How to reduce our Carbon Footprint.
Advice from Green Ixworth.

Many people are looking for ways to reduce their carbon footprint. As we shall see later advice and help is on its way. In the meantime much is being made of the Hydrogen economy. It is often portrayed as an easy answer to our need for Clean Energy. Government is spending several billions of pounds, much of it going to oil companies, to develop processes to produce Blue Hydrogen from natural gas and then establish a distribution system similar to that for petrol and diesel. Below are some of the arguments concerning the potential of Hydrogen for reducing Climate heating.

Why Hydrogen?

When burned in a boiler the exhaust contains only water. When used in a Fuel Cell to produce electricity the exhaust is again only water.

Where does it come from?

There are two main commercial methods to produce hydrogen:

1. **From water by hydrolysis.**

   This involves using electricity to split water into hydrogen and Oxygen, a relatively simple process but using a great deal of electric power.

2. **From Natural Gas – Methane**

   A catalyst and heat and produces Hydrogen and Carbon Dioxide plus leakage of Methane which is many more times powerful as a greenhouse gas than Carbon Dioxide. Not surprisingly the oil and gas companies prefer Blue Hydrogen so they can continue to justify their current exploitation of oil and gas.

Which is best?

From the above it is clear that both methods have downsides.

Green Hydrogen uses large quantities of electricity. If used only to replace natural gas in domestic and industrial heating we should need to nearly double our electricity supply. (More on this below)

Blue Hydrogen creates not just similar amounts of Carbon Dioxide to burning natural gas in a boiler but leakage of Methane increases total greenhouse gas by a further 20%. Now Oil companies are being paid to develop ways of capturing and placing the Carbon Dioxide underground. Methods to date are only 80% efficient so still exhaust Carbon Dioxide to the atmosphere. Significant amounts of electricity are also used. If we are to capture carbon its better use is to take it from the atmosphere to reduce the rate of growth whilst other longer term means are used to reduce its production.

So what do we do?

Both methods for making Hydrogen, require large amounts of energy from what will rapidly become an overloaded electricity grid. This will require extensions to and a likely doubling or more of the capacity of the National Grid overhead transmission lines and switching centres along with upgrading sub-stations and cabling at local level.

There is however a good case for Green Hydrogen as its impact on electricity demand can be made smaller.

The North Sea is covered in gas pipelines linking shore to production platforms in the sea. When no longer needed for natural gas they and the platforms will need to be removed at cost to the oil companies and a great cost to the taxpayer as removal costs are set against taxable incomes of the companies. Many of the smaller companies involved offshore may go bust in which case the taxpayer will either put up the full cost of removal or the legal requirement to remove the hazards, established in International Environmental Treaties, may be broken. Re-use is the best recommended environmentally friendly solution. As the demand for natural gas declines, surely a sensible use of this infrastructure, would be to act as collection stations for surplus electricity generated by wind turbines at night and convert the sea water into hydrogen, offshore. Subsequently the hydrogen could be transported by the existing infrastructure to the existing shore collecting and distribution centres. This would reduce the need for the grid to carry all the power used in its manufacture. Or is this too simple?

However if we just replace Natural Gas with Blue or Green Hydrogen for domestic heating and heavy lorries and then replace fossil fuelled car/van engines with battery powered units, electricity demand will at least double and possibly treble.

Is Green Hydrogen a good replacement for Batteries in vehicles?

For those who want to see Hydrogen powered cars, research over the last 30 years has failed to come up with a viable, affordable car.

Fuel Cells are a piece of equipment with no moving parts which generates electricity directly from hydrogen and air with no conventional burning of the fuel, the exhaust is only water. They have been used in space craft and are portable. Several motor manufacturers have produced small numbers of vehicles, cars, buses and trucks for development and testing. Currently the only regular and large scale use is in fork lift trucks used in enclosed spaces.

Compared to an Electric Battery vehicle, a Hydrogen vehicle's range is often less and are only half as efficient users of energy.

Because of high energy usage, even Green Hydrogen should for the near future only be used for essential purposes, for which there is no alternative. For now it would be environmentally friendlier to use an electric car.

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Is Green Hydrogen a good replacement in domestic boilers?

Recent newspaper headlines have been keen to show both the horrors of and the failure of measures to reduce Climate Heating.

The Telegraph, Sun, Mirror and Mail-online ran a story misquoting an important report into the relative danger of Hydrogen and Natural Gas boilers purporting to show Hydrogen was twice as dangerous as natural gas. Stories like this, misinterpreting reports, and reporting an increased threat to life, tend NOT to be written by those few journalists who are science or statistics literate and such stories make no comparison to the enormous loss of life which is already happening due to the Climate Emergency.

The result of these alarmist reports is to miss entirely the conclusions of the report which was that, the risk was the same as with Natural Gas. However one advantage of Hydrogen is that unlike Natural Gas when burnt, It cannot produce deadly Carbon Monoxide.

So how can hydrogen contribute to a green economy?

Firstly what can we do to reduce transport emissions?

There will be an effective physical limit to the global number of electric cars. The materials which make modern electrical and electronic devices so efficient, called rare earths, often have few sources and some of those are in areas of conflict so supply is unreliable. They are used in small quantities in each device or vehicle but are critical to performance. Developing mines and refining processes take up to twenty years or more before useful quantities are produced and themselves can be environmentally damaging.

One way to reduce the energy used in road transport and cars is to significantly reduce the mileage travelled, not easy but with good planning can be achieved. Good, frequent and cheap public transport; new housing concentrated around comprehensive service centres,like Ixworth; the 15 minute walk principle; work places, services and housing close together.

Rural areas have relatively low population density and will still require cars for some passenger transport, but we can find ways of reducing both the number and frequency of use by, for example, more car sharing.

Hydrogen does have its place.

Already the first deliveries of Steel produced using hydrogen rather than coking coal have been made in and then delivered to Volvo in Sweden. So why are the UK Government not prohibiting the proposed Cumbrian Coal Mine. Steel manufacture in the UK could be come fossil fuel free by using Hydrogen throughout the steel making process instead of coal, coal gas and natural gas.

Even the International Energy Agency has said that “development of all new and existing coal, oil and gas sources should cease by the end of 2021.”

Aircraft

Research and development is progressing on engines which can run on pure hydrogen which will remove the largest part of the greenhouse effect from air travel. The remaining part is water vapour released at high levels in the atmosphere. But we are likely to wait another twenty years or so before passenger aircraft start to enter service.

And domestic heating?

We look forward to the arrival in Ixworth in September of the **Green Champions** who will be helping residents reduce their energy usage at little on no cost. We wait to see whether Government will provide assistance for the proper insulation of existing house and provision of solar panels, storage batteries and heat exchangers all of which would take pressure off the national Grid.

There are simpler and cheaper ways of reducing our heating costs now, mainly by better home insulation. Lofts, windows and walls are the areas where most heat escapes. New buildings can have this built in at little extra cost but for those of us with older homes there will be costs to which, hopefully, government will make a contribution. Of course better insulation means lower heating costs so we personally benefit as well as our environment. We shall be warmer for less cost. The Zero Carbon Building Regulations were to have been implemented in 2016, but then the present government abandoned the new standards to please housing developers and to “reduce red tape”. We are promised new standards later in 2023 or 24 or ? but so far have no publication nor start date.

We do not have to rely on government, as we see above there is a great deal we can do for ourselves.

What to do now?

If you have the opportunity, do work with our Green Champions to reduce your own energy use. Show the powers that be that we the ordinary people understand the challenges and are looking for leadership to meet those challenges head on. Companies and governments often say they accept the need to deal with Global Heating but then fail to implement those solutions which conflict with the need to please their financial supporters. In the UK the government has still not banned the development of the new Cambo oil field west of the Shetland Isles. But times they are a changing.

Always remember it does no harm to let your MP know your views. Matt Hancock has probably got time on his hands at the moment to give proper consideration to these matters. Why not send him an email with your thoughts.

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We would be interested to hear your thoughts on this article, whether you agree or disagree with its contents.

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