

### SCIENCE SEMINAR - "Future Energy – Alternatives to Fossil Fuels"

*Some of our members attended the recent seminar hosted by Sevenoaks u3a at East Malling. One of our members, John, has kindly written a summary.*

This half day seminar was held at the East Malling Research Centre on the 7<sup>th</sup> June 2023.

There were four fantastic lectures from top people in their field; Imperial College, Shell, UKAEA (UK Atomic Energy Authority) and Rolls Royce.

Imperial College talked about the future of solar panels. There was lots of information, but a highlight was their new research where they were producing thin flexible solar panels by 3D printing the photovoltaic material onto a polythene sheet. This material could be laid on the roof of all buildings and would impose no significant structural load.

Shell talked about the use of hydrogen as a propulsion fuel on all their maritime tanker fleet. He also covered with the first presenter the possibility of fitting VAST areas of the Sahara Desert with solar panels. Being too far to have feed cables to Europe with line losses, they would use the electrical solar power to dissociate water. The hydrogen produced is liquified and shipped to Europe to use as a fuel. I did not realise how hydrogen could work as a domestic fuel in a house boiler. Replacing 25% of Natural gas is ok but above that hydrogen being so light would leak out of pipe joints. If you released hydrogen in a room, it would pass straight through brick walls!

Both men thought hydrogen to power cars and trucks had a future.

One paper on very small nuclear power plants that would fit onto a 20 hectares site. Using nuclear submarine technology. They are close to starting to build one. They would be built modularly in a factory to reduce cost and lead times.

One paper on nuclear fusion where they are trying to recreate the temperatures of the centre of the sun in a vessel. The fusion process is held within a vast magnetic field. This is fascinating, 1.5 million degrees centigrade and millions of bar pressure. The test runs, at present, last 5 seconds and use 4% of ALL the electricity generated in the UK for that period. This apparently is not possible as above 2%, the UK energy grid would collapse. So, the extra 2% is generated by using two horizontal flywheels that generate the 2% of the energy requirement when they slow down over 5 seconds. They are 4000 tonnes each and the peripheral speed is 250 mph! before switching in the electrical generators. Their aim, with nuclear fusion, is to produce vast quantities of energy without the use of any radioactive material. There are robotic arms that reached inside the fusion chamber. The operator put his hands/arms in "gloves" and could feel the tips of the robotic fingers. Apparently, he could detect a very thin sheet of plastic in the robots' "fingers". The robot arms were bigger than human arms and undertook intricate operations.

The fusion plant does use tritium which they are starting to produce themselves. The current commercial cost of tritium is \$30,000 a gram!!!!

I hopefully will attend more of this group's seminars. A previous one covered the difficult subject of dementia and a future one will be on recycling plastic wastes.

The research centre was an excellent modern venue for the group of about 80 and a buffet lunch was included in the delegate cost.

*John C Twiselton*