STRATA CARBON ASSURANCE WHITE PAPER

From Plant Data to Proof

How measured evidence can restore value, speed and trust to industrial carbon, tax credit and geothermal claims

A Strata Carbon Assurance white paper
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Strata Carbon Assurance is a trade name of JIL Sovereign Technologies, Inc.

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NOTE

About this paper

This paper explains why the link between what an industrial plant measures and what its carbon or tax credit claim says is weak today, what the market and policy landscape looks like in late 2026, and how a measured-evidence approach can close the gap. Every external statistic is cited in the References. Examples marked **Illustrative** are composites or calculations built on stated assumptions. They are not customer results, and no real company is depicted. Nothing in this paper is tax, legal, engineering or investment advice.

Read this if you are...

If you are a...	Start with	What you will take away
CFO, CEO or board member of an industrial emitter (cement, steel, refining, chemicals, landfill gas, ethanol, food and agriculture, utilities)	Executive summary; The financial case; Trust and governance	Where carbon and tax credit value leaks between the meter and the books, and how to size it
Geothermal operator or developer	Market context: geothermal; Industry focus; Forward look	How net export, auxiliary load and non-condensable gas evidence supports credits, offtake and financing
Carbon project developer (landfill gas, mine methane, ODS, digesters, CCS)	The problem; How it works; Role walkthrough	How continuous, gap-visible evidence can shorten the path from monitoring to issuance
CCS or 45Q operator, or a tax credit buyer	Market context: 45Q and Subpart RR; The marketplace; The financial case	Why documentation quality matters for transfers under Section 6418, and what changed in 2025 and 2026
Plant engineer, operations or EHS lead	How it works; Role walkthrough	What read only really means, which checks run, and what you will (and will not) be asked to do
Environmental consultant or integrator	How it works; How to engage	How a shared engine and 16 industry packs fit your client work, and the channel partner program

If you are a...	Start with	What you will take away
Independent verification body	Trust and governance; Role walkthrough: verifier	How evidence is packaged for any accredited verifier, and how Strata preserves your impartiality
Credit buyer or investor	The problem; Market context; Forward look	What separates a measured claim from an estimated one, and what to ask a supplier

Executive summary

The short answer: Industrial carbon value is created in the plant and lost on the way to the books. Meters, historians and laboratories already record what a plant actually did, minute by minute. But the claims built on that data, whether a carbon credit, a compliance offset, a 45Q tax credit or a geothermal clean electricity credit, are usually assembled months later in spreadsheets, where tags lose their names, gaps quietly become zeros and reviewers must reconstruct the trail. Strata Carbon Assurance connects the two worlds. It reads approved plant data read only, checks it with defined rules, keeps every 15-minute interval with its source tag, time, quality flag and exception, and prepares draft workpapers and evidence packages that any independent, accredited reviewer can recompute.

Why now. Four forces are converging:

- **Trust is now priced.** A 2024 peer-reviewed synthesis of 2,346 crediting projects estimated that less than 16% of the credits issued to the projects studied represented real emission reductions [5]. Buyers have responded by paying for quality. MSCI reports a primary market worth just over $1.4 billion in 2025, its fourth year near that level, with rising prices and stronger demand for higher-quality credits [1]. Ecosystem Marketplace found that after landfill gas methodologies were approved under the Integrity Council's Core Carbon Principles, landfill gas credit prices rose 35% between the first and second halves of 2024 [3].
- **Compliance markets got longer and stricter.** California extended its program, now called Cap-and-Invest, through 2045 and kept offsets at up to 6% of an entity's obligation, with at least half from projects with direct environmental benefits in the state [6]. A separate law requires all compliance offset protocols to be updated by January 1, 2029 [7]. Washington signed a linkage agreement with California and Québec in June 2026 and expects a shared market in 2027 [12].
- **Federal measurement rules are moving.** EPA proposed in September 2025 to end most Greenhouse Gas Reporting Program obligations, including Subpart RR for geologic sequestration [14]. Treasury and the IRS responded with a safe harbor that lets 45Q claimants have an independent

engineer or geologist certify a Subpart RR style annual report if EPA's reporting system is unavailable [16]. When the filing channel can change, the measured record underneath it is what endures.

- **Tax credits became a cash market.** Section 6418 lets eligible taxpayers transfer credits such as 45Q, 45Y and 48E to unrelated buyers for cash [18]. Crux estimates the transfer market grew from $32 billion in 2024 to $42 billion in 2025 [19]. Buyers diligence documentation, and documentation quality affects price.

What Strata does today. A read-only AVEVA PI Web API connector and a CSV history import are built. Sixteen industry packs run on one shared assurance engine, with 15 defined plant-health checks and seven labeled model checks beside them. The output is draft workpapers (for example, a Form 8933 draft workpaper, a Section 6418 transfer statement draft and an EPA Subpart RR draft) and evidence package manifests. They are drafts for qualified people. They are not filed returns, verified credits or tax determinations.

What Strata is not. It is not a verifier, a registry, a CPA firm, an engineering firm, a law firm or a paid tax return preparer. It does not write to plant controls. It never changes a setpoint.

How to start. A no-cost ROI assessment on 3 to 12 months of historical PI data, or a CSV export, under NDA. You see your own gaps, exceptions and draft workpapers before any production connection.

> *Carbon value is created in the plant and lost on the way to the books.*

1. A night shift: how a claim is really made

> ILLUSTRATIVE
>
> **Illustrative composite scenario**
>
> The plant, people and events below are a composite created for this paper. They do not depict any real company, facility or customer.

It is 2:14 a.m. at a mid-sized industrial plant that captures carbon dioxide from a process stream, compresses it and sends it by pipeline to a permitted injection well. The control room is quiet. On the historian, the capture-line flow meter reads exactly the same value it read at 2:13, and at 2:12, and at 2:11. The compressor downstream is still drawing power. The injection-side meter is still moving.

Nothing alarms. A frozen transmitter is not a safety event, so the operator has no reason to look.

In the world most plants live in today, that flat line sits in the archive for eleven months. The following spring, a consultant exports a year of data into a spreadsheet, rolls it up to daily totals and then monthly totals. The tag name is gone by the second tab. The flat stretch looks like normal operation, so it is counted. During verification, a reviewer notices that capture and injection do not reconcile for a week in March. Now the questions start. Which meter is right? When was it last calibrated? Was a value substituted? Who decided? The answers are in three inboxes and one retired technician's memory. The verification slips. The finance team, which had planned to transfer the year's 45Q credits for cash before its tax deadline, now has to explain to a buyer why the documentation is still open.

In a measured-evidence world, the same morning looks different. Within 15 minutes, a flatline check notices that the capture flow has stopped moving while the related load still moves. The check is critical, so the interval is marked as blocking. It is not dropped and it is not filled with a guess. A balance check compares capture, injection and line pack over a trailing hour and shows the gap. By the start of day shift, a technician has the tag, the timestamps and the calibration due date in one view. The transmitter is fixed by lunch. The exception, the repair and the reviewer's disposition are written into a tamper-evident record next to the affected intervals.

Eleven months later, the verifier does not have to reconstruct anything. They open the evidence package, see every interval, see the week in March, see what was excluded and why, and recompute the result themselves. The finance team hands its buyer a clean trail.

Same plant. Same meters. Same people. The difference is whether the evidence was preserved when it happened or reconstructed after the fact.

> *The difference is whether the evidence was preserved when it happened or reconstructed after the fact.*

2. The problem: why plant data and carbon value are disconnected

Where does carbon value leak between the meter and the books?

Industrial plants are among the most heavily instrumented places on earth. A modern facility can record thousands of tags every few seconds in a process historian. Yet most carbon and tax credit claims are still built by hand, after the fact, from exports.

The leaks are predictable:

- **Tags lose their names.** Once a value is summed into a daily or monthly total, the link to the instrument, the timestamp and the quality flag disappears. A reviewer must take the total on trust or rebuild it.
- **Gaps become zeros, or worse, become normal.** A missing sample, a frozen transmitter or a backfilled archive can be silently treated as valid operation. In some protocols that inflates a claim. In others it forces conservative defaults that destroy value the plant actually earned.
- **Calibration lives somewhere else.** Calibration certificates, zero and span drift and substitution decisions sit in maintenance systems, binders and email, disconnected from the intervals they affect.
- **Methods hide in formulas.** Emission factors, boundaries and exclusions are embedded in spreadsheet cells. Version control is a file name.
- **Laboratory results are re-keyed.** Gas composition and other lab analyses are often transcribed by hand into the calculation, adding error and breaking chain of custody.

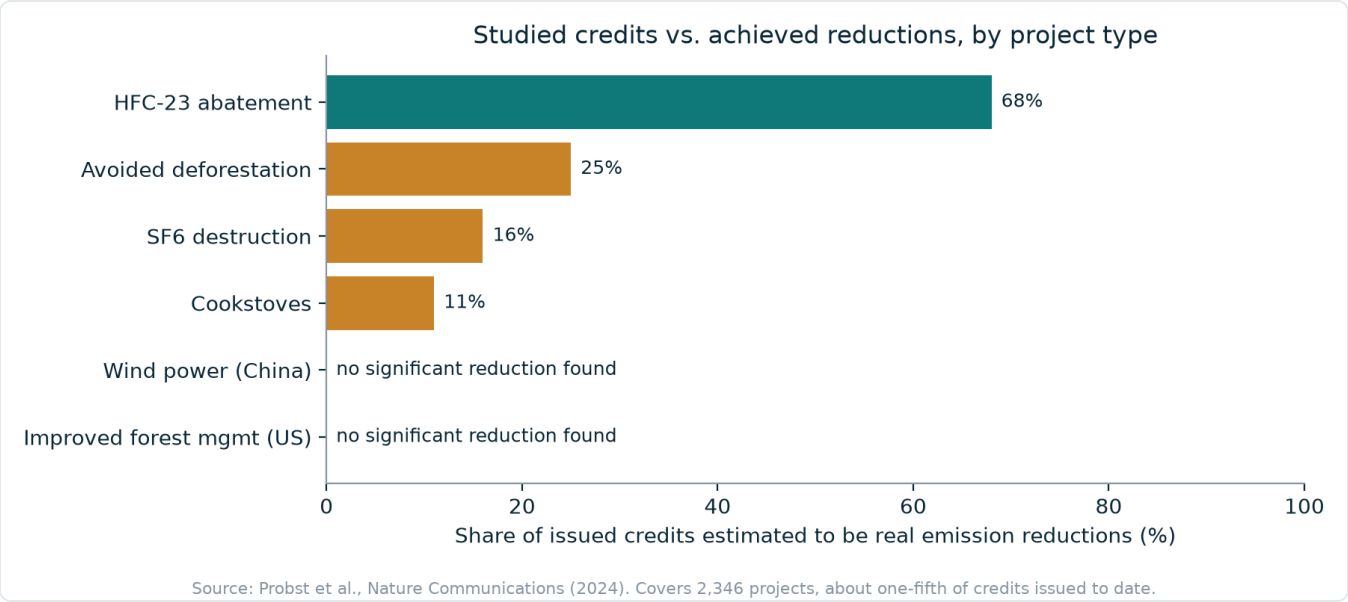
Why are verification costs and delays so persistent?

Independent verification exists for good reasons: an accredited third party must be able to challenge the claim. But when the evidence arrives as a reconstructed spreadsheet, verifiers spend their time rebuilding the trail rather than testing it. Findings lead to corrections, corrections lead to re-review, and each cycle delays issuance or filing. For developers, delay is working capital. For tax credit sellers, delay can push a transfer past a buyer's planning window.

The market has noticed. Registries and newer certification platforms now advertise faster, data-driven issuance, and buyers increasingly ask how a supplier's monitoring data was produced, not only what it totals [29]. The common thread is that verification goes faster when evidence is organized for verification from the start.

What is the credit integrity crisis, in plain numbers?

The voluntary carbon market has spent several years absorbing evidence that many credits overstated their impact. The most comprehensive synthesis to date, published in *Nature Communications* in 2024, covered 14 rigorous studies on 2,346 crediting projects and about one-fifth of all credits issued, almost one billion tonnes. It estimated that less than 16% of the credits issued to the investigated projects constituted real emission reductions, with wide variation by project type [5]. The authors attributed the problem in part to "the ability of project developers to make unrealistic assumptions or pick favourable data" [5].



Studied credits vs. achieved reductions, by project type

That finding is not an indictment of every project. It is an indictment of claims that cannot be checked. When assumptions replace measurements, and when the data that would settle the question is unavailable, buyers have to discount everything.

Why does double counting keep coming up?

Double counting takes several forms: the same tonne claimed twice by two parties, the same reduction counted in a voluntary credit and in a national inventory without adjustment, or overlapping boundaries between a plant's own reporting and a project's credited reductions. International rules under Article 6 of the Paris Agreement now operate a supervised crediting mechanism with host country authorization [22]. At the plant level, the defense is simple and unglamorous: one measured record, clear boundaries and an explicit statement of which program each tonne is counted in.

Why do buyers distrust what they are offered?

Buyers face reputational risk if a credit they retire is later challenged. They have therefore shifted toward credits with recognized quality labels, recent vintages and transparent monitoring. Ecosystem Marketplace reported a 217% price premium in 2024 for credits with vintages from the last five years and found that removal credits averaged 381% more than reduction credits [3]. MSCI reported that higher prices and stronger demand for higher-quality credits offset weaker performance among lower-quality projects in 2025 [1]. Trust has become a price signal.

How is compliance pressure changing the job?

Compliance programs reward measured, conservative evidence and punish gaps. California's statute now requires CARB to update every compliance offset protocol to reflect the best available science by January 1, 2029, and to re-evaluate them at least every five years beginning in 2034 [7]. Washington requires offset projects to be real, permanent, quantifiable, verifiable and enforceable, and to be verified by an independent third party before issuance [11]. In the European Union, importers of cement, iron and steel, aluminium, fertilisers, electricity and hydrogen must now declare embedded emissions and surrender CBAM certificates [20]. Each regime asks the same question in a different accent: show me the measurement.

What happens when the rules themselves move?

The most underappreciated risk in 2026 is regulatory motion. EPA's September 2025 proposal would permanently remove reporting obligations for 46 source categories after reporting year 2024, including Subpart RR, the geologic sequestration reporting that 45Q has long relied on [14][16]. As of this writing that proposal has not been finalized. EPA's October 2026 interim final rule only moved the reporting year 2025 deadline to March 10, 2027 [15]. Treasury and the IRS, in Notice 2026-50, extended a safe harbor under which, if EPA's reporting system is unavailable, a taxpayer may satisfy the Subpart RR related 45Q requirements by preparing the annual report Subpart RR would have required, including mass balance calculations and monitoring, and having it certified by an independent, state-registered engineer or geologist [16]. The same notice asks for comments on whether ISO 27914:2026 could serve as an alternative standard [16].

SIDEBAR

The Subpart RR lesson

When a reporting channel can disappear, the value of a claim rests on the evidence beneath it. A plant that preserved every injection interval, every mass balance input and every calibration record can hand that evidence to an independent engineer, to EPA or to whatever standard replaces it. A plant that relied on assembling a report once a year must rebuild it for a new audience. Measured evidence is portable across rule changes. Reconstructed evidence is not.

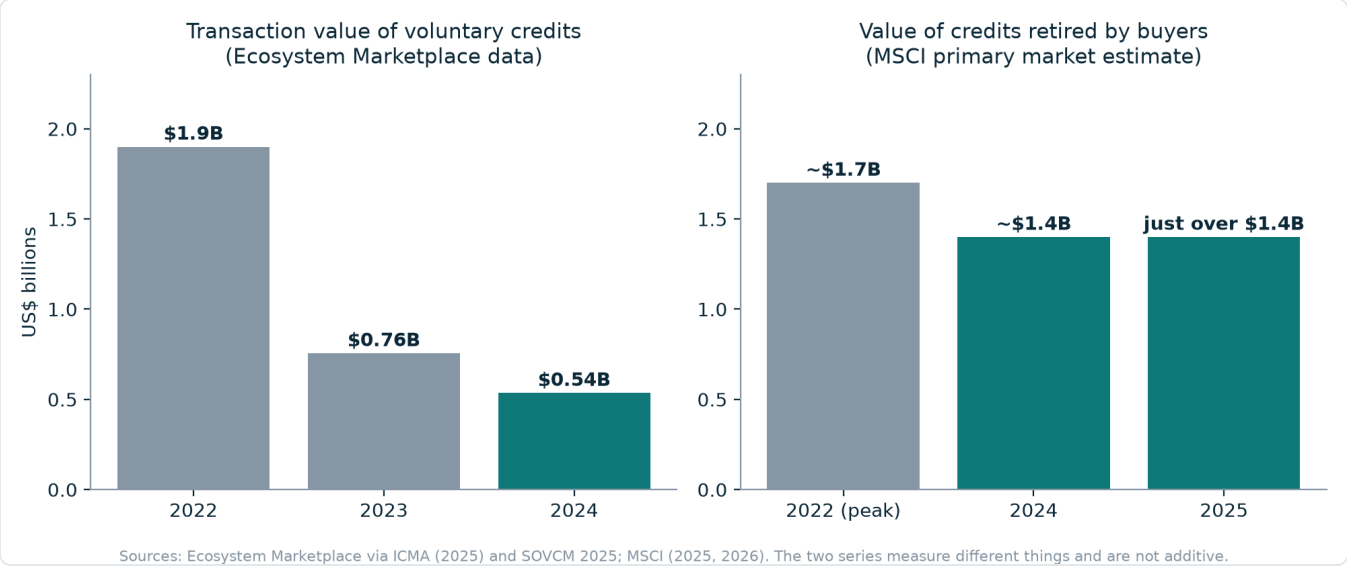
> *Measured evidence is portable across rule changes. Reconstructed evidence is not.*

3. Market context: the numbers that matter in late 2026

How big is the voluntary carbon market?

It depends on what you measure, and the difference matters.

- **Value of credits retired by buyers.** MSCI estimates the primary global carbon credit market, calculated as credits retired multiplied by the estimated purchase price, at just over $1.4 billion in 2025, the fourth consecutive year near that level [1]. Retirements rose 3% to 202 million tonnes CO2e, matching 2021's record [1]. MSCI put 2024 at about $1.4 billion and the 2022 peak at about $1.7 billion [2].
- **Value of reported transactions.** Ecosystem Marketplace, which tracks reported transactions, found $535 million in 2024, down from $755 million in 2023, on 84.4 million tonnes traded [3][4]. Its data show $1.9 billion in 2022 [4].



Two ways to measure the voluntary carbon market

The takeaway for executives: the voluntary market is roughly a $1 billion class market by the broader measure, flat in total, and bifurcating by quality. MSCI projects it could be worth $5 billion to $20 billion by 2030 and $60 billion to $270 billion by 2050, depending on demand and supply tightness [1]. Projections are not promises. What is already true is that quality is being priced.

What is the ICVCM Core Carbon Principles label, and does it move prices?

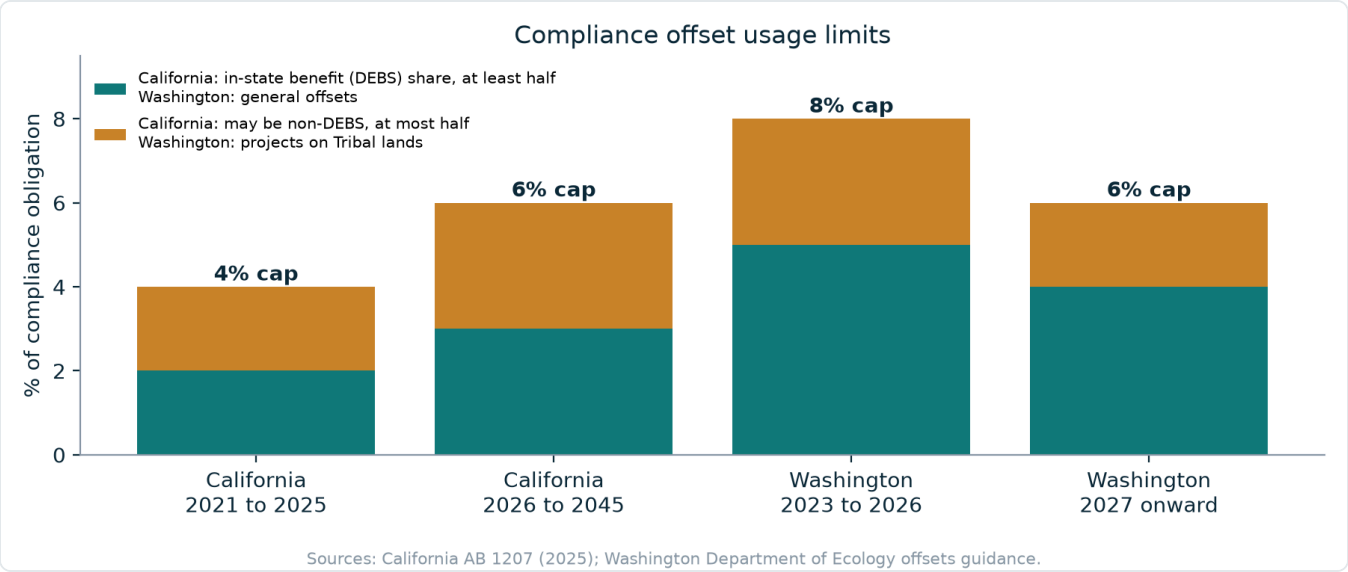
The Integrity Council for the Voluntary Carbon Market assesses methodologies against its Core Carbon Principles (CCPs). CCP-approved categories relevant to industrial and methane developers include landfill gas capture and utilization methodologies under ACR, the Climate Action Reserve, Gold Standard and

Verra, and ozone depleting substances destruction methodologies under ACR and the Climate Action Reserve [21]. In 2024, waste disposal transaction volume more than tripled on demand for CCP-approved landfill gas credits, and landfill gas prices rose 35% from the first half to the second half of the year [3]. Labels reward methodologies. Evidence decides whether an individual project can stand behind the label.

California Cap-and-Invest: what changed in 2025?

- **Extended through 2045.** AB 1207 extended and renamed the program as Cap-and-Invest through December 31, 2045 [6].
- **Offsets kept at 6%.** From 2026 through 2045, no more than 6% of a covered entity's compliance obligation may be met with offset credits, and no more than half of those may come from projects without direct environmental benefits in the state [6].
- **Offsets under the cap.** Allowances equal to the offsets used each year are removed from the next year's budget and retired [6].
- **Protocols must be modernized.** SB 840 requires a CARB offsets study by December 31, 2026, updates to all compliance offset protocols by January 1, 2029, and re-evaluation at least every five years from 2034 [7].
- **Scale.** CARB describes about 400 covered facilities and coverage of about 80% of the state's greenhouse gas emissions [8]. It reported 273 million verified compliance offsets issued, across six approved offset project types [33].
- **Registries and verifiers.** Compliance offset projects are listed with CARB-approved offset project registries, the American Carbon Registry and the Climate Action Reserve, and verified by CARB-accredited verification bodies [9][34].

CARB's issuance table shows the industrial and methane project types that matter to plant-based developers, including ozone depleting substances (14.0 million compliance credits), livestock digesters (4.6 million) and mine methane capture (3.7 million), alongside U.S. forest projects (117.4 million) [10].



Compliance offset usage limits

Washington's Climate Commitment Act and linkage

Washington's Cap-and-Invest program allows offsets for up to 8% of an entity's obligation in the 2023 to 2026 compliance period (up to 5% general and up to 3% from projects on federally recognized Tribal lands), falling to 6% (4% and 2%) from 2027 [11]. Washington has approved protocols for ozone depleting substances, U.S. forest, urban forest and livestock projects, and projects must be listed with the Climate Action Reserve or the American Carbon Registry and verified by an independent third party [11]. Washington, California and Québec signed a linkage agreement in June 2026. Washington completed its rule changes in September 2026, and the jurisdictions expect to begin operating a linked market in 2027 once California and Québec finish their processes [12].

EPA's Greenhouse Gas Reporting Program

The GHGRP generally requires facilities emitting more than 25,000 metric tons CO2e per year, and large suppliers, to report. More than 8,000 facilities and suppliers reported for 2023, covering roughly 85% to 90% of total U.S. emissions [13]. Its future is uncertain: EPA's 2025 proposal would end most reporting [14], and the reporting year 2025 deadline has been moved to March 10, 2027 [15]. Whatever the outcome, buyers, lenders, state programs and tax advisers will still ask plants to prove their numbers.

45Q and Section 6418: how tax credits became a cash market

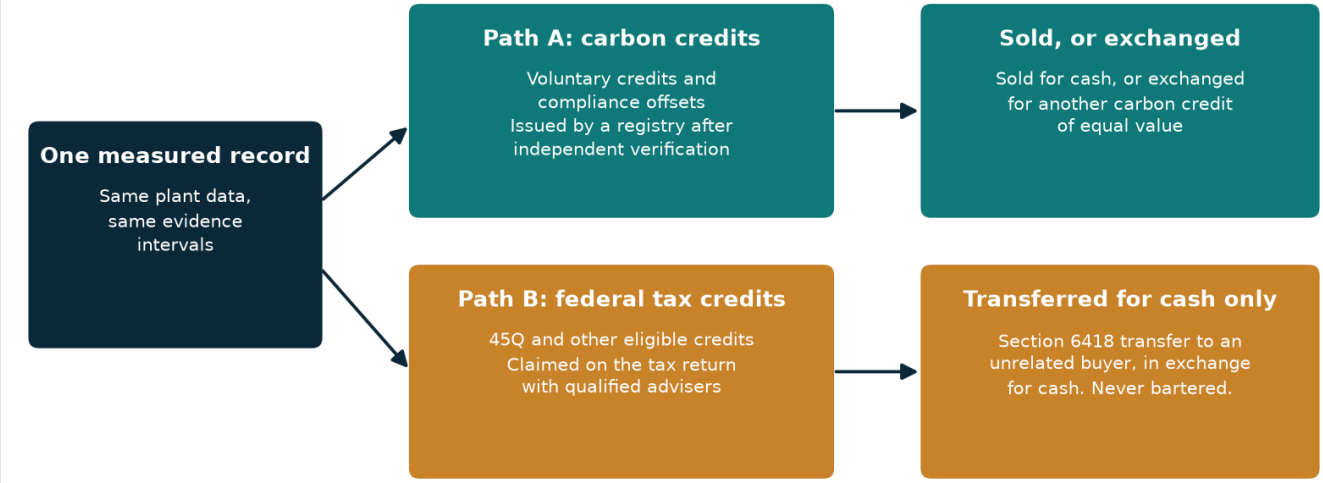
- **45Q value.** Under the 2025 budget law, the credit for point-source capture remains up to $85 per metric ton for qualifying projects that meet prevailing wage and apprenticeship requirements, with parity now extended to utilization and enhanced oil recovery, and up to $180 per metric ton for direct air capture, with inflation adjustments for later years [17].

- **Transferability.** Section 6418 allows an eligible taxpayer to transfer all or part of eligible credits, including 45Q, 45Y and 48E, to an unrelated party in exchange for cash only [18]. For transferred 45Q credits, the transferee generally bears the financial responsibility for a recapture event [18], which is one reason buyers diligence the storage and monitoring record.
- **Market scale.** Crux estimates the transferable credit market reached $42 billion in 2025, up from $32 billion in 2024, within total tax credit monetization of $63 billion [19]. Crux also observed that 45Z clean fuel credits averaged $0.908 per dollar in 2025, lower than other credit types, consistent with factors including additional verification requirements [19].
- **CCS build-out.** According to the Congressional Research Service, EPA had issued at least 23 Class VI well permits as of September 2026, with applications pending for 44 projects covering 142 wells [28].

SIDEBAR

Two credits, two paths

Voluntary carbon credits and compliance offsets are environmental instruments issued by a registry or program after independent verification. A carbon credit can be sold, or exchanged between parties for another carbon credit of equal value. Federal tax credits such as 45Q are claimed on a tax return with qualified advisers and, where eligible, transferred under Section 6418 to an unrelated buyer for cash. Tax credits are never bartered, and they are never mixed into a carbon credit exchange. Strata keeps the two paths separate from the first data point to the last document.



Two credits, two paths

EU CBAM: carbon at the border

The CBAM definitive regime has applied since January 1, 2026. Importers bringing more than 50 tonnes of CBAM goods into the EU must become authorised CBAM declarants, declare embedded emissions and

surrender certificates priced from EU ETS auction prices each year. If a carbon price was already paid in production, the corresponding amount can be deducted [20]. For U.S. exporters of cement, steel, aluminium, fertilisers and hydrogen, credible installation-level emissions data is becoming a commercial requirement, not only a regulatory one.

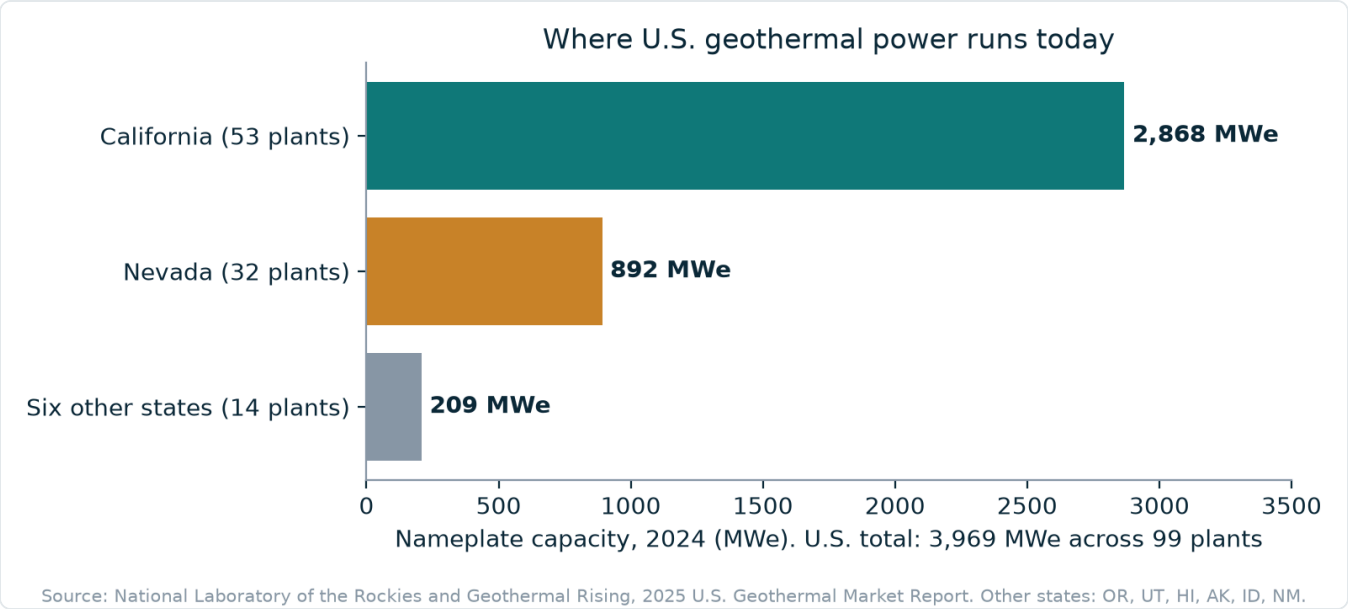
Article 6: the international layer goes live

The Paris Agreement Crediting Mechanism (Article 6.4) approved its first issuance on February 26, 2026, for a transitioning cookstove program. Conservative parameters produced roughly 40% fewer credits than the earlier Clean Development Mechanism approach would have [22][23]. As of June 30, 2026, host country approval had been obtained for 418 transitioning projects and programs [22]. The direction is unmistakable: conservative, measured quantification is becoming the international norm.

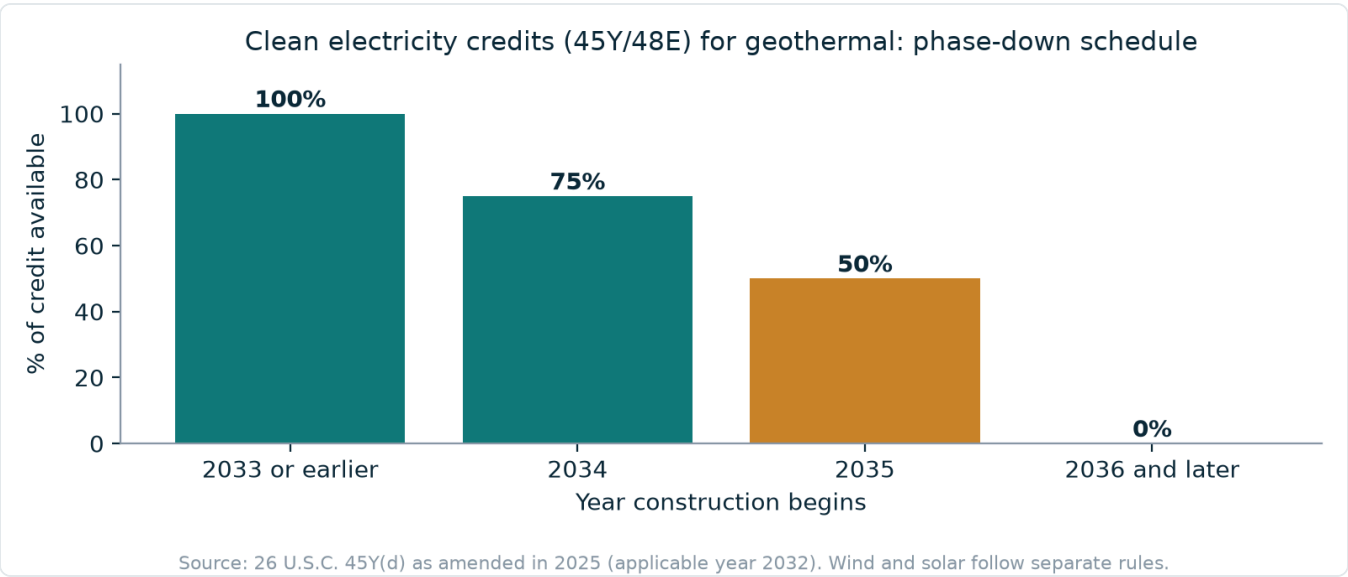
Geothermal: the clean, firm resource that needs better evidence

Geothermal is on the cover of Strata's website for a reason. It delivers around-the-clock power and is drawing renewed investment.

- **Today.** U.S. geothermal nameplate capacity reached 3,969 MWe in 2024 across 99 plants, with 72% of capacity in California [27]. Since 2021, 27 new power purchase agreements totaling 1,661 MWe have been signed [27].
- **Tomorrow.** The IEA estimates next-generation geothermal could meet up to 15% of global electricity demand growth to 2050, with as much as 800 GW of capacity, and that costs could fall 80% by 2035 to around $50 per MWh [26]. DOE's Enhanced Geothermal Shot targets a 90% cost reduction for enhanced geothermal systems, to $45 per MWh by 2035 [25].
- **Tax credits.** Under the 2025 amendments, the 45Y clean electricity production credit and the related 48E investment credit remain fully available to geothermal facilities that begin construction by the end of 2033, then step down to 75% for 2034, 50% for 2035, and zero after that [24]. Both are eligible for Section 6418 transfer [18].



Where U.S. geothermal power runs today



45Y/48E phase-down schedule for geothermal

Geothermal claims carry engineering nuance that a nameplate number hides: net export versus gross generation, auxiliary and parasitic loads, imports and storage charging, non-condensable gas emissions, brine chemistry and well performance. A buyer of clean firm power, a tax credit transferee or a lender increasingly wants to see that nuance documented rather than assumed.

Carbon removals: from contracts to deliveries

Durable carbon removal purchases reached 30.4 million tonnes contracted in 2025, according to CDR.fyi, but were highly concentrated in a single buyer [29]. CDR.fyi reports that biomass-based methods accounted for 96% of 2025 purchase volume and 91% of delivered volume, and that buyers rank permanence, supplier

transparency and confidence in measurement among their top concerns [29]. Removals are a measurement business: every tonne must be reconciled against process energy, transport and storage.

Methane: the fastest lever inside the fence line

Methane projects are where plant telemetry and credit value meet most directly. EPA's AgSTAR program counts 400 operating manure digesters in the United States as of June 2024, which reduced 14.8 million metric tons CO2e in 2023 [30]. EPA's Landfill Methane Outreach Program estimates that 444 additional candidate landfills could cost-effectively turn their methane into an energy resource [31]. Each of those projects runs on flow meters, methane analyzers, destruction devices and uptime records, which is exactly the evidence a verifier must test.

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4. Who Strata is

Strata Carbon Assurance is a trade name of JIL Sovereign Technologies, Inc., a Delaware corporation based in Midlothian, Texas. The company builds evidence workflows that connect plant operations, finance and independent technical review, without pretending those functions are interchangeable.

The leadership team brings enterprise and federal technology experience, including work across NASA, the Department of Defense and major enterprise software companies. That background shows up in the product's design priorities: least-privilege access, deterministic rules, tamper-evident records and clear separation of duties.

Strata's posture can be summarized in four commitments:

1. **Measured.** Actual operating data from approved systems, not typed assumptions.
2. **Calculated.** Transparent methods with traceable inputs, in exact decimal arithmetic.
3. **Verifiable.** Source records and exceptions a reviewer can check and recompute.
4. **Credible.** Evidence designed for independent scrutiny, with gaps left visible.

SIDEBAR

What Strata is not

Strata is not a verification body, a registry, a CPA firm, a licensed engineering firm, a law firm or a paid tax return preparer of record. It operates as a non-preparer: it prepares evidence and draft documents for qualified people, who keep their professional roles and decisions. A draft workpaper is not a filed return, a verified credit, a registry issuance or a tax determination.

5. How it works: from plant telemetry to measured evidence

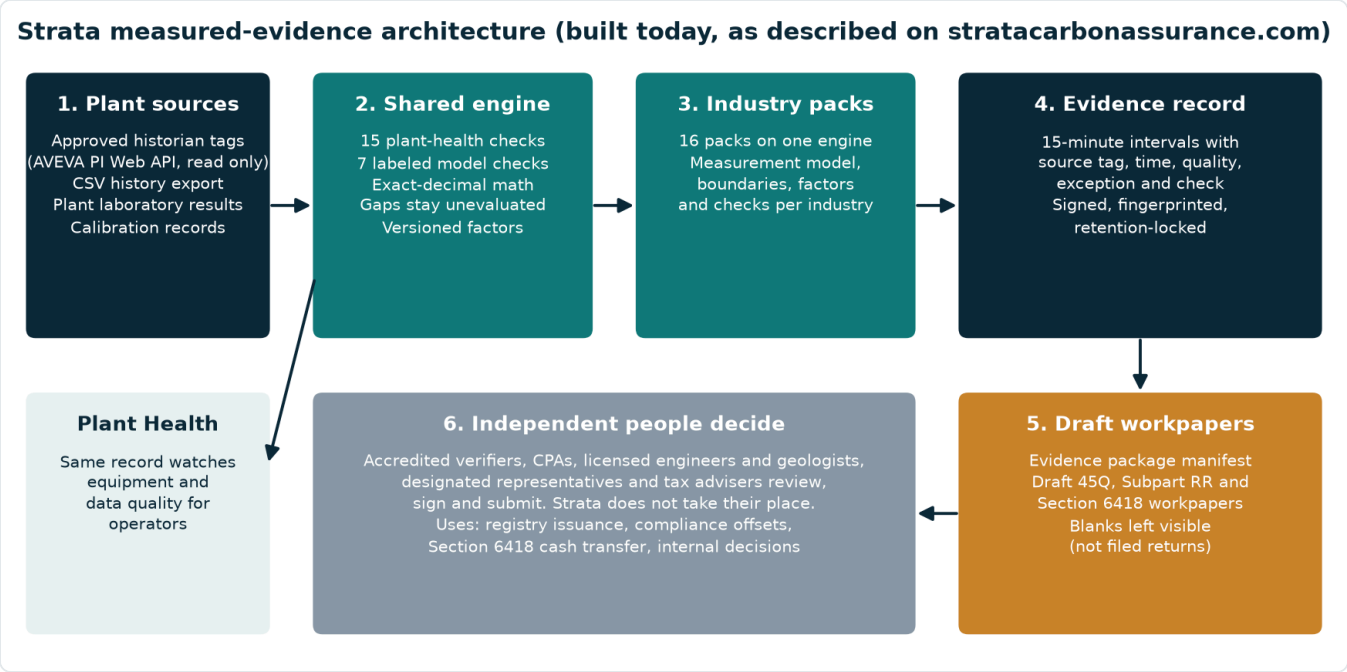
What does Strata connect to?

Built today:

- **AVEVA PI Web API connector, read only.** The customer controls the credentials and approves the tag scope. The connector observes. It does not write to the historian, command plant equipment or change a setpoint.
- **CSV history import.** A plant can start with an exported history file, before any network connection is approved.

Planned: connectors for other widely used plant historians. These are roadmap items, not delivered capabilities.

No new field instrumentation is implied. Strata works with the meters, analyzers and historians a plant already has, and it surfaces where those instruments are not fit for purpose.



Strata measured-evidence architecture

What happens to a measurement once it arrives?

A measurement is a time-stamped sample from an approved historian. Its tag, time and quality stay with the value through every later step. The shared assurance engine then applies defined rules:

- **Fifteen plant-health checks.** These include flatline detection on short and long windows, capture versus injection versus line pack balance, zero and span drift, calibration due dates, substituted values on critical tags, archive backfill, kiln mass balance, kiln shell temperature bands, parasitic energy, compressor vibration, heat exchanger resistance and injectivity. Thresholds are configurable example settings, not guarantees.
- **Seven labeled model checks.** These run beside the rules and never replace them. No detection rate is claimed. A peer-group check stays unevaluated until a peer group is configured.
- **Exact-decimal arithmetic.** Calculations avoid floating point rounding drift. Factors and methods are versioned.
- **A gap stays a gap.** If a sample or a coefficient is missing, the check stays unevaluated. It is never stored as zero and never presented as healthy operation. A sample flagged as not good or questionable keeps a credit record from being issued until it is reviewed.

> *A missing sample is not a healthy reading. A blank stays blank.*

What is a 15-minute evidence interval?

Every 15 minutes, Strata preserves an interval record that carries the source tag identifiers, timestamps, values, quality flags, the checks that ran, their results and any open exception. A latest sample older than 15 minutes is treated as unevaluated. Each interval is signed and fingerprinted with cryptographic hashes so that any later change is detectable. Review decisions are recorded the same way, so a reviewer can see what changed and when. Taxpayer identification numbers are kept out of the evidence record. Records are held in retention-locked, write-once storage designed around a 15-year retention horizon.

What are the 16 industry packs?

Adding an industry is configuration on the shared engine, not a new product. Each pack defines the measurement model, factors, boundaries and checks for its industry.

Family	Industry packs (all built on the shared engine)
Energy and power	Geothermal; power with capture; hydrogen and ammonia; natural gas processing with capture; oil and gas methane
Industrial manufacturing	Cement and lime; refining, steel, pulp and paper; ethanol and fermentation
Carbon management and storage	Direct air capture; enhanced oil recovery

Family	Industry packs (all built on the shared engine)
Water, waste and methane	Water utilities; wastewater; landfills; recycling and materials recovery; organics and composting; coal mine methane

Carbon capture and injection is a shared foundation the capture packs build on, not a seventeenth industry. Methodology applicability and verifier acceptance are confirmed facility by facility. A pack is not a verified credit, a registry approval or a tax determination.

What does a reviewer actually receive?

Draft workpapers and evidence records, with measurements, checks and blanks in one line of sight. The current report line includes:

- A Form 8933 draft workpaper (gross capture, gross injection, deductions and net amounts, with missing-record notices)
- A Section 6418 transfer statement draft
- An EPA Subpart RR draft (marked as not an official upload)
- A Class VI monitoring log at 15-minute resolution
- An attestation draft
- An evidence packet manifest
- Plant health check records

For carbon credit projects, the same evidence record organizes monitoring data around the parameters of the applicable protocol, so a project developer and its verifier can test it against the methodology they use.

Where does the plant laboratory fit?

The plant portal is the command center. A laboratory view sits as a tab on that same portal for sample receiving, test methods and result review. The goal is simple: laboratory results such as gas composition join the same evidence record as the historian data, with chain of custody preserved, instead of being retyped into a spreadsheet.

How is the client portal organized?

One portal, two modules, one plant record. **Plant Health** watches equipment behavior and data quality for operators and technicians. **Carbon Assurance** turns the same measured record into reviewable evidence and draft workpapers for finance, EHS and reviewers. A plant can use either module or both.

6. Functional walkthrough: a day in the record, by role

For the CFO and tax team

Your question: what supports the claim, and what still needs review?

You see a status view by facility and period: intervals evaluated, intervals blocked, open exceptions, and the draft workpapers that will go to your CPA. Your advisers can attach their own value assumptions to open items so you know which exceptions matter most. When a buyer of transferred 45Q credits asks for diligence, you share an evidence package rather than a narrative. When an auditor asks how a number was produced, you show the interval, not the spreadsheet.

What changes: fewer surprises at year end, documentation you can stand behind with a transferee, and a clear line between what software prepared and what your advisers decided.

For the CEO and board

Your question: can we trust what we are telling markets, regulators and buyers?

You get a plain-language assurance posture: which facilities are covered, which claims rest on measured evidence and which still rely on estimates, and the trend in open exceptions. That posture supports disclosure, financing and capital allocation conversations without overstating anything.

For the plant engineer and operations

Your question: will this get in my way?

It should not. The connection is read only, scoped to approved tags, and reviewed by your OT security team before production. What you get is faster triage: the tag, the reading and the issue in one place, with flatline, drift, calibration and balance checks pointing you to the instrument that needs attention. A draft investigation note cites the check that produced it. It does not close an alert or create a work order on its own.

For the EHS and environmental team

Your question: will this make reporting season less of a scramble?

Calibration due dates, substitutions and exceptions are tracked continuously instead of discovered in the spring. Monitoring plan parameters map to the evidence record, so the report you prepare draws on preserved intervals. When a rule changes, as Subpart RR has shown it can, the underlying evidence is still there to present to a new audience.

For the carbon project developer

Your question: how do I get from monitoring to issuance faster, with fewer findings?

Your landfill gas flare uptime, digester methane flow, mine methane destruction records or ODS destruction documentation are preserved interval by interval with their quality flags. Gaps are visible early, while they can still be fixed, rather than at verification, when they can only be discounted. Your verifier receives a package organized for recomputation.

For the independent verifier

Your question: can I follow any result back to its source and recompute it?

You can inspect the evidence trail from calculation to source measurement and signed interval record. You can reproduce the numbers: factors, units, time boundaries, whole-ton handling and exclusions. You determine which methodology, regulatory and registry conditions apply. Software-generated evidence is not verification, certification or issuance. Your professional judgment, independence and conclusions remain entirely yours. Strata does not select, recommend or pay verifiers, and verification bodies are not Strata partners.

For the credit buyer and investor

Your question: what am I actually buying?

Ask the supplier for the evidence behind the tonnes: source tags, interval coverage, exceptions and their disposition, calibration status and the verifier's conclusion. A supplier whose claims rest on preserved, measured intervals can answer quickly. That is the difference between a claim and a proof.

> *Ask for the evidence behind the tonnes. That is the difference between a claim and a proof.*

7. Industry focus: what measured evidence looks like on the ground

Sector	What the pack watches	Why it matters to value
Geothermal	Net export reconciliation, auxiliary loads, imports and storage charging, non-condensable gas, exchanger and well performance	Clean electricity credits, offtake claims and financing rest on net, not gross, performance
Cement and lime	Calcination, kiln fuel, clinker production, kiln mass balance, shell temperature, capture context	Process emissions are inherent to the product; CBAM and compliance programs demand installation-level data
Carbon capture and storage, EOR	Capture versus injection versus line pack, compression, injectivity, Class VI monitoring	45Q value and recapture exposure depend on mass balance and monitoring integrity
Ethanol and fermentation	Fermentation capture on shared injection checks, carbon intensity inputs kept visible	45Z clean fuel credits generally accrue to the fuel producer, so inputs are documented for the producer and its advisers
Landfills, wastewater, organics	Methane flow and composition, destruction device uptime, capture efficiency, aeration energy	Methane destruction credits are earned interval by interval; downtime and analyzer gaps directly affect issuance
Coal mine methane	Drainage and ventilation methane, destruction records	Destruction must be evidenced continuously to be credited
Oil and gas methane, gas processing	Flare, vent and leak records; amine capture and compression	Fugitive methane is kept separate from combustion emissions for clean accounting
Hydrogen and ammonia, power with capture, DAC	Production, capture, solvent energy and lifecycle inputs with boundaries stated	Lifecycle boundaries and energy inputs decide whether a claim holds
Refining, steel, pulp and paper	Process emissions and capture variants	Large, complex boundaries need traceable allocation
Water utilities, recycling	Pumping energy, water loss, tonnage and chain of custody	Water units and avoided-emission factors stay separate from carbon tons unless a protocol applies

8. The financial case: how to think about ROI

Where does the money come from?

Measured evidence creates value through five levers. Each can be estimated from your own historical data during a no-cost assessment.

1. **Recovered value at risk.** Intervals lost to unexplained gaps, frozen instruments or overdue calibration can force conservative defaults or exclusion. Finding and fixing them in real time preserves tonnes the plant actually earned.
2. **Faster cash conversion.** Fewer verification findings and less rework can shorten the path from monitoring period to issuance or transfer.
3. **Transfer price and terms.** Tax credit buyers price risk. Crux's observation that newer 45Z credits, with additional verification requirements, priced lower than other categories in 2025 [19] illustrates that documentation burden can show up in price.
4. **Avoided labor.** Hours spent exporting, reconciling and re-keying data, and answering reviewer questions, can be redeployed.
5. **Avoided downside.** Recapture exposure, restatements and reputational damage are expensive. A tamper-evident trail is inexpensive insurance by comparison.

Illustrative example: a 45Q capture and storage project

ILLUSTRATIVE

Illustrative calculation

All inputs below are assumptions chosen to make the arithmetic transparent. They are not benchmarks, forecasts or customer results. Credit eligibility and amounts depend on facts that only qualified advisers can determine.

Input (assumption)	Value
Annual CO2 captured and securely stored	500,000 metric tons
45Q rate assumed for the example (point source, geologic storage, wage and apprenticeship requirements met)	$85 per metric ton [17]
Gross annual credit value	$42,500,000
Share of tons in intervals that would otherwise be unsupportable because of unexplained data gaps	1.0%

Input (assumption)	Value
Assumed improvement in transfer price from stronger documentation	1 cent per dollar of credit
Internal hours redeployed and fully loaded hourly cost	1,000 hours at $150

Value lever	Illustrative annual value
Tons preserved by catching and documenting gaps when they occur (1.0% x 500,000 t x $85)	$425,000
Transfer pricing effect (1 cent x $42.5 million)	$425,000
Internal labor redeployed (1,000 hours x $150)	$150,000
Illustrative total	**$1,000,000 per year**

Change any assumption and the result moves proportionally. That is the point: the model is simple enough for a CFO to challenge, and the inputs can be replaced with your own plant's measured gap rate during an assessment.

Illustrative sensitivity: a geothermal plant

> ILLUSTRATIVE
>
> **Illustrative calculation**
>
> Assumptions only. Applies to facilities that qualify for 45Y, which generally means facilities placed in service after 2024 or qualifying capacity additions.

A new 50 MW geothermal facility running at a 90% capacity factor produces about 394,200 MWh per year (50 x 8,760 x 0.90). At the statutory 45Y rate of 1.5 cents per kWh for facilities meeting the wage and apprenticeship requirements, before inflation adjustment [24], the credit would be about $5.9 million per year. Every 1% of net export that cannot be reconciled against auxiliary loads and imports represents about $59,000 per year in credit value, before considering offtake and financing implications.

Illustrative sensitivity: a methane destruction project

> ILLUSTRATIVE
>
> **Illustrative calculation**
>
> Assumptions only. Credit prices vary widely by protocol, label, vintage and market.

A landfill gas or digester project credited at 100,000 tonnes CO2e per year, valued at an assumed $6.34 per tonne (Ecosystem Marketplace's 2024 volume-weighted voluntary average [4], used here only as a placeholder) earns about $634,000 per year. If 3% of monitoring intervals would otherwise be lost to analyzer gaps or undocumented downtime, about $19,000 per year is at risk, plus the cost of each verification finding. The lesson for developers is that value per tonne and gap rate, not facility size, determine what an assurance investment is worth, which is why Strata scopes commercial terms per facility and per program.

How should a CFO evaluate any assurance investment?

Ask three questions. What is our current measured gap rate? What is a day of delay worth in our issuance or transfer cycle? What would a buyer, lender or auditor pay us, or charge us, for the difference between a reconstructed number and a measured one? The no-cost ROI assessment exists to answer those questions with your own data.

> *The model is simple enough for a CFO to challenge. That is the point.*

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9. The marketplace: in development

Strata is building a marketplace layer that prepares records for each of the two paths described earlier. It is in development. The marketplace shown on the public website is an illustrative demonstration. It settles nothing, holds no inventory and reports no live trades.

The design principles are fixed:

- **Voluntary and compliance carbon credits** are kept separate from federal tax credits at every step. A carbon credit can be sold, or exchanged for another carbon credit of equal value.

- **45Q and other eligible federal tax credits** are transferred for cash under Section 6418 to an unrelated buyer, with the seller and buyer each working with their own qualified advisers. They are never bartered and never exchanged for carbon credits.
- **Eligibility, filing and registry decisions** stay with qualified advisers, CPAs, registries and program administrators.
- **Evidence travels with the instrument**, so a buyer's diligence starts from the measured record.

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10. Trust, security and governance

What does read only really mean?

The described connector reads approved AVEVA PI historian data. The customer controls credentials and approves the tag scope. Strata does not write to the historian, command equipment or change a setpoint. Deployment is designed around the industrial DMZ pattern (Purdue Level 3.5), and the security architecture is reviewed by the plant's OT staff before any production connection. A CSV history sample can come first.

The OT security review covers:

- Read-only service account and tag scope
- Documented traffic direction and egress policy
- Identity, credentials, monitoring and change control
- Data retention, encryption and access review
- Incident response roles and auditability

Who owns the data?

The customer does. Strata works on data the plant approves. Access, retention and deletion terms are set in the customer agreement.

What is the status of SOC 2?

SOC 2 compliance is in progress with Johanson Group LLP, under the same security program as JIL Sovereign Technologies, Inc. Report availability will be confirmed under NDA when the audit completes. Strata does not claim a completed SOC 2 report today.

How does Strata protect verifier independence?

Independent verification bodies operate under impartiality requirements, including those of ISO 14065, the international standard for bodies that validate and verify environmental information [32], and under program-

specific accreditation such as CARB's [34]. Strata's design respects that:

- Strata does not select, recommend, refer, pay or receive payment from verification bodies.
- Verification bodies are not partners, resellers or channel participants, and they are excluded from Strata's partner program and from any exclusivity.
- Evidence packages are designed to be reviewed by any independent accredited verifier the project chooses.
- Software outputs are labeled as drafts. Verification conclusions belong solely to the verifier.

What governance documents exist?

Deployments execute under standardized contracts, including a Master Subscription Agreement, an order form and security brief, a channel partner agreement and an external verifier onboarding guide. These are available for review during an engagement.

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11. Forward look: where measured MRV is heading

From periodic reports to continuous evidence

Measurement, reporting and verification has historically been a once-a-year event. The direction of travel is continuous. Certification platforms are building data interfaces for more frequent issuance, and buyers increasingly value monitoring transparency [29]. Plants that preserve evidence as it happens will be ready for that shift without re-engineering their data.

Digital MRV becomes the default, but only if it is honest about gaps

Digital MRV is often sold as automation. Its real value is honesty: a system that flags what it does not know. The research on over-crediting [5] and the more conservative Article 6.4 parameters [22] point the same way. The next generation of credible claims will be the ones that show their blanks.

Removals will be priced by their measurement

Durable removal buyers rank permanence, supplier transparency and measurement confidence among their top concerns [29]. Removal suppliers, from direct air capture to biomass carbon removal and storage, will compete on the quality of their net-removal accounting.

Geothermal moves from niche to firm-power mainstream

If the IEA's cost trajectory holds [26], geothermal will be financed and contracted at much larger scale, and the buyers of that power will want auditable evidence of net clean output and gas emissions. Clean electricity credits that step down after 2033 [24] add urgency for projects in development now.

Carbon at the border makes plant data a trade document

CBAM turns installation-level emissions into a cost line for exporters to Europe [20]. Measured, verifiable embedded emissions data becomes part of the commercial package for cement, steel, aluminium, fertiliser and hydrogen producers.

Interoperability will separate durable platforms from closed ones

Rules will keep changing: the GHGRP, possible Subpart RR alternatives such as ISO 27914:2026 [16], California's protocol updates due by 2029 [7] and linkage with Washington [12]. Evidence must be portable across standards, registries and reviewers. That argues for open, documented export formats and read-only reviewer access rather than proprietary lock-in.

> *The next generation of credible claims will be the ones that show their blanks.*

Strata's roadmap (plans, not delivered capabilities)

The following are stated intentions that may change. None should be read as available today.

- **More historians.** Connectors for other widely used plant historians beyond AVEVA PI.
- **Standards mapping.** Mapping the evidence record to additional protocols and standards as they are adopted or revised, including any replacement for Subpart RR that Treasury and EPA confirm.
- **Removal pathways.** Deeper evidence support for removal suppliers working with removal-focused registries.
- **CBAM evidence.** Installation-level embedded emissions evidence packages for exporters.
- **Reviewer access.** Read-only, time-boxed access for independent reviewers to recompute directly from the evidence record.
- **Peer-group analytics.** Configured peer groups so the currently unevaluated peer-group check can run.
- **Marketplace.** Completion of the marketplace layer, keeping carbon credits and tax credits on separate paths.
- **SOC 2.** Completion of the in-progress SOC 2 audit.

12. How to engage

Strata engagements start with one plant and expand only when the record holds up.

1. **No-cost ROI assessment.** We analyze 3 to 12 months of historical PI data, or a CSV export, under NDA. You see your gap rate, exceptions, value at risk and sample draft workpapers.
2. **Evidence review.** A 30-minute conversation. Bring the plant type, the historian you use and the reporting question that matters most. We tell you which pack applies and what data it needs.
3. **Data and security review.** Your OT team first. We walk through the read-only path, permissions and retention.
4. **Single-facility pilot.** One plant, one pack, run on your record, with the checks, exceptions and draft workpapers your reviewers would receive.
5. **Facility license.** Add plants and packs on the same engine. Commercial terms are set per facility and scope.

What we need from you: the plant type, historian access or a CSV export, a named OT or IT contact, and the finance or tax lead who owns the reporting question.

For environmental consultants, integrators and channel partners

Strata offers a channel partner program for environmental consultants, systems integrators and industrial technology firms. First-mover partners may be offered exclusivity by vertical or by region, agreed in writing. **The partner program and any exclusivity are not open to verification bodies**, which remain fully independent.

Contact

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- **Office:** Midlothian, Texas

Frequently asked questions

Does Strata touch plant controls?

No. The built connector reads from the AVEVA PI Web API, read only. A CSV history import is also available. Strata does not write to the historian and does not change a setpoint.

Does Strata replace our verifier?

No. Strata prepares evidence and draft workpapers. Independent verifiers, accountants, engineers, geologists and designated representatives keep their professional roles and decisions.

Is a draft workpaper a tax opinion or a filed return?

No. Draft workpapers organize the measurements and calculations behind a claim. Eligibility and tax treatment are decided by qualified advisers, who also file.

Which historians does Strata connect to?

The AVEVA PI Web API (read only) and CSV history import are built. Other historians are planned.

Which industries are supported?

Sixteen industry packs on one engine, across energy and power, industrial manufacturing, carbon management and storage, and water, waste and methane. Applicability is confirmed facility by facility.

What happens to missing data?

It stays visible. A missing sample or coefficient is left unevaluated, never stored as zero, so the reviewer sees the gap.

Can we sell or trade credits through Strata?

Not today. The marketplace is in development, and the website version is an illustrative demonstration that settles nothing. When live, voluntary and compliance carbon credits will follow a separate path from federal tax credits, which are transferred for cash under Section 6418 and never bartered.

Is Strata SOC 2 certified?

Not yet. SOC 2 compliance is in progress with Johanson Group LLP.

Are verification bodies Strata partners?

No. Verification bodies are independent and are excluded from the partner program and from any exclusivity.

How do we start?

Request the no-cost ROI assessment or book a 30-minute evidence review.

Glossary

Term	Meaning
45Q	U.S. federal tax credit for carbon oxide captured and securely stored or utilized
45Y and 48E	U.S. clean electricity production and investment tax credits; for geothermal, they phase down for construction beginning after 2033
45Z	U.S. clean fuel production credit, generally claimed by the fuel producer
Article 6.4 (PACM)	The Paris Agreement Crediting Mechanism, a UN-supervised international crediting system
AVEVA PI	A widely used industrial data historian; Strata's built connector uses its Web API, read only
Cap-and-Invest	The name of California's extended emissions trading program, and of Washington's program
CBAM	The EU Carbon Border Adjustment Mechanism, which prices embedded emissions in certain imports
CCP	Core Carbon Principles, the ICVCM's quality benchmark for carbon credit methodologies
Class VI well	An EPA-regulated well for geologic sequestration of CO2
DEBS	Direct environmental benefits in the state, a California offset requirement
Digital MRV (dMRV)	Measurement, reporting and verification supported by automated data capture and checks
Evidence interval	Strata's 15-minute record of source tags, values, quality, checks and exceptions
GHGRP	EPA's Greenhouse Gas Reporting Program

Term	Meaning
Historian	Software that records time-series data from plant instruments
ISO 14065	International standard for bodies that validate and verify environmental information, including impartiality requirements
LIMS	Laboratory information management system
Line pack	The mass of gas held in a pipeline at a point in time
Non-condensable gas (NCG)	Gases such as CO2 and hydrogen sulfide carried in geothermal fluids
Purdue Level 3.5	The industrial DMZ between plant operations networks and business networks
Section 6418	The U.S. tax code section allowing eligible credits to be transferred to unrelated buyers for cash
Subpart RR	GHGRP reporting for geologic sequestration of CO2
Unevaluated	Strata's status for a check whose inputs are missing; never treated as zero or healthy

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