low-carbon economy already exist, and there are examples of communities in the UK who have gone low-carbon (Bed-Zed, for example). Society has always been changing (Remember not having mobile phones? Remember typewriters? Remember the Cold War?) and it will continue to change. It's up to us to make sure that it changes in the most positive way possible.



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