

Reinventing the well: It's time to get serious about carbon capture and storage

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Ten megatons of carbon dioxide per year. That's the government's stated aim for UK carbon capture and storage (CCS) activity by 2030. Ten megatons. That's not much less than the total 2020 emissions of a country like [Zimbabwe](#) (or a company like [YouTube](#)).

Some people will see that number and think it's not enough. Others will see it and think it is unrealistically high. But pretty much everyone will agree that we are a long way from reaching that target by the close of this decade.

We must though. Negative emissions are widely believed to be necessary for meeting the goals of the [Paris Agreement](#), but the recent wildfires that have ravaged countries across the globe illustrate the risks of relying on purely nature based solutions to do so. At some point we need to think seriously about directly capturing and storing carbon itself – and the 2030 target doesn't leave us much time to do so.

Fortunately, there has been progress. The UK government has launched 'Phase 2' of its carbon capture, utilisation and storage (CCUS) plan, having identified two offshore clusters in Phase 1. Though there has been consternation at the decision to relegate the Scottish Acorn Cluster to reserve

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status, BP's East Coast cluster and ENI's Hynet look like positive steps forwards for this nascent industry.

However, there are significant barriers to overcome before that 10 MtCO₂ per year target starts to look achievable. Here is a (non-exhaustive) list of three hurdles that must be overcome – and soon.

1. Putting right perceptions

I am more comfortable identifying and addressing technical problems versus ones of perception. Yet it is abundantly clear that this sector has some reputational work to do in order to succeed.

CCS has suffered from a vocal group of detractors over the years. Often, complaints centre on the idea that the technology will be used as a 'get out of jail free card' for the oil and gas industry; a license to continue operating as before. The concern is understandable, but the conclusion – that CCS is therefore to be resisted as an option – is false.



Even if the oil and gas industry were to shut-up shop tomorrow and the country switch wholesale to renewables, emissions would remain. Sectors such as industry and agriculture would continue to create greenhouse gases regardless. The reason we talk about a 'net zero' target instead of a simple 'zero' target is that some of this will remain unavoidable, and therefore we need negative emissions technologies to cancel out remainder emissions.

This is where CCS has a uniquely positive role to play, and that argument needs to be made more effectively by all stakeholders, from government to industry.

2. Market making

CCS is an expensive undertaking. Over time, it should become cheaper as technological and operational efficiencies are found, but it will never be free. In effect, we are asking businesses to incur extra costs today. That won't happen without effective incentives or disincentives, or both. In other words, the rules of the market need to be remade.

Most commonly that is perceived as a cost imposed on industry, such as via a carbon tax. If the cost of emitting a tonne of carbon were higher than the cost of capturing and storing it then, logically, businesses will choose the latter option.

However, we shouldn't forget there is a positive side of the coin, too. More consumers – and therefore more businesses that supply them – are demanding greener options in their products and supply chains. Take cement for example: there is no clear way to decarbonise cement production; some of the CO₂ is produced by the chemical reaction involved rather than just simply the energy required. However, if that carbon was captured and stored, then there may be eco-minded property developers willing to pay a small premium as a result.

And, in fact, positive business cases can be made even from disincentives. If technology such as [Climeworks](#) goes mainstream, and there is some sort of carbon trading scheme active, then CCS companies may be able to generate revenue via direct capture carbon removal, too.

At the moment though, these are all hypotheticals. It will take firm action from policymakers to lay out the new rules of the market, and the private sector can take it from there.

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3. Tackling the technicalities

The basic technologies of CCS are already in place. After all, despite its reputation as an unproven process, carbon capture and reinjection has already been practiced for years for enhanced oil recovery (EOR). There are some new technical challenges to be overcome however, even if they are often familiar to oilfield engineers – variations on existing themes.

For example, if we are to store captured CO₂ in depleted subsea oil reservoirs, this will, in some cases, require safe well re-entry to address legacy well integrity issues, thus avoiding costly intersection well requirements. Plug and abandonment (P&A) techniques have improved considerably over the years, but it may be that some wells have not been plugged in such a way as to stand up to re-pressurisation with CO₂, this is especially true for old exploration wells. Specialists in well re-entry and P&A will be needed to assess and solve these challenges.

By expanding existing practice to cover below mudline well detection and pipe to pipe connection via complementary technologies will also provide a means to re-enter legacy wells and re-abandon them for CO2 storage, reducing intersection well planning and in-storage leaks.

There will be a number of other ways existing oil and gas technologies, competencies and skills will need to be tweaked and repurposed like this. Exploration geologists will turn

their trade to assessing storage potential of depleted reservoirs and saline aquifers, rather than looking for new hydrocarbons, for example.

It is in this last category of technical challenges that companies like Aquaterra Energy are equipped to contribute, and we look forward to doing so. However, there is a lot of work to do in constituting the market and changing perceptions, without which we can only be an isolated piece of the puzzle. There is a great opportunity for CCS in this country – both in terms of environmental impact and the potential for a new energy subsector for the UK to lead – but we must work together to seize it.



Find out more about our CCS capabilities [here](#)

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