

Opinion: We're burning too much fossil fuel to fix by planting trees—making 'net zero' emissions impossible with offsets

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The idea that we can mitigate current carbon emissions by "offsetting" them with carbon reduction initiatives elsewhere has become central to

government and business responses to climate change. But it's an idea we need to seriously question.

Essentially, the offsetting strategy assumes the release of [carbon](#) stored by ancient biology a hundred million years ago can be mitigated in the current active carbon cycle. Since the [Kyoto protocol](#) was signed, offsetting has become the [preferred option](#) globally.

The concept of "net zero" carbon emissions is also at the heart of New Zealand's [official climate response](#) and its [Emissions Trading Scheme](#).

How this might change under a new government is hard to predict, with the different positions held by the negotiating parties potentially leading to a "coalition of climate chaos", [according to one commentator](#).

At one level, net zero makes sense. Planting trees to mitigate the effects of forest clearance—or to provide shade, stabilize land and enhance biodiversity—means carbon in the atmosphere can be sequestered where it otherwise would not be.

But that doesn't automatically mean the planet can absorb all the fossil carbon human industry continues to release. The idea that harm done in the present can be "offset" somewhere else in the future—something [also seen](#) in the field of freshwater ecology—cannot be taken at face value.

How the carbon cycle works

To put things in perspective, [global carbon emissions](#) from burning fossil fuels are currently around [10 billion tons per year](#). If we continue emitting at this rate, total fossil fuel emissions from now to 2050 will be about 280 billion tons—seven times larger than the [maximum estimated biological carbon sequestration](#) of 38 billion tons from 2015 to 2050.

Before humans began extracting fossil fuels, carbon cycled in a [dynamic equilibrium](#): the total amount of carbon entering each carbon pool was balanced by the total amount of carbon leaving, so the amount of carbon stored did not change.

Then, beginning with coal and later oil and gas, carbon stored over millennia prior to 65 million years ago has been unlocked and released.

Despite its ancient origins, this fossil carbon is "new" carbon being added to the current active [land-atmosphere-ocean](#) carbon cycle. The reality is that the long-term storage of carbon in plants, soils, geologic formations and the ocean can only mitigate carbon from the current carbon cycle—not any extra fossil carbon.

While the carbon atom in the tree is the same as the carbon atom from burned fossil fuels, that's where the similarity ends. The fossil carbon the tree is purportedly mitigating is a [separate and additional source](#).

Planting a tree only mitigates the carbon lost from another tree that no longer exists (the one we chopped down, for example). Furthermore, planting trees to mitigate fossil carbon emissions commits future generations to locking up land as forests, to be maintained forever.

This comes with many risks, including [wildfires](#) and [storm damage](#) driven by [droughts](#) and rising temperatures. The resulting feedback loop of weather extremes caused by [climate change](#) can [limit and even halt](#) carbon sequestration in forests.

Planting forests to mitigate this means the land is then not available for possibly better uses, including food production. Even so, the world is currently removing trees at [double the rate](#) they are being replanted.

The carbon trading trap

The now ubiquitous notion of "net zero" emissions is at best a delaying tactic, at worst a form of self-delusion, because it [justifies allowing more fossil carbon](#) to be released unabated.

In New Zealand, this translates into subtracting the carbon sequestered by forests planted since 1990 from total emissions—giving a false impression they are [27% lower](#) than they actually are.

After subtracting the carbon sequestered from the total emissions, the remainder is labeled "net emissions"—even though every tree planted replaced a preexisting tree, so no fossil emissions were balanced out.

The trading of [fraudulent carbon credits](#) has been an issue in the past, as has been the sale of "[phantom credits](#)". Overall, it [has been shown](#) that "offset credits traded on the market today do not represent real emissions reductions".

But the underlying assumption that we can mitigate fossil carbon in the current carbon cycle persists. This is despite New Zealand's Climate Change Commission [making it clear](#) the addition of fossil carbon to the atmosphere is effectively permanent on human timescales.

More trees alone won't work

On top of natural sequestration strategies, there are also technological carbon capture and storage techniques being promoted. However, these require large amounts of energy, have been shown to be [extraordinarily expensive](#), and have limited potential. Most attempts so far [have failed](#).

Also, as the Intergovernmental Panel on Climate Change [has noted](#), the carbon captured through such technologies will not necessarily be permanent. Crucially, the net energy return for fossil fuels—that is, the

energy they supply versus the energy it costs to extract them—is already in [sharp decline](#).

Any carbon capture system will [significantly accelerate](#) that decline. According to the IPCC, 13-44% of the energy obtained from extracting [fossil fuels would be lost](#) in the form of the energy required for the process of carbon capture.

The notion that the planet can achieve a net-zero equilibrium without fundamental economic and social change only serves to delay the inevitable.

Even if the entire country or planet were replanted in trees, it would at best [soak up a decade's worth](#) of current emissions.

Deforestation has to be reversed, and more trees must be planted to sequester the carbon emitted through past land-use changes. But planting trees instead of stopping fossil emissions is not the answer. Planting trees as well as not emitting fossil carbon is the only solution.

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