



WHITE PAPER · CARBON CAPTURE & PROJECT FINANCE

The captured tonne is *not yet money*.

Europe priced the carbon. Yet the value of a captured tonne is paid against its evidence, not against the tonne, and that is where carbon-capture projects quietly lose money. What the gap is, and how to close it.

PUBLISHED BY

Ariadne Labs

SUBJECT

MitOS, by Ariadne Labs

CONTEXT

EU ETS · CCS · removals

EDITION

1.0 · September 2026

IN BRIEF

Where the money in a captured tonne actually leaks

- **The tonne is not the finish line.** Capturing CO2 spends the capital; the value is paid later, and only against evidence for the tonne, not the tonne itself.
- **The allowance gap.** Relief from surrendering an EU ETS allowance applies to CO2 captured and permanently stored, verified under the monitoring rules. A tonne you cannot yet prove was stored and verified is still a tonne you surrender an allowance for.
- **The credit gap.** A removal or offtake unit sells only if its chain of custody is unbroken and its MRV complete. Break one link and it is not discounted, it is unsold.
- **The financing gap.** A lender sizes debt against inventory it can audit. Evidence scattered across spreadsheets and verifier emails is not collateral.
- **It is an information problem.** The capture plant works. The loss lives in the distance between a physical tonne and its provable, financeable record.
- **Which is what software can close.** A batch ledger with chain of custody, MRV and verification cycles, a credit inventory, and a financing desk that sizes debt the way a lender would.

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01 · THE CAPTURED TONNE IS NOT YET MONEY

Capture is the starting line, not the finish

A carbon-capture project spends its capital turning a flue gas into a captured tonne of CO₂. That tonne feels like the finish line. Financially, it is the starting line.

Europe has built the demand. The Emissions Trading System puts a price on emitting and treats a tonne that is captured and permanently stored as a tonne you do not surrender an allowance for. The Net-Zero Industry Act sets a European target for injection capacity. Around them a market for removals and for captured-carbon offtake is forming. The economics exist.

The problem is that none of that value is paid against a tonne. It is paid against the evidence for a tonne. The distance between a captured tonne and a tonne that has earned its keep is where projects quietly lose money.

02 · THREE PLACES THE MONEY LEAKS

The allowance gap

Relief from surrendering an allowance applies to CO₂ that is captured and permanently stored, verified under the monitoring rules. A tonne you captured but cannot yet prove was stored and verified is, for the compliance year in front of you, still a tonne you surrender an allowance for. You paid to capture it, and you pay again to cover it. The chemistry happened; the accounting did not.

The credit gap

A removal unit or an offtake volume is sellable only if its chain of custody is unbroken and its MRV is complete: which capture batch, which transport, which store, verified by whom, against which methodology, on what date. Break one link and the unit is not sold at a discount. It is not sold. A buyer under scrutiny does not want a cheaper tonne. They want a defensible one.

The financing gap

A lender advances against inventory it can audit. Captured tonnes whose evidence is scattered across spreadsheets, verifier emails and a folder nobody owns are not collateral a credit committee will size debt against. The project is then financed as if the tonnes did not exist, which is to say under-financed against its own output.



A buyer under scrutiny does not want a cheaper tonne. They want a defensible one.

03 · AN INFORMATION PROBLEM, NOT A CHEMISTRY PROBLEM

The plant works; the record does not

None of the three gaps is a capture-technology problem. The loss is in the distance between a physical tonne and its provable, financeable record, and that distance is made of missing dates, unlinked batches, a methodology version nobody pinned, and a verification cycle that closed after the compliance deadline rather than before it.

That is the same shape of problem that swallows permitting time, and it has the same answer: make the record explicit, current and evidenced, so the value the project has already created actually converts.

04 · WHAT WE BUILT

A carbon module built around the defensible tonne

— A batch ledger with chain of custody.

Every captured batch carries its origin, transport, store and verification, linked, so a tonne can be followed from flue to formation without leaving the record.

— MRV and verification cycles, with claim tie-out and methodology tracks.

What was measured, under which methodology version, verified by whom and when, tied out to the claim it supports. When a verifier or registry asks how a number was reached, the answer is one place, not a reconstruction.

— **A credit inventory, with offtake and transport cost books.**

What exists, what is verified, what is committed, what is sellable, and what each tonne costs to move and store, so a margin is a fact rather than an estimate.

— **A financing desk that sizes debt the way a lender would.**

The verified, bankable inventory feeds a full-life model on a lender basis, so the tonnes you can prove become the debt capacity you can raise.

— **Books that are tamper-evident.**

The record carries a content fingerprint, so what you show a buyer, a lender or a registry is provably the record you kept.

05 · HOW THAT EARNS MONEY

It stops created value from leaking

The module does not create value out of nothing. It stops created value from leaking, at three points that are all denominated in your own numbers, not ours.

ALLOWANCES

not surrendered

every tonne proven captured-stored-and-verified before the deadline is an allowance you do not buy

UNITS

sold, not stranded

every tonne with an unbroken chain and complete MRV is a unit you can actually sell

DEBT

sized on proof

every tonne a lender can audit is inventory that sizes debt

Value at risk in a period is the tonnes that did not convert, multiplied by what each would have been worth. MitOS is built to make that number small, and visible while there is still time to act on it.

06 · THE REST OF THE PROJECT, ON THE SAME RECORD

Capture is also a permitting, land and financing project

MitOS holds those on the same line: the derived permitting path with every requirement cited to the article, documents versioned on the step they belong to with a data room for verifiers and buyers, and reports and evidence packs exported to PDF and Word from live data, each carrying a tamper-evident fingerprint. Greek, Italian and Swiss law are built in from the regulators' own texts. It runs as a desktop edition where nothing leaves your machine, or as a cloud workspace for teams.

07 · WHAT IT DOES NOT DO

The honest boundary

It does not capture carbon and it does not verify it: an accredited verifier does that, and MitOS is not that verifier. It is not legal advice and it does not set the carbon price. It will not make an unverifiable tonne sellable, because nothing can. What it does is keep the evidence for every tonne complete, current and financeable, so the tonne you captured becomes the tonne you get paid for.

Europe priced the carbon. Whether a project is paid for capturing it is still decided by how well the file is kept.

ABOUT

Ariadne Labs

Ariadne Labs is a software company with its roots in the field. MitOS is built on more than twelve years of EPC project controls across combined-cycle power, transmission, pipeline and renewable projects, by people who have lived with the cost of a project's value that cannot be proven when it matters.

The carbon module is live in Switzerland, the company's carbon flagship, and MitOS is built to add more. Permits, land, contracts, guarantees, documents, financing and carbon sit on the same record, so nothing falls between the steps.

NOTICE

MitOS is not legal advice, is not an accredited MRV verifier, and does not set any carbon price. Regulatory instruments referenced here are described in substance; the official publication alone is authoritative. Verify against the consolidated text in force on the day you rely on it.

This paper describes the MitOS carbon module: chain of custody, MRV, credit inventory and financing. Carbon-capture permitting in EU jurisdictions is not claimed here.



Permitting energy projects is a labyrinth.
MitOS is the thread.

