

## Carbon capture and storage is 'essential' to meet Paris target

Journalist: Peter Ker

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Carbon capture and storage (CCS) has an "absolutely essential" role to play if the world is to achieve the goals of the 2015 Paris climate agreement, according to one of the UK's leading experts on climate and energy policy.

In comments that challenge the business model upon which many of the world's existing CCS plants are based, Professor Julia King warned that using CCS to improve the performance of oilfields was against the spirit of capturing carbon in the first place.

An engineer by training, Professor King has spent the past decade at the forefront of the UK's response to climate change, leading reviews into lower carbon vehicles and serving as a director of the independent agency that advises the British government on climate change targets and budgets.

She is now more commonly known as Baroness Brown of Cambridge and sits in the House of Lords as an independent crossbencher.

CCS has been a lightning rod for controversy in Australia over the past decade, [with critics suggesting the more than \\$400 million of federal funding for research into the technology has been wasted on trying to extend the life of coal-fired power generators.](#)

But a growing consensus has formed across industry and environmental groups since the Paris agreement that CCS will, at a minimum, need to play a role in reducing emissions from heavy industries like steel and cement, which would still emit huge volumes of greenhouse gases even if they were entirely powered by renewable energy.

The UN Intergovernmental Panel on Climate Change (IPCC) included CCS in three of the four "pathways" it published last year for keeping temperature rises to 1.5 degrees Celsius, and Baroness Brown said she was convinced that CCS must play a role.

"I think it is absolutely essential," she told *The Australian Financial Review* during a visit to Australia organised by the University of Melbourne and the Minerals Council of Australia.

"It is hard to see how we can completely decarbonise industrial processes like cement manufacturing and possibly steel making."

CCS typically involves carbon dioxide produced in industrial processes being captured and stored underground in porous rock or other geological structures.

Carbon dioxide is created when common limestone (calcium carbonate) is used as the major ingredient in cement, while the emissions of the steel sector are caused when carbon in metallurgical coal combines under combustion with oxygen in iron ore.

## Intensive and expensive

While hydrogen has been proposed as a cleaner, long term alternative to metallurgical coal, Baroness Brown said it was extremely energy intensive and expensive to make hydrogen using electrolysis, and alternative methods for making hydrogen (the gasification of methane) would likely require carbon capture and storage as well.

"Quite a lot of that hydrogen is going to need CCS, as well as the industrial processes ... so we see it as absolutely essential to meeting (the UK government's goal of) net zero (emissions by 2050)," she said.

Despite [the political chaos surrounding Brexit](#), UK political parties gave bipartisan support this year to a toughening of the nation's climate target, which now aims for net zero emissions by 2050.

Baroness Brown said while a bipartisan approach to the target had been achieved, she expected the pathway to achieving that target would be more politically contentious as parties grappled with options from regulation to financial incentives to taxes.

Some governments, including the UK, increasingly refer to "carbon capture utilisation and storage", or "CCUS", in a bid to increase the focus on finding economic uses for the carbon dioxide that is captured.

Many of the world's existing CCS projects inject captured carbon dioxide into nearby oil fields in a bid to improve oil extraction rates, and that tactic was supposed to underpin the business models for the world's two most advanced CCS for coal-fired power projects; Canada's Boundary Dam and the Petra Nova project in the US state of Texas.

## Capture and use

The International Energy Agency estimated in 2015 that 0.63 of a tonne of carbon abatement was achieved for every tonne of carbon dioxide injected for oil field enhancement, even if the oil was ultimately burned, but Baroness Brown said she had reservations about using CCS to produce another fossil fuel.

"The UK government has now put a "U" into carbon capture, making it carbon capture use and storage, and I feel that is slightly optimistic, because in terms of the scale of CO<sub>2</sub> that we are going to need to capture we are not going to find very many ways to use that," she said.

"There will be some uses, putting some into greenhouses and using some in chemical reactions, but actually most of it is going to need to be stored so I think the letter 'U' in CCUS is slightly decorative.

"I certainly feel that if the 'U' is enhanced oil and gas recovery that is slightly against the whole purpose of doing this carbon capture and storage in the first place."

Australian oil and gas producer Santos is investigating whether it can improve production in its flagship Cooper Basin business by injecting carbon dioxide underground.

[While coal miners and petroleum producers continue to pump money into research and development of CCS](#), some environment groups are increasingly accepting that the technology may have a limited role to play.

While it does not support government funds being devoted to CCS for coal-fired power generators, the Australian Conservation Foundation said it was open to CCS playing a bigger role for industries like cement and steel.

"For industries that do not have a choice, yes I think we should continue research and where possible trialling forms of sequestration," said the Foundation's climate and energy policy adviser Suzanne Harter.