University of Glasgow

# CC(U)S FUTURES 1

Visions from the Scottish Cluster, 2023/4

WORLD CHANGING GLASGOW

IDRIC

UK Research and Innovation

# Introduction

**Carbon Capture (Use) and Storage – CC(U)S – is widely seen as necessary if we're to meet commitments to limit global warming. Within industry and policy circles, there is an expectation that the capture of greenhouse gas emissions at source and geological long-term storage will be a key step in decarbonising industry and mitigating climate change.**

In contrast, public awareness of CC(U)S is very limited, as demonstrated by the recent survey commissioned by the British Geological Society [1]. This seems to be true across different sectors of society, including in places and industries that might be directly affected.

This does not mean that people are blank slates, however. The way we receive, process and judge new information is strongly influenced by other knowledge and experiences, as well as what the new information is, where we come across it and who we perceive as the source.

In order to better understand how to improve awareness and knowledge, it is therefore crucially important that we understand the backdrop of prior knowledge, awareness and experience that will shape people's responses to CC(U)S.

We are using Place-Based Participatory Speculative Fiction [2-3] to find out what people imagine implementing CC(U)S might look like, and what it might change, on the basis of what they do know and without any priming.

The stories that follow were created in the Scottish Cluster between December 2023 and March 2024. Some were created in short participatory workshops; others are syntheses, created by the project team, that highlight themes in the responses and stories we received stories and responses. The workshop participants were students and educators working in sectors and subjects relevant to CC(U)S.

The stories reveal the historical and contemporary social and cultural dynamics that shape CC(U)S imaginaries. They show the importance of recognising that CC(U)S (and other decarbonisation interventions) will unfold in a complex landscape of other technological changes, stories and scandals. They also show some of the conflations and misconceptions that shape people's responses.

[1] Evensen, D., Dickie, J. & Bartie, P. (2024). *Public reactions to carbon storage in the UK: Quantitative survey findings*.
[2] Wilson, A., Robertson, G., & Dickie, J. (2024). Future ordinaries: Assembling place-based knowledges and literacies in real and imagined harmscapes. *Futures, 159,* 103376.
[3] Wilson, A. (2024). From Crime and Punishment to Future Archaeologies – reimagining relationships of waste and value. In: Jordan-Baker, C. and Holloway, P. (eds.) *Writing Landscape and Setting in the Anthropocene*. Palgrave Macmillan.

*Bloody Boring Potatoes* was written by Patrick at a workshop held at the University of Glasgow

*Bloody Boring Potatoes* is one of several visions of the near future (or present) that highlight a perception that "emissions" are the responsibility of something or somebody else, and in particular that rural communities and farming are not to blame. Whilst this was written in a somewhat tongue-in-cheek tone, others where not, and *Bloody Boring Potatoes* conveys the confusion and frustration experienced by people being told to change without really knowing why.

Like many of the responses we encountered, "emissions" is used in a way that suggests $CO_2$ is a poisonous pollutant, or perhaps particulate matter. The flip side of such a conflation is that capturing $CO_2$ would somehow improve air quality.

In *Bloody Boring Potatoes*, the reaction to demands for emissions reduction is a familiar grumbling. In other stories and responses, the imagined reaction is far more energetic/ and vociferous…

# Bloody Boring Potatoes

My parents were farmers, as were their parents, and the parents of them. We were growing potatoes forever. For the longest time, we were growing potatoes. For decades we were selling them to get by – and we did. Harvests did change year by year, but we did get by.

Even though we did grow potatoes over generations, it wasn't good enough anymore, they said we cannot compete with global prices anymore, cheaper and cheaper we were asked to sell the potatoes – and all these emissions, they said. We need to reduce our emissions, they said. What are these emissions even? Where do they come from? Where do they go? We are farmers, bloody potato farmers, we put food on families' tables, we are not emitters.

Now they want us to capture our emissions. What good is that gonna do? It's expensive, I don't know how it works and what it's good for? Government says we have to do it, Scientists say it's safe. Better for the planet, they say. I am not convinced! Who are they to tell me what to do and not to do? We just want to grow potatoes, bloody boring potatoes.

*T.H.E.M*. was written by the project team as a synthesis of a large number of stories and responses that all featured resistance and defiance. These stories and responses can be associated with two very important sociocultural dynamics. First, a sense that anything industrial will inevitably be a blight – a destructive, polluting, damaging force. Second, a nostalgia for a (semi-mythic) pastoral idyll. Together these embody a narrative trope that we refer to as the 'Dark Satanic Mills', in acknowledgement of the profound influence of Blake's poem *Jerusalem*, most commonly known in the form of the hymn sung by the Women's Institute and fans at England Rugby Matches.

*T.H.E.M.* also deliberately introduces the perceived otherness of those responsible for the ruination of a green and pleasant land. It thus represents stories and responses that expressed a passionate defence of a beloved place, seen as completely innocent of contributing to greenhouse gas emissions, against a perceived external threat from an inherently and inevitably polluting industrial process.

# T.H.E.M.*

THEM wants us to believe that this is for our own good. THEM says THEM is saving the world. But why is THEM saving the world here? Why doesn't THEM go and save the world somewhere else? THEM should go to where the problem is. THEM should go to the big cities! THEM should go to where the heavy industry is!

We are not the polluters. We are not the emitters. Look around you. Look at our farms and fields, our meadows and woodlands. Look at our beautiful village. Look at the turbines on the hill producing good clean electricity. Look at our reservoir, producing good clean electricity. We are not the problem. We are the solution.

THEM is pushing carbon capture as the answer to all our problems. THEM wants to implement carbon capture and storage here, in our peaceful valley. THEM will build their looming plant over our idyllic countryside. THEM will cut down our trees. THEM will destroy our quiet, safe space. THEM will shatter our tranquility. THEM will inflict unhealable scars on our landscape.

THEM says THEM knows best. But THEM only knows money. THEM only knows profit. THEM doesn't know us! THEM doesn't know our village!

THEM thinks THEM knows best. But we know better! Friends, neighbours, we must stand together and tell THEM where to go! United, with one voice, we must tell THEM…

THEM IS NOT WELCOME ROUND THESE PARTS!

***T.H.E.M.** Tomorrow's Hope Emissions Management Inc.

*Pumping Carbon* moves us further into the future, into a time when CC(U)S infrastructure has already been built. It was created by one of the team to express some commonly co-occurring themes in responses received in both Falkirk, close to Grangemouth oil refinery, and in Peterhead, just South of St. Fergus gas terminal.

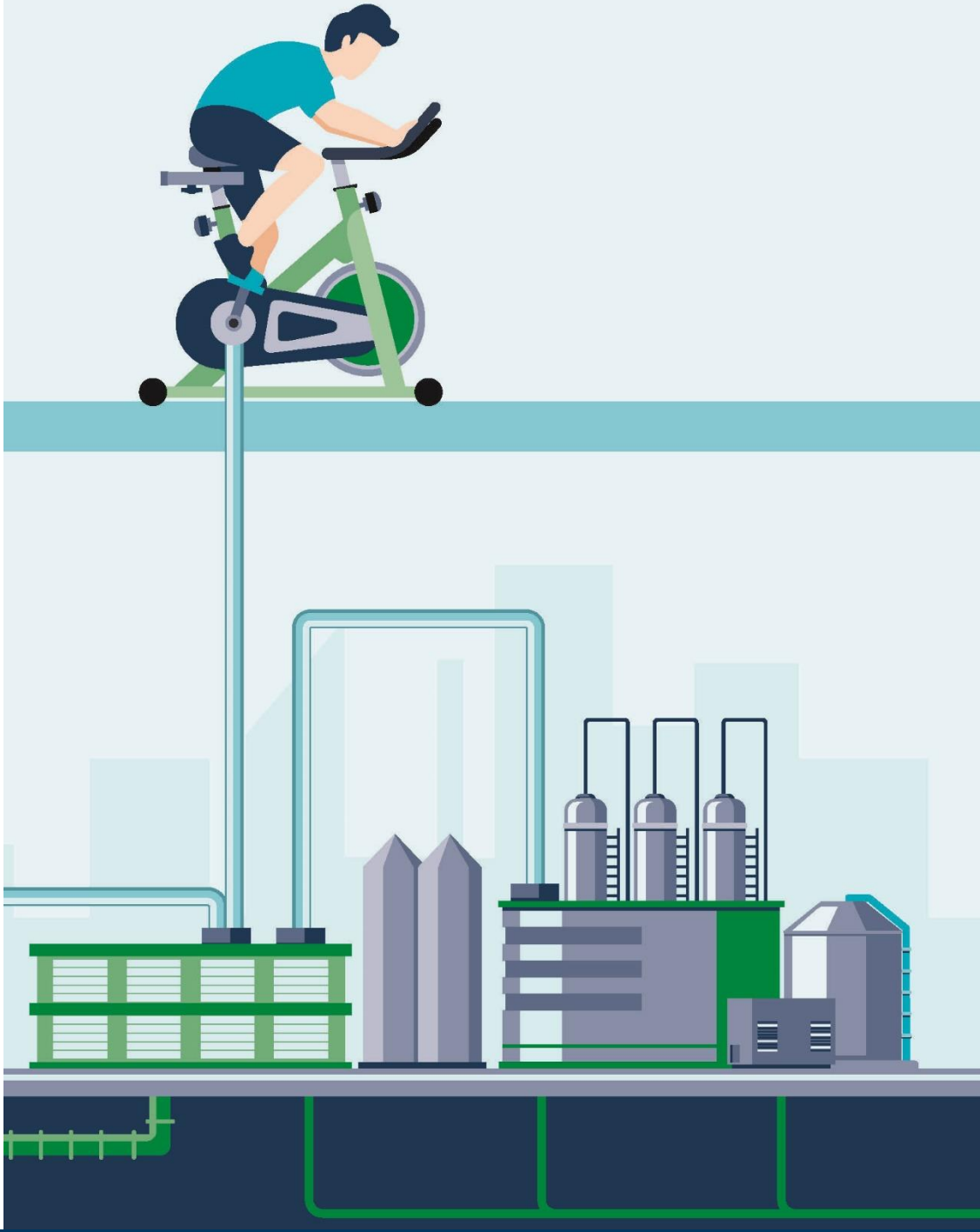
The first of these appears early in the story: a widely held belief that any jobs created by the introduction of CC(U)S will be short-lived and given to people from outside local communities This perhaps accurate belief[1] was coupled with two other dynamics that animated many of the stories and responses we received; a genuine optimism that opportunities might emerge and an almost total absence of awareness of what CC(U)S infrastructure will actually entail.

[1] See Katris et al., 2024 Understanding and Addressing Labour Supply Constraints and their Impact on Efforts to Decarbonise UK Industry Clusters and the Wider Economy.

# Pumping Carbon

There was quite a lot of resentment at first, when they brought in construction teams from overseas instead of giving jobs to us locals. But it soon became clear that those jobs weren't going to last long – in the end, even with the over-runs, the whole thing was pretty much done in 3 years, and then they were all gone, off to the next job or back to where they came from, who knows?

Anyway, the pumping stations turned out to be a real boon, and it looks like they'll need workers for another 20 years. When they realised that the only way to keep the whole thing net zero was to decarbonise the pumping system, there was a bit of confusion at first; there was even talk of cancelling the whole thing. But then someone suggested driving the pumps by bicycle. It was one of the engineers from up at the uni – they'd been to the gym, watching the spin classes as they pumped a bit of iron. And now there are plenty of job opportunities for our young folk pumping carbon. The work's a bit monotonous, but it keeps you fit, and you don't need any specialist training.



This story was written by Fraser Scobbie, a student taking the University of Stirling's Energy and Society module, in one of our workshops.

We include it here to represent a fusing of three important dynamics that emerged in the stories and responses we received throughout the project. The first of these is the absence of a vision of what CC(U)S will entail. The second is a deep cynicism, here combining an awareness of both greenwashing and sportswashing practices. The third is a belief that there will be an economic value in the captured carbon. Some stories and responses imagined captured $CO_2$ being piped into greenhouses and parks to feed plants or stored in cannisters and used in Soda Streams: others imagined an emerging market, allowing entrepreneurial opportunities for collection and reselling; and others, such as this one, demonstrated a widespread equation between $CO_2$ and carbon.

# The World's First Carbon Neutral Golf Competition

Tiger woods pulled up in his electric car.

Looking to rebuild his image, he had agreed to take part in the world's first carbon neutral golf competition.

Unfortunately, the solar powered cruise ship carrying the rest of the professional golfers across the Atlantic had gone missing. The officials had to act fast, trying to find anyone who would take part, anyone who would play 18 holes against Tiger Woods.

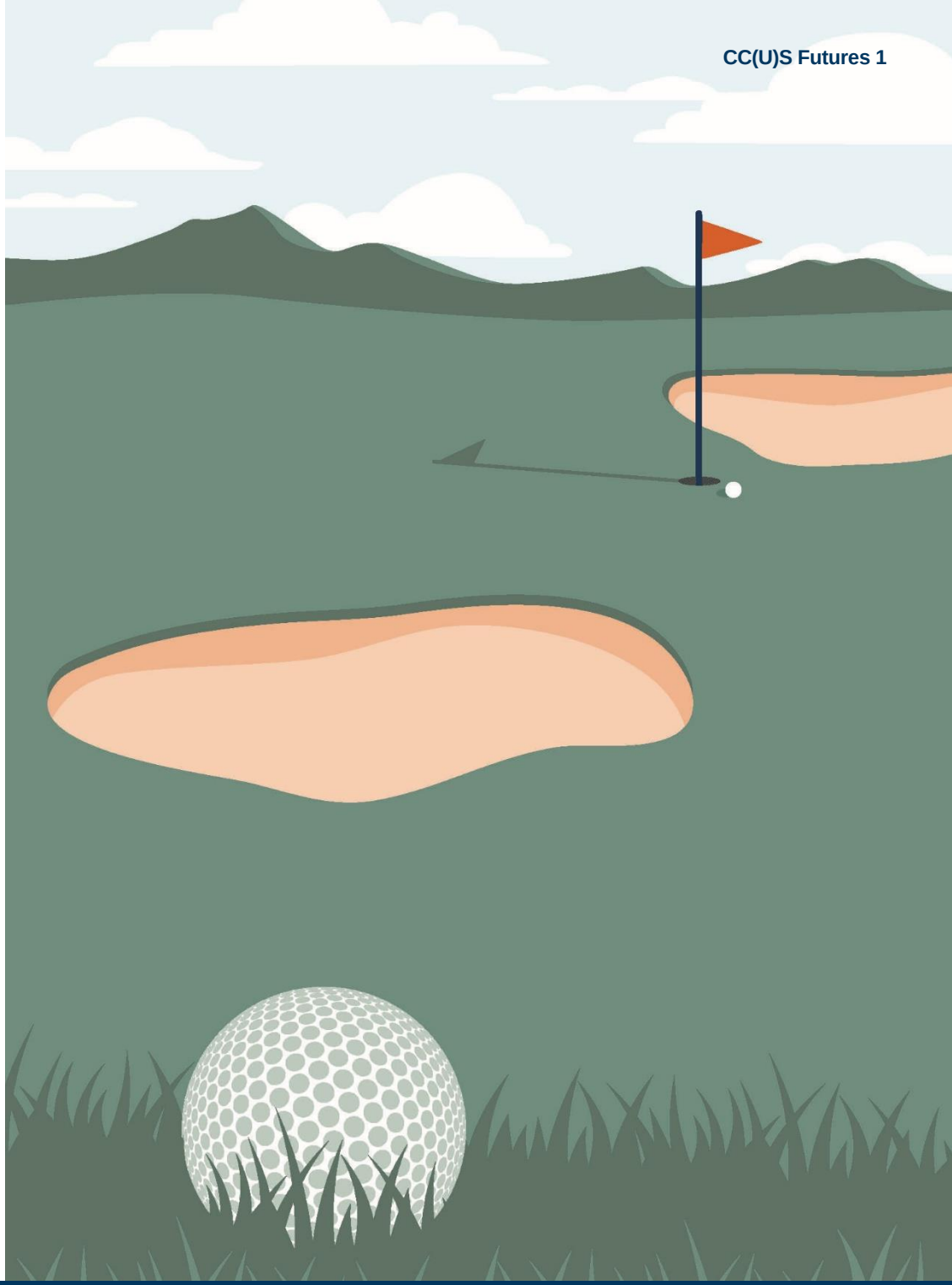
At the last minute, Greta Thunberg agreed.

Tiger walked up to the first tee, carrying his new Taylormade high-tensile captured-carbon golf club, teeing up his captured carbon golf ball, and bombed one down the middle. He smirked. Piece of cake.

It was now Greta's turn. She stood over her golf ball and closed her eyes.

She could hear the trees breathe. She hit her shot.

Finishing up on the captured-carbon astroturf of the 18th green, Tiger was in tears. Greta had absolutely smoked him. She left him there, lit up a carbon neutral cigar, and headed for the bar.



*Peat Bog Roofs* was created and recounted by storyteller Lindsey Gibb at a workshop with The Royal Scottish Geographical Society.

It is one of a small number of stories and responses that have an optimistic tone – although frequently this optimism was limited, either in a sense that only Scotland would achieve effective carbon capture or that positive action will not occur in the near future and might be as much as 50 years away.

It also expresses another narrative dynamic: that of *adaptation* as well as mitigation.

# Peat Bog Roofs

It aw started wi ma freend Liz. She wanted tae put a turf roof on her hoose. Her son and daughter-in-law had done it and it had been really successful. When she went tae speak tae the guys they'd said "Well we could do you a turf roof, but you know there's something new oot there – we could gie you a peat bog roof – yer very ain peat bog on yer roof." Well Liz is up for anything new, it was new technology and on it went and it made nae difference tae the roof – you'd think it was too heavy but naw naw it was aw fine, and it was grand, and you know whit? As soon as she got that going aw the emission ratings roond her hoose went absolutely doon because there was aw the carbon capture. Well, course, you know whit it's like when somebody gets something a bit different and it wurks, suddenly everybody else is getting wan as weil, and the hale village is covered in peat bog roofs, even the historic buildings because the planners couldnae argue as it didnae look that much different from the grey slate. And soon everybody had come roond tae see the peat bog roof village and all the carbon capture that's going on, in fact, every time they did statistics in Scotland, wheech, it's gone doon and doon and doon and Scotland's peat bog village began to capture everything. And because it was instant ancient peat bog, you didnae huv tae worry aboot the peat bog being formed. But naebody had tested the technology before and efter a while the peat bog kept growing. It didnae stay on the roofs, it went doon the walls, and into the streets and o'er the bridge and intae the river until, you no longer needed the bridge or a boat, you could just, if you knew what you were doing, walk on o'er from wan side tae the ither and, of course, being Dunkeldians we like to adapt so it wasnae long before the webs between our feet began to regrow, just like they would hae been in the past. Efter a while the kids were born wi webbed feet and they didnae need shoes, cause they were used tae the peat bogs, and they were known as the Bog Bairns. So everywhere we went we just walked o'er the river, and it needed a wee bit practice because it could get a bit shooglie and, you know, we've all done the trip, where you fall in the bog and somebody has tae pull you oot, in fact, actually, that's your comin' o 'age thing – other people might be taken for a drink on their eighteenth but in Dunkeld you get dunked in the peat bog so you've got that full experience. Aye some people left, they couldnae stond being covered in aw that wet, soggy stuff and it was all broon, and some didnae fancy webbed feet. But those of us that stayed, we adapted. And noo oor peat bog village, which is just the biggest peat bog in the world, and there's nae need for the A9 because it's taken o'er the whole thing, well, it single handedly did aw the carbon capture and bringing the emissions doon for Scotland alane, in fact I believe when they run the statistics there's even a wee bit when you look from space you can see aw the difference it's making, so we're awfy proud of oor webbed feet and oor wee peat bog village.

*Happier Birds* was written by Cameo Marlatt at one of our workshops. Cameo is part of the project team whose expertise lies in creative writing.

It is one of a small number of stories and responses that directly addressed the storage of $CO_2$. It moves us further into the future, to a time in which undersea storage has been filled but $CO_2$ is still being produced and so still needs to be captured and stored.

Like many of the stories and responses we received it expresses uncertainty about what infrastructure will be required for CC(U)S and a sense that there are likely to be unanticipated consequences for both the built and natural environments.

# Happier Birds

It's a bit of a pickle, really, what to do with the captured $CO_2$ now the North Sea is no longer an option. As a temporary measure, until something bigger can be found by those scientists we read about in the news, they are using what sites they can find – the old gas storage structure out near Queensferry, was de-converted from its use as a theatre venue back into a gas storage tank. The old factory sites in Leith that we've been using as housing and community centres have been populated with storage tanks. On day hikes along the canal, you can sometimes see small barges with their cannisters on their way to Edinburgh. There are fewer kingfishers now – I suppose they have gone somewhere else. But in the meantime we are meeting our UK emissions goals, so I suppose these small changes are worth it. We will all – the birds and the humans – be happier in the long run.

*Toxic Carbon Leaks* was written by the team as a synthesis of several stories and responses received during the project. It paints a far more pessimistic vision of the future than Peat Bog Roofs or Happier Birds – one in which change is associated with deterioration and pollution. The sociocultural dynamics that animate these kinds of stories and responses are clear - they combine current outrage at sewage dumping by the UKs water companies; a sense that all profit-driven private corporations do not and will not maintain pipelines and infrastructure; and a perception of graft and incompetence associated with major infrastructure projects such as HS2, the construction of new railway stations and the RAAC crisis.

These are particularly common themes and associations in the stories and responses that we received and highlights how important it is to recognise that CC(U)S futures will not unfold in a cultural vacuum.

# Revealed: toxic carbon leaks

23rd February 2037

Daphne Wilbertson, TTN Environmental Correspondent

Emissions management giant Tomorrow's Hope (THEM) are once again in the spotlight as evidence mounts of inadequate investment in infrastructure and maintenance.

Last month, our own investigations revealed more than 1000 $CO_2$ discharges in the past year. Government regulations allow THEM to release $CO_2$ into the atmosphere when environmental conditions result in high GHG loads and there is a risk of overloading the grid. However, the frequency of THEM's $CO_2$ discharges suggests it is happening as part of day-to-day operations.

Now, new drone footage obtained by TTN correspondents provides compelling evidence of ongoing leaks at least 17 locations along the pipeline used by THEM to transport waste $CO_2$ to its North Sea storage facilities. The aerial photographs, taken by drones flown by campaign group *Just Stop* THEM, show intense localised growth of vegetation including Giant Hogweed – a toxic, invasive species that can cause severe blistering and burns and poses significant a health threat to children and pets. The images have been verified by our fact-checking team, TTN Verify.

Just Stop THEM claim that the excessive growth is fed by $CO_2$ leaking from the underground pipeline. Dr Earnest Limelight, a specialist in plant biology at Central University, has confirmed that $CO_2$ can produce Giant Hogweed. A spokesperson for *Just Stop THEM* told TTN:

"This was always inevitable, from the initial decision to use old, obsolete infrastructure and technology as the basis for the $CO_2$ grid. Add to this the demand for profits from THEM's shareholders, leading to a lack of investment in maintenance and blatant disregard for the environment, and what do you expect? They're hardly *Tomorrow's Hope* – more Today's Hopelessness."

THEM reported pre-tax profits of more than £13 billion for the 2035-6 financial year. We have approached THEM for comment but have yet to receive a response.

*2085* was written by Mike Robinson MBE at a workshop with the Royal Scottish Geographical Society.

We include it here because it expresses an optimism and faith in our ability to make progress that is almost unique amongst the stories and responses we received – and because we want to end on a happy note.

# 2085

I'm glad so many of you could make it here today – it's truly the end of an era. Not just the end of this carbon capture plant, but dare I say even the end of the Anthropocene. Yes, I know, perhaps a little early, but that is surely the direction of travel – we have at last understood the need to be sustainable as a species - to stop borrowing from future generations, and finally take the responsibility and action necessary to avoid the worst of climate change. And yet here we are closing this carbon capture plant on the edge of Perth. I know many of you will see this as a sad day, the building has stood for 50 years after all. But we have managed, through ingenuity, innovation and determination, to do away with so many of our day to day emissions, and this plant is no longer needed. It's hard to believe that all of our transport, heat and electricity production burned fossil fuels… yes, I know, it's laughable now. But when my grandfather's generation set out to decarbonise properly, I don't think they could have imagined how easily they might decarbonise heating. Electricity. Cars and buses and trains. Even farming.

This industrial carbon storage was always a stop-gap – capturing the worst of our emissions and those that were hardest curtail. But as you will all know, after its peak around 2050, innovation has continued to drive our progress and we have needed to capture less and less. Who knew then how much we could do without causing long term damage.

My grandfather declared a vision for this city to become the most sustainable small city in Europe. We began to do this by decarbonising everything we could. We captured emissions where we couldn't, but did that make us sustainable? Well I would argue no! But as we stand here today, to dismantle this carbon capture facility, we can finally declare this city sustainable.

# Learning from the stories

**Collectively, the stories draw on recognisable historical and cultural influences. They are animated by fears, hopes, distrust, cynicism and humour. They also demonstrate some common conflations and misconceptions.**

For example, the responses and stories we received showed that many people equate environmentally responsible behaviour with recycling and re-use.

There were also widespread misconceptions about $CO_2$: that it (and all other greenhouse gases) is pollution; that it is toxic and that it is inflammable. Many responses elided $CO_2$ and carbon and in many cases we also saw confusion over “net zero” and zero.

Importantly, the stories illustrate some of the ways in which pre-existing historical and contemporary dynamics shape visions of technological and industrial changes to landscape and life. Some key themes are:

- Resistance to change and a belief that “emissions” are created by someone else
- A nostalgia for an innocent, pastoral past, coupled with a view of industry as inevitably polluting and in destructive opposition to nature (the “dark satanic mills” trope)
- No connection between industry and progress
- A fear that decarbonisation will see a repeat of the localised social impacts of the end of coal mining
- A total lack of awareness of what CC(U)S implementation might involve
- Widespread belief that re-using $CO_2$ would somehow “use it up” and so reduce the amount that needed to be stored
- Very high levels of cynicism associated with assumptions of incompetence and greed within industry and government, clearly strongly influenced by awareness of water pollution, sewage dumping, and other infrastructure projects such as HS2.

**These cannot and should not be dismissed as ignorance or noise. These associations are real, and unless addressed head-on will to some extent be justified.** Simply showing infographics of $CO_2$ capture and transport will not provide the education and communication needed to form the basis of meaningful consultation.

## Who contributed to the creation of these stories?

These stories were created in and following five workshops held at Forth Valley College, the University of Glasgow, the University of Stirling, the University of Strathclyde and the Royal Scottish Geographical Society, plus visits to locations in the Scottish Cluster by the project team. The workshops included a total of 52 participants. Those involved were given the option to have their stories attributed to them, to use a pseudonym or to remain anonymous. We are grateful to all those involved.

## Why do we use fiction?

We use Participatory Speculative Fiction because in fiction, there is:

- No pressure to be accurate or factual (i.e. no need to demonstrate expertise)
- No requirement to find solutions
- No sense that we are asking people to embrace or resist an intervention
- No bargaining dynamic (no sense that we are going to give what people ask for)
- The possibility of revealing conscious and subconscious influences and associations through narrative tropes and images.

## This resource

This resource is intended to highlight some of the factors that shape people’s responses to and understandings of possible CC(U)S futures.

It was created by Anna Wilson, George Robertson and Cameo Marlatt as part of the IDRIC-funded *CC(U)S Futures* project and the Leverhulme Trust-funded *Waste Stori*es project.

Please cite as Wilson, A., Robertson, G. and Marlatt. C. (2024). CC(U)S *Futures 1: Visions from the Scottish Cluster, 2023/4*.

## CC(U)S Futures

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