THE
CHEAP ENERGY
CAMPAIGN

THE OBJECTIONS TO NUCLEAR POWER ARE MISCONCEIVED

The points which are usually raised by those who are opposed to nuclear power are as follows: cost, safety, waste disposal, construction time, lack of sites and tech readiness.

COST

Costs have indeed been sky-high in the past notably at Hinkley Point C which is currently projected to cost at least £43.1 bn for 3200 MW[1] of i.e £13.5m per MW of capacity. However Korean companies have recently been building reactors for about one third the cost per MW of Hinkley Point. The four-unit nuclear power plant in Abu Dhabi cost $32bn (£25.6 bn) for 5,600 MW or £4.6m per MW of capacity[2]. Small modular nuclear reactors (SMRs) will be even cheaper. An SMR can be built in a factory and shipped to a site. Provided that a design is ordered in sufficient number the cost per MW of capacity will be lower than that offshore wind[3] and the levelised cost of electricity very much lower if full system analysis[4] (which takes account of the costs of an equivalent assurance of supply) is used.

SAFETY

Nuclear has an unrivalled safety record which, in electricity generation terms, is only surpassed by solar photovoltaic. Only 30[5] people initially died at Chernobyl and a further 20 died of cancer later; many of these cancer cases could have been prevented had iodine tablets been available. Nobody died at Three Mile Island and the radiation emitted was the equivalent of CT scan. Nobody died of acute radiation at Fukushima and one long term cancer death may or may not be attributable to radiation[6]. The deaths were tsunami related. There is an argument that says lithium-

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[1] https://www.current-news.co.uk/hinkley-point-c-inflated-cost-rises-to-43-billion
[2] https://www.agbi.com/analysis/energy/2023/07/uaes-nuclear-finance-deal-sets-standard-for-gulf/
[3] https://www.adamsmith.org/research/keeping-the-lights-on-testing-the-governments-projections-for-electricity-supply-and-nuclear-capacity
[4] https://www.sciencedirect.com/science/article/abs/pii/S0360544222018035
[5] https://www.unscear.org/docs/reports/2008/11-80076_Report_2008_Annex_D.pdf
[6] https://www.britannica.com/question/Did-anyone-die-as-a-result-of-the-Fukushima-accident

ion battery arrays and li-ion batteries in cars & bicycles pose a greater hazard. Li-ion batteries have caused at least 646 deaths to consumers and the figures are rising.[7]

WASTE DISPOSAL

Neither the volume of nuclear waste nor the disposal techniques are a problem

Annual volume is very small -the main problem is the backlog

If, as in France, 70% of our electricity was supplied by nuclear power stations this would require about 34GW of nuclear capacity. The annual volume of spent fuel produced from 34 GW of nuclear capacity would about 200 cubic metres or less than the volume of one medium sized house. (Packaging this for safe geological disposal would increase the volume to the equivalent of five houses). By far the largest volume consists of intermediate and low level waste. Plans are well advanced for a geological disposal facility[8] which will not only deal with the forecast future arisings of nuclear waste but also the considerable backlog of waste that has accumulated over the past 70 years.

Treatment methods are proven

The various methods of treatment tried and tested over at least 70 years. There are also a number of new technologies available for the reprocessing of spent nuclear fuel rods[9]. Furthermore, some of the latest reactor designs are nuclear waste burners[10].

CONSTRUCTION TIMES

Small Modular Reactors will take 6-24 months to manufacture offsite[11] once a production line is set up and it might then need up to 2 years to ship to a site, install and commission.

[7] https://www.ul.com/insights/lithium-ion-battery-incident-reporting
[8] https://www.nuclearwasteservices.uk/disposal/geological-disposal
[9] https://world-nuclear.org/information-library/nuclear-fuel-cycle/fuel-recycling/processing-of-used-nuclear-fuel
[10] e.g. Copenhagen Atomic, Moltex, NewCleo.
[11] Terrestrial Energy estimates 4 years in total. Thorcon estimates 6 moths to construct in a Korean shipyard and up to 2 years to ship to a site and install.

Between 1974 and 1989, France built 56 new large scale reactors with a combined capacity of about 60 GW. The roll-out speed was largely due to standard designs and an efficient planning process.

NUCLEAR SITES

In previous years, nuclear power plants were mostly water cooled and had to be sited close to the sea or a large river. This is no longer the case as many modern designs use inert gases, molten lead or molten salt to remove heat energy from the reactor to where it can generate electricity or perform other clean energy-related work. This means that siting is much less of a problem and reactors they can be placed close to where they are needed.

FLEXIBILITY

It is a common misconception that nuclear reactors can only be used for baseload and that natural gas power stations are better at varying output with demand. This was indeed broadly true of the older designs of nuclear reactor (although French nuclear can varying output but it is a cumbersome process). However many of the newer designs of nuclear can vary output to meet demand[12]; a typical rate would be 5% per minute from 25% of capacity. Also, nuclear reactors produce heat energy which can be easily and cheaply stored until it is required at short notice to meet peak demands or to stabilise transmission systems that are struggling with large quantities of unpredictable renewable energy.

TECH READINESS

A common criticism of small modular nuclear reactors (SMRs) is that they are a long way from being built That is not the case. There are three SMRs currently operational (in Russia, China and Japan) and there are at least 7 other designs which have either got design approval or have commenced construction of a pilot plant (GE-Hitachi, Kairos, Natura, NuScale, Kaeri SMART, Terrestrial, X –Energy) and several more who claim that they will have pilot plants operational by 2030 (Aalo, Copenhagen Atomics, Holtec, Last Energy, NewCleo, Terrapower Natrium, Thorcon, Westinghouse

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[12] e.g, Arc Cleantech, NewCleo, NuScale , Rolls Royce, Terrestrial Energy, Thorcon, Westinghouse eVinci. X- Energy

eVinci). SMRs could be operational in Britain by the very early 2030s but the political will is lacking.