

Why Nuclear Power isn't the answer to Climate Change

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If we are to tackle climate change, quickly and effectively we need to rigorously compare how to achieve targets as rapidly, securely and cost-effectively as possible. Such an analysis shows nuclear power is hopelessly costly, much too slow and otherwise problematic. (1)

Nuclear power is too expensive

Although the Scottish Government is opposed to building new nuclear stations because they “represents poor value for consumers” (2) this doesn't mean that Scottish consumers will not be impacted. Aside from the possibility of a nuclear accident south of the border, the only nuclear power station currently being built in the UK - Hinkley Point C in Somerset - will cost a staggering £23billion. EDF Energy has been guaranteed a price of £92.50 (at 2012 prices) for every megawatt-hour of electricity produced (compared with wholesale electricity prices of around £40-£50). The UK Government estimates this will add £10-£15 per year to the average energy bill for all UK consumers for the next 35 years. Meanwhile, discussions continue with EDF about funding options for another new nuclear station at Sizewell C in Suffolk. (3) And there are other companies with other sites waiting in the wings.

Energy Efficiency is much more cost effective

Alternatively, cost-effective investments in domestic energy efficiency alone between now and 2035 could save around 140TWh of energy – roughly equivalent to the output of six power stations the size of Hinkley Point C. Such a programme could save an average of £270 per household per year and deliver net benefits worth £7.5bn to the UK, and could reach £47bn, if benefits such as health improvements and additional economic activity are counted. (4) And efficiency measures can be implemented quickly. An accelerated programme of LED lighting installation, for instance, could reduce peak electricity demand by almost the capacity of existing reactors. (5)

Nuclear energy use impedes renewable energy development

Renewable energy is now relatively cheap and becoming cheaper, and needs little or no public subsidy - a big contrast with new nuclear. Even if only some of the new nuclear power stations proposed come online, new renewable energy could be crowded out. This is because electricity contracts given to nuclear power give them 'dispatch priority' over renewable energy, causing windfarms and solar farms to be turned off to give priority to nuclear power.

Put simply, nuclear power is switching off windfarms in Scotland. Indeed, it seems that higher generation of nuclear power is associated with a higher proportion of wind power being switched off. One study found that in 2017, when Hunterston B was still operating properly, 94% of windfarm output that had been turned off (constrained) could have been generated had nuclear power plant not been operating. In 2019, 77% of the windfarm output that had been turned off could have been generated if nuclear was not operating. (6)

The baseload myth

New nuclear plants would get in the way of expanding renewables, because they are inflexible and can't balance the output from variable renewables like wind and solar. We need a more flexible system with smart grids, time-of-use tariffs, batteries and storage including hydrogen made using surplus renewables power. Baseload plants are inefficient and cannot meet demand as needed. (17)

Every pound we spend on reducing carbon emissions has to maximise carbon reductions

Many advocates of new nuclear construction call for a 'balanced energy policy' and promote the idea that 'we need every energy technology' in order to successfully tackle climate change. This suggests we have infinite amounts of money to spend on energy projects. But resources are scarce, so we need to make choices. Because climate change is a serious and urgent problem then we must spend our limited resources as effectively and quickly as possible - best buys first, not the more the merrier. (8) Investment in more expensive nuclear power will, in effect, worsen climate change because each pound we spend is buying less solution than it would do if we were to spend it on energy efficiency and renewables. (9)

Nuclear power takes too long to build

The world's leading climate scientists on the UN's Intergovernmental Panel on Climate Change (IPCC) have warned that we have less than 10 years to make massive and unprecedented changes to global energy infrastructure to limit global warming to moderate levels. (10)

Around the world it takes between 10 and 19 years to plan and build a nuclear reactor. The UK Government first started consulting on building new nuclear power stations in May 2007. Hinkley Point C is not expected to start generating electricity until around 2027.

Nuclear power has a big carbon footprint

All energy sources produce some carbon emissions during their life cycle. There will be CO₂ emissions generated to make the steel to build wind turbines for example. It can be quite complicated to work out the life cycle emissions for nuclear power. Professor Benjamin Sovacool looked at 103 different studies and concluded that the mean value is about 66 grams of carbon dioxide for every kWh produced by nuclear power. This compares to about 9g for wind, 32g for solar and 443g for gas making nuclear the third highest emitter after coal and gas. (11) A large programme of reactors would mean having to mine lower quality uranium thus increasing life-cycle emissions. (12)

Because of the huge carbon emissions caused during construction, even on EDF's assumptions, Sizewell C cannot make a positive contribution to the UK's net zero target until 2040, assuming that it is finished on schedule by 2034. In fact, by then the electricity Sizewell displaces will be mostly renewable anyway, so it could end up increasing the UK's carbon emissions overall. (13)

Nuclear power stations are not resilient to climate change

Nuclear power stations are, quite literally, on the frontline of the climate change battle but not in a good way. Recent scientific data indicates sea levels globally will rise further and faster than earlier predictions suggested, and bigger storm surges could threaten coastal installations. 40% of reactors around the globe are on the coast. Nuclear stations require large quantities of water to keep cool and avert meltdowns so inland reactors face threats from drought and wildfires. Over half a billion people live within 50 miles of an operating reactor. A new report from Dr Paul Dorfman at UCL warns that nuclear power could become a significant casualty of climate change, yet nuclear infrastructure is largely unprepared. He calls for a prompt, substantive reassessment of nuclear's role in helping the world reach net zero emissions. (14)

Using nuclear plants to address climate change involves unacceptable risks

Nuclear power involves major risks, including: a higher probability of serious accidents; a mounting and unsolved radioactive waste problem; and increased nuclear proliferation. Renewable energy risks none of these. Why replace one risk – climate change – with another – nuclear accidents and radioactive waste – if we don't need to. There is an increasing body of work which shows that it is perfectly feasible to run an energy system using 100% renewable energy. (15)

- (1) New nuclear plants would be hopelessly problematic, Letter by Prof Andy Stirling et al to the Financial Times, June 2021 <https://blogs.sussex.ac.uk/sussexenergygroup/2021/06/24/letter-new-nuclear-plants-would-be-hopelessly-problematic/>
- (2) See <https://www.gov.scot/policies/nuclear-energy/nuclear-stations/>
- (3) Power Mag 27th January 2021 <https://www.powermag.com/costs-rise-as-virus-delays-hinkley-nuclear-build/>
- (4) Carbon Brief 6th Sept 2017 <https://www.carbonbrief.org/energy-efficiency-policies-save-uk-homes-270-report-finds>
- (5) Ecologist 7th June 2016 <https://theecologist.org/2016/jun/07/urgent-case-mass-switch-led-lighting>
- (6) See <https://100percentrenewableuk.org/how-nuclear-power-undermines-renewable-energy-the-truth-about-wind-power-compensation-payments>
- (7) Guardian 27th January 2020 <https://www.theguardian.com/news/2020/jan/27/weatherwatch-nuclear-energy-now-surplus-to-needs-renewable-energy> and Chatham House 22nd Aug 2018 <https://www.chathamhouse.org/2018/08/power-flexibility>
- (8) Scientific American September 2005 <https://static.scientificamerican.com/sciam/assets/media/pdf/Lovinsforweb.pdf>
- (9) Forbes 18th November 2019 <https://www.forbes.com/sites/amorylovins/2019/11/18/does-nuclear-power-slow-or-speed-climate-change/?sh=2ed39ab7506b>
- (10) Guardian 8th October 2018 <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>
- (11) Sovacool, B Valuing the greenhouse gas emissions from nuclear power: A critical survey. Energy Policy Volume 36, Issue 8, August 2008, Pages 2950-2963 <https://www.sciencedirect.com/science/article/abs/pii/S0301421508001997>
- (12) Climate Change and Nuclear Power by Jan Willem Storm van Leeuwen, MSc <https://www.stormsmith.nl/Resources/nucl%26climsumm2017.pdf>
- (13) <https://stopsizewellc.org/sizewell-c-and-climate-change/>
- (14) Paul Dorfman in the Conversation 28th June 2021 <https://theconversation.com/nuclear-energy-isnt-a-safe-bet-in-a-warming-world-heres-why-163371> The full report is available here: <https://www.nuclearconsult.com/wp/wp-content/uploads/2021/06/Climate-Change-UK-Nuclear-June-2021.pdf>
- (15) Abstracts of 56 Peer-Reviewed Published Journal Articles From 18 Independent Research Groups With 109 Different Authors Supporting the Result That Energy for Electricity, Transportation, Building Heating/Cooling, and/or Industry can be Supplied Reliably with 100% or Near-100% Renewable Energy at Difference Locations Worldwide April 7, 2021 <https://www.no2nuclearpower.org.uk/wp/wp-content/uploads/2021/04/100PercentPaperAbstracts-2021.pdf>