SONE

Supporters of Nuclear Energy

# Newsletter

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## A Zero Carbon Policy

A resolution to cease carbon emissions, as passed by Parliament with great fanfare, achieves nothing unless a thought-out plan follows. The solution should come from advances in science and technology, everyone supposes. These two, science and technology, get conflated by commentators who would benefit from studying the difference.

Science concerns the natural world and how it works. Technology relates what mankind can do with nature through ingenuity and by investing time and effort. So for energy, science tells where it can be found and where it is worth technology trying to harvest it. A lot of effort is wasted by speculative technology if science indicates that it will fail. Whereas new technology may be developed in a few years, the science of energy only changes every century or so.

What does such a scientific survey reveal today? Here is a four-page article that I have posted that answers that question: https://www.researchgate.net/publication/332766939. It has attracted some attention and SONE members may find it useful. Please do send a link to your contacts who might be interested and send any comments that you may have to me sec@sone.org.uk. SONE has a message to get out and all members could help to do that whenever they can. The opposition is not the "antis" - there are very few of them and they run away when faced with real science - but the vested interests of industry and the machinery of government who prefer to let sleeping dogs lie.

## The SONE Visit to Hinkley Point C

Our visit took place on April 18. We had hoped to visit Hinkley Point B as well, but that was not possible because it had an outage. We were a party of 15 and were joined by a similar number of other visitors. After a buffet lunch provided by EDF we were given several talks on the project and its status by EDF staff, and also on

the plans for Sizewell C by staff from London. They have invested in extensive educational and social projects to attract and establish the workforce they need, and with the experience already gained on this project they expect that Sizewell C will be about 20% cheaper. We were told that Hinkley C is already 20% built, on target and on budget. Meanwhile EDF is heavily engaged in attracting financial interest from pension funds and other investors for Sizewell C.

We were given a commentary as we toured the site by bus. So far most of the construction has been below ground level and the boring of the cooling channels out to sea is about to begin. The scene was a hive of activity with steel reinforcements overseen by many cranes.

Two impressions of the day.

First, they were out to impress with the scale of their engineering achievements - and they succeeded! However, nuclear does not lack a macho image, and the size of the construction may impress some but be less reassuring to others. In the future, apart from any technical advantage small modular reactors may become more acceptable to the public for being less impressive, more local and less intrusive in the environment.

Second, they continually emphasise safety. Or rather, they conflate standard industrial safety, which is important and admirable, on the one hand, with nuclear safety on the other. The public don't need an emphasis on the latter, just a simple footnote to remind them that there has been no fatal civil nuclear accident worldwide in over thirty years. To be greeted by a notice "Safety is our number one priority" suggests to the visitor that this is what he should be thinking about. A more positive impression would be given by "Electric power for the nation, their children and grandchildren, that is our number one priority".

Nevertheless we were well received EDF, we wish them luck at Sizewell and Bradwell, and we hope that we may return to see further progress at Hinkley in future years.

## It's education, stupid!

The recently delayed start of the Korean nuclear plants in UAE is an interesting story: https://neutronbytes.com/2019/04/27/delays-in-startup-of-1st-uae-nuclear-reactor-linked-to-problems-with-south-korean-firms-building-all-four-units/ It shows the importance of education when engaging in a nuclear power programme. The Chernobyl accident had many causes but a significant one was that the operators did

not understand the consequences of the tests that they were making. Just as active nuclear fuel needs multiple layers of containment, the prevention of accidents, needs multiple layers of understanding, from the need to comply with regulations to building personal judgement and experience. Evidently that was not true at Chernobyl, and at UAE language and other barriers have still to be overcome.

On more than one occasion I have been asked what those in countries with no nuclear experience should do. My suggestion to individuals and to authorities is that they should get themselves educated in depth: physics, engineering, chemistry, radiobiology and human behaviour. Education is more important to the roll-out of nuclear than money or regulations. And that is true in all countries, because nowhere does the basic national education system teach the general public effectively the place of nuclear in nature, and almost everywhere the experience of building new power stations has been lost, too. That is why the building Hinkley Point C is so important for the UK. Incidentally, none of the personnel that we saw on our visit was Chinese, or even French. Admittedly it was the day before the Easter holiday but it did seem that the domestic UK personnel were the ones getting the practical experience for the future.

Just now the public are being fed a diet of shock-horror by the media, especially the BBC, over Chernobyl - it is that time of year. No letter submitted by SONE that might spoil that story gets published, though we submit to the UK media regularly. Articles that do get through in less sensational outlets and modern media receive attention around the world.

We should be optimistic. The UK is in an excellent position to offer nuclear education to the world in the future, and we should develop that. As the UAE story suggests providing educational lubrication could become an important nuclear commodity. And we have the universal language to do it.

## Questions for nuclear plants

A realistic discussion by Dan Yurman about the financing challenges faced by the developers of the next generation of nuclear plants may be found here: https://neutronbytes.com/2019/04/14/key-questions-for-developers-of-small-modular-reactors/ Needs are often seen in local political terms but financial success of a design lies in engaging the international market.

There is no doubt in my mind that the giant plants like Hinkley Point C will be followed by SMRs in due course. But which design and when will that change begin? We need to build new nuclear plant as fast as we can. Is it possible that the

life of any of the existing UK fleet might be extended for a year or two? When will the default policy of building nuclear plants in the UK on remote sites be explicitly discontinued? This happened in the past for reasons of security and to keep plant out of the public eye. This is no longer a reasonable policy. It is inefficient to site supply far from its consumers and to discard huge quantities of waste heat that could heat homes and supply local industry. Not everybody may realise that a 1 GW power station produces 2 GW of waste heat. For a small reduction in the efficiency with which the 1 GW of electricity is produced, the 2 GW could be supplied as hot water. (Newer reactor designs are expected to be somewhat more efficient by running at higher temperatures.)

So a question for UK policy is: When might power stations like DRAX and Didcot go nuclear? It is interesting to read from a reliable source that China is discussing the siting of 345 power stations, some may start as coal-fired, but all are being designed to retro fit high temperature nuclear fission power sources as soon as these are accepted as ready for mass produced. https://twitter.com/Atomicrod/status/1121002960106983424 Ambitious but realistic!

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