



COP26: A perfect launchpad for the UK's alternative energy sources?

'Alternative energy sources' are energy sources that are less technologically mature than traditional sources, yet their development and use will be critical to the UK's path to net zero by 2050.

While it may be a surprise to some, the UK has been actively progressing alternative energy sources over the last number of years and is hugely supportive in developing them further. In this article, we explore how COP26 could help the UK to develop and regulate its alternative energy sources, specifically in relation to (i) nuclear fusion and (ii) direct air capture.

Nuclear Energy

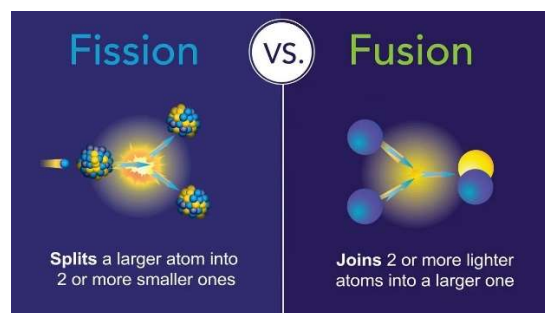
Over the last year, the Government has repeatedly committed to nuclear as a key future source of energy. In the lead up to COP26, the Government has unveiled two significant developments to build upon nuclear energy's momentum. First, the recent Net Zero Strategy dedicated £120million towards the development of nuclear projects. Second, a new finance model – the "Regulated Asset Base" model – has been developed to address the high capital cost of building new nuclear power stations. Such developments are welcomed by all involved in the sector and demonstrates the UK's intention to create a world-leading nuclear sector at an affordable cost to domestic consumers.

[There are primarily two methods of producing nuclear energy, namely \(i\) fission and \(ii\) fusion.](#)

Nuclear fission is the energy created from dividing one uranium atom into two. Fission has been deployed in the UK for decades and is heavily regulated by the Office for Nuclear Regulation ("ONR"). The ONR regulates licensed nuclear sites, of which there are 37 in the UK.

Nuclear fusion, on the other hand, is the energy created from combining two lighter uranium atoms into a larger one. Fusion is significantly less developed, yet could provide a potential source of

almost limitless clean energy. It has been described by some commentators as the "holy grail" of energy production. While a suitable site in the UK is still to be located, the UK aims to produce the world's first prototype fusion power plant, STEP (Spherical Tokamak for Energy Production) by 2040 and has committed £220m to the project.



Source: US Department of Energy, Fission vs Fusion: What's the difference?

However, one of the many barriers facing nuclear fusion in the UK is the lack of a developed regulatory regime for fusion projects. This is for two major reasons. First, the only UK-based authority on fusion, the UK Atomic Energy Authority ("UKAEA"), is not regulatory in nature. Instead, the UKAEA is primarily focussed on R&D and managing fusion research projects across the country. Second, fusion sites tend to be unlicensed, meaning that the nuclear fission regulator – the ONR – has limited reach. The end result is that, instead of operating within a strict

regulatory framework governed by the ONR (similar to fission), fusion sites operate within a wide and unconsolidated legislative framework governed by the Environment Agency and Health & Safety Executive. Although the Government has taken significant steps to address these barriers recently (through the Fusion Green Paper and Fusion Strategy both published in October 2021), the regulatory landscape will remain in a state of flux until the Government's conclusions are published in early 2022.

How can COP26 benefit the UK's regulation of fusion?

COP26 will inform discussions between the UKAEA and the UK Government on which regulatory option the UK should adopt at this crucial crossroads. Amongst others, the main avenues which could be available to the UK Government are:

- (a) continue with the current regime; or
- (b) create a new fusion-specific regulatory body; or
- (c) extend the ONR's remit to cover fusion as well as fission. Whilst this is the case in the USA with the US Nuclear Regulatory Commission, the UK's Regulatory Horizons Council ("**RHC**") recommended against this option in their report on 1 June 2021 ("**RHC**: Report on Fusion Energy Regulation").

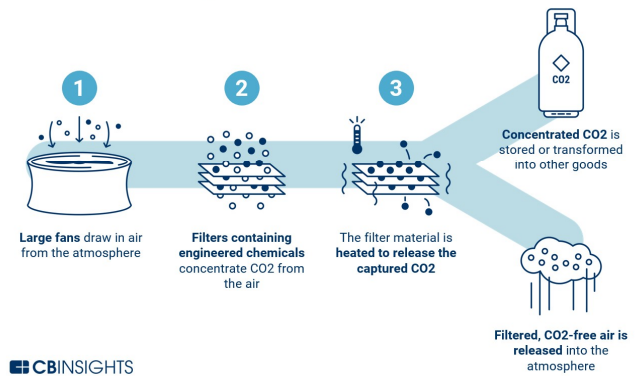
The selected avenue could depend on the way that other countries regulate fusion. For instance, at COP26, the UK could liaise with the relevant regulatory entity in France – the Nuclear Safety Authority ("**ASN**"). In France, ASN is responsible for contributing to draft regulations, examining all individual authorisation applications and compliance with rules for nuclear facilities, and generally informing stakeholders of the state of nuclear safety and radiation protection. This ambit of responsibilities has meant that ASN's role in ITER – the nuclear fusion megaproject aimed at replicating the fusion processes of the sun – will continue to be significant. In fact, it is anticipated that in the coming years, ASN will be involved in the authorisation for pre-fusion operations, as well as the ultimate commissioning of ITER.

Regardless of which avenue the UK Government ultimately selects, the amount of regulation imposed in the UK must be proportionate to the risks, public safety, environmental issues, and to the UK's transition to net zero.

Direct air capture

Direct air capture (DAC) is a technology that captures CO₂ from the atmosphere. The CO₂ can then be permanently sequestered in deep geological formations. Alternatively, the CO₂ can be re-used to generate energy directly (e.g. to turn turbines) or indirectly (e.g. to produce synthetic fuels).

How direct air capture works



When CO₂ is geologically stored, it permanently removes the CO₂ from the atmosphere and results in negative emissions. There are currently 15 DAC projects operating globally, capturing more than 9,000 tonnes of CO₂/year.

In August 2020, the UK Government recognised the potential of the technology in meeting net zero by launching a fund of up to £100m to support innovative DAC technologies. The fund has since identified 24 projects requiring support.

Momentum has been gradually building and the UK Government will go to COP26 boosted by the recent announcement that Storegga (a UK carbon reduction and removal company) has joined Carbon Engineering (a DAC technology specialist) in commencing the pre-front engineering and design stage on a DAC project in north-east Scotland. The project ("**Acorn Project**") ultimately aims to permanently sequester between 500,000 and 1million tonnes of CO₂ from the atmosphere annually.

Similar to nuclear, one of the many barriers facing DAC in the UK is the lack of a developed regulatory regime. However, unlike nuclear, there is currently no roadmap or consultation planned to progress the issue of regulation in the near term.

How can COP26 benefit the UK's regulation of DAC?

The Government could use COP26 to demonstrate the UK DAC market on an international stage. This step is critical as the regulatory framework will naturally develop when there is sufficient demand for the captured CO₂. Amongst other objectives, a UK regulatory framework for DAC should aim to encourage: (a) innovative DAC standalone projects; (b) DAC projects bolted on to industrial processes; (c) a market for CO₂-related products; and (d) access to private sector financing.

a) International private sector examples

There are already some great examples across the globe that the Government can discuss with the relevant representatives. For example, Switzerland appears to have successfully harnessed the private sector in driving the DAC market forward. In August 2021, the insurance giant Swiss Re signed a 10-year agreement with carbon capture firm Climeworks, under which it is purchasing captured carbon dioxide from DAC facilities and the associated carbon storage. Climeworks stated that this agreement is "sending a key demand signal to carbon removal solution providers and investors". If such "early customer" agreements could be replicated at this scale in the UK, it would drive momentum in the UK DAC market, and, subsequently, the development of a regulatory regime will no doubt follow.

b) International public sector examples

In the public sector, the USA and countries across the EU are setting the standard for quickly and effectively developing DAC markets. Norway's state-owned Equinor ASA has partnered with Royal Dutch Shell Plc and Total SA to assess the viability of scaling up carbon capture, transportation and storage in Europe. Such projects are promising in the sense that they develop viable, replicable commercial models which the UK could adopt in order to launch and stimulate new commercial carbon capture projects.

Conclusion

Developing the usage of alternative energy sources is critical to the UK meeting its net zero goals. COP26 presents an opportunity for the UK to learn from other countries how they have implemented and developed regulatory regimes for alternative energies successfully. Such an opportunity should not be missed – the quicker the UK develops these regulatory environments, the more confidence investors and developers will gain.

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