Climate Change – the background, and what needs to happen

Most scientists now agree that the activities of mankind are causing the average world temperatures to be rising fast, to put much of the living world, including us, at risk and that this temperature rise must be stopped by 2050 to prevent a run-away environmental disaster that will affect all of us. On the other hand, some scientists point out that over the life of the Earth there have been many catastrophic climate events from natural causes, and the present global warming is just another; I don't agree, so I will explain:

The early atmosphere of the Earth was hot and thick with carbon dioxide (CO_2) and little oxygen, so animals could not breathe in it. Around 900 million years ago the first primitive plant life started to appear in the Earth's warm seas, capturing the sun's energy with photosynthesis, CO_2 and water in growing. This first life on Earth started to release oxygen, gradually changing the atmosphere over millions of years, into one that animals could breathe. When this plant life died, it was laid down in layers of organic matter that over millions of years, were covered in rocks that sank deep into the Earth's crust, where heat and pressure transformed it into the fossil fuels of gas, oil and coal.

When these fossil fuels are burned in air, the fossil CO_2 which was captured long ago and which is a powerful green-house gas, is released, gradually turning our atmosphere back into the primeval hot one in which animals cannot survive. The rising air temperatures from this green-house effect are also causing an increase in forest fires and the release of fossil methane from frozen tundra, further adding to the rising temperatures, accelerating the rise in air temperature that is predicted to reach a tipping point of no return within the next 28 years.

Scientists believe that mankind must stop burning all fossil fuels by 2050 to avoid this existential threat, so how are we to replace this low-cost source of energy to power our growing civilisation? Our fossil-free energy sources, such as wind, solar and tidal are limited by the available land and sea, and the time needed to ramp them up. We must first help by reducing our waste of energy by better insulation in homes and other buildings, and more efficient machines. However, there is a massive amount of fossil-free energy in organic waste, from our kitchens and sewage, that is allowed to break down in the open, releasing methane that is around 9 times more powerful a greenhouse gas than CO_2. If this organic waste was processed in an anaerobic digester, we could capture the biomethane and extract its non-fossil energy. Local authorities which collect this waste could have it processed in anaerobic digesters, so anyone who feels strongly about the problem of climate change should talk to their local Councillors about this opportunity.

Unfortunately, according to the Future Energy Scenarios of the National Grid, we cannot increase the green energy sources of renewables such as wind, solar, hydro and tidal, fast enough to meet all our energy needs by 2050, so we will have to greatly increase the only other source of fossil-free energy: nuclear power. Fortunately, the latest nuclear fission technologies are far safer than they were 50 years ago, in fact nuclear power can boast the lowest world average death rate of 90 per thousand terra Watt hours (TWh) generated, compared with natural gas of 4,000 deaths.

There are now small modular reactors (SMRs) that can be mass produced in factories and taken to site by heavy goods vehicles. If these SMRs are of the type cooled by molten salt or metal which work at low pressure, they do not need the massive and expensive safety containment buildings required for those cooled by high pressure water. SMRs can be used to replace the coal and gas fired boilers in the world's power stations and retain the electricity generation and distribution equipment already in place, saving time and cost.

Whether you agree that the fast-rising world air temperatures are man-made or not, one thing is clear, which is that if they are from natural causes, mankind is adding to the problem.