MOLECULE

White Paper

SCALING GROWTH IN THE RENEWABLE ENERGY MARKET.

INTRODUCTION.

Energy teams know the story well: portfolios are becoming more complex, volumes are multiplying, and regulations are constantly evolving. Add in market volatility and geopolitical pressures, and managing renewables at scale requires more than legacy tools and spreadsheets.

Much of that complexity comes from renewable certificates — including RECs, GOs, and offsets that connect physical energy to carbon compliance and commercial value.

At the same time, renewables are opening new opportunities. Falling costs and expanding markets are reshaping strategies across trading, risk, and operations. Capturing that growth demands a system designed for this moment — one that can handle renewable data at scale, streamline complex workflows, and flex with changing market conditions.

In this whitepaper, we'll explore:

- The challenges of managing renewable energy portfolios today
- How modern ETRMs simplify and strengthen renewable operations
- What to look for when evaluating systems built for the energy transition
- How to scale both operations and technology alongside market growth

> **"Renewable energy has added supply options, which create opportunities and challenges. More options further complicate the analysis and selection process. Incorrect choices or failure to understand the risks associated with specific choices can easily and quickly destroy business models, making trading systems critical to the process."**
>
> ***Allen Brooks,***
> ***Author of Energy Musings newsletter***

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THE CHALLENGES OF MANAGING RENEWABLE CERTIFICATES.

The benefits of renewables are clear — but managing the certificates behind them is anything but simple. Certificates like RECs, GOs, and offsets may carry the environmental attributes, but each one is tied to its own registry, platform, jurisdiction, and shifting compliance rules. Sellers want to maximize certificate value; buyers want to meet obligations with confidence. In practice, both face the same hurdles.

The biggest challenges energy teams run into:

- **Tracking across systems:** Inventory, obligations, and certificate attributes spread across multiple tools — increasing the risk of expirations or overlooked positions.
- **Avoiding costly errors:** Double-counting, misaligned positions, and incomplete data that lead to overpayment, undercharging, or missed trading opportunities.
- **Staying compliant:** Delivering automated, auditable reporting that stands up to regulatory scrutiny.
- **Allocating inventory efficiently:** Moving beyond ad hoc, manual processes that only focus on delivery — leaving savings and efficiencies on the table as portfolios scale.

Since renewable certificates and offsets are so unique, you need the right software designed to manage them. Modern ETRMs are able to handle the complexities of renewable energy trading, including the large datasets associated with renewable portfolios and power purchase agreements (PPAs) – which often involve tracking thousands of data points and billions of rows of data across multiple energy sources.

The reality is simple: the market for renewable certificates has advanced faster than most of the technology used to manage it. That gap makes an already complex task even harder.

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WHAT IT TAKES TO MANAGE RENEWABLE CERTIFICATES AT SCALE.

Renewable certificates are distinct from traditional trade instruments. Their characteristics vary by market and region, which means each must be tracked and monitored differently throughout its lifecycle.

Many companies managing certificate portfolios have tried to do so in their existing systems, only to end up managing them in spreadsheets.

Why? Legacy systems weren't built with renewables in mind — so they struggle to handle the complexity and granularity that comes with them. Spreadsheets may be a temporary fix, but aren't a long-term solution due to the time-consuming (and risky) manual upkeep.

Managing renewable portfolios isn't just about capturing trades — it's about keeping the entire lifecycle connected, accurate, and auditable. That's where modern ETRMs step in. They serve as a single source of truth, pulling data from market integrations, uploads, and manual inputs into one centralized system.

Automation Across the Entire Trade Lifecycle

But being "renewable-ready" means more than housing data. It means enabling automation across the full trade lifecycle:

- Trade capture and flow of data
- Position tracking and exposure management
- Matching certificate retirements against obligations
- Broker reconciliation
- Compliance-ready reporting

When these steps are automated, the benefits go beyond efficiency. Teams gain real-time visibility, reduce costly errors, and free up time to focus on strategy — not data wrangling. In a market that moves this quickly, that kind of visibility and control is no longer optional.

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Interoperability: The Foundation for Real-Time Visibility

Risk management in renewable portfolios depends on pulling together many moving parts — from weather forecasts and market prices to REC registries and compliance data. The challenge isn't a lack of information; it's that critical data often lives in silos. Building accurate reports means chasing multiple sources, and by the time numbers are consolidated, they're already outdated.

That's why interoperability matters. In fast-moving renewable markets, systems need to talk to each other reliably. An ETRM that integrates with diverse data sources creates a single, real-time view of positions, P&L, and risk exposure. The result: decisions made with live visibility, not yesterday's reports.

Managing Renewable Risk with Precision

An ETRM designed for renewables helps energy teams handle the complexity and scale of production-linked certificates and obligations. Risk management in this space often comes down to policies: how many certificates or offsets should be bought or sold, and when, based on production or usage.

At the core, ETRMs are built for positions. With renewable certificates, that position isn't just volume — it's status: projected, minted, bought or sold, delivered, and retired. Tracking those statuses accurately means having a reliable inventory to measure against your policies and limits. For example, excluding retired certificates prevents double-counting and ensures your data reflects reality.

When portfolio data and renewable positions are combined, the result is a clear, accurate picture of exposure. An effective ETRM matches certificates against obligations and related trades, highlights purchase or sales needs, and flags policy gaps — giving teams the confidence to manage renewable risk at scale.

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Keeping Up With the Renewables Market

Molecule's 2025 ETRM/CTRM Transformation + Modernization Report found that Environmental Products and Renewables are now the most commonly traded commodities. Activity in Biofuels, ags, Carbon, and Renewable Certificates also grew, reflecting increasingly complex and sustainability-linked portfolios.

As portfolios expand and diversify, scalability becomes critical. For companies or trading firms adding renewables to their portfolio, spreadsheets and legacy systems won't handle the complexity and granularity of renewable instruments. A modern solution that is designed to scale with the business is needed to easily manage large, complex datasets.

For optimal scalability, consider multi-tenant, cloud-native ETRM/CTRMs that run on the latest technology and will automatically scale based on trade load. In turn, you won't have to worry about slow load times or outdated trade data.

Consistent and Accurate Renewable Positions and Inventory

At their core, ETRMs serve as the system of record for trades, curves, positions, valuations, inventory, and settlements. For renewable portfolios, that means delivering reliable, timely access to data you can trust. Compared to spreadsheets, an ETRM offers stronger controls, fewer errors, and a single source of truth for all position and inventory data.

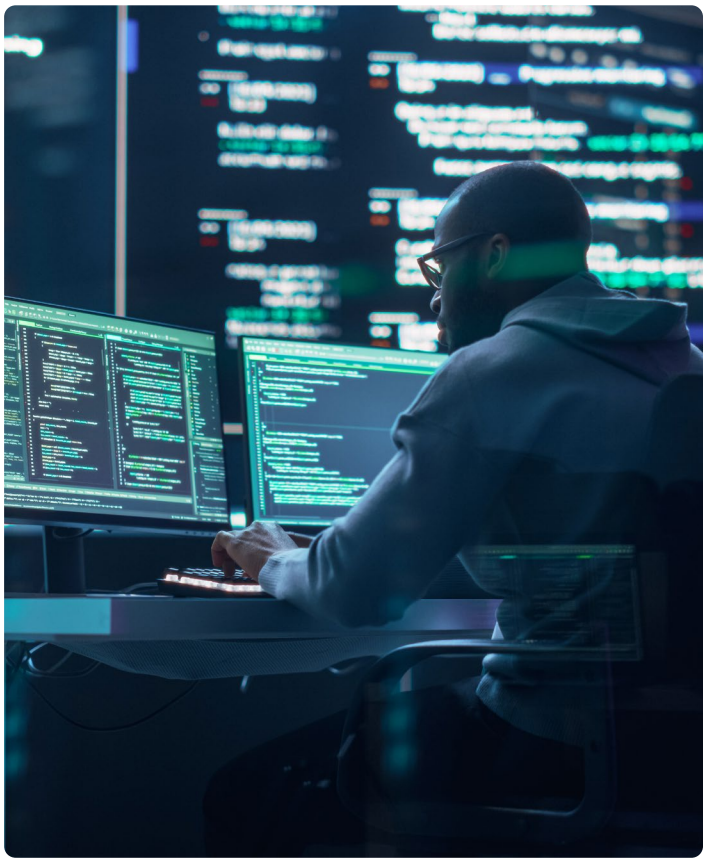
Renewable-ready systems go a step further. They track certificate lifecycles and link them to associated trades or commodities — making it easier to manage high-volume or bundled contracts and maintain a clear view of outlooks and exposures.

Smarter Reporting Capabilities

ETRMs designed for renewables offer reporting capabilities unique to how these portfolios are modeled. These capabilities provide better visibility into your portfolio with reports that you can configure and extract for further analysis.

Here are the types of reports you can expect to access for production-linked renewable certificates (such as RECs, GOs, etc.) and related carbon instruments (like RGGIs):

- Positions
- Inventory
- Obligations
- Minting
- Vintage & Class
- REC status



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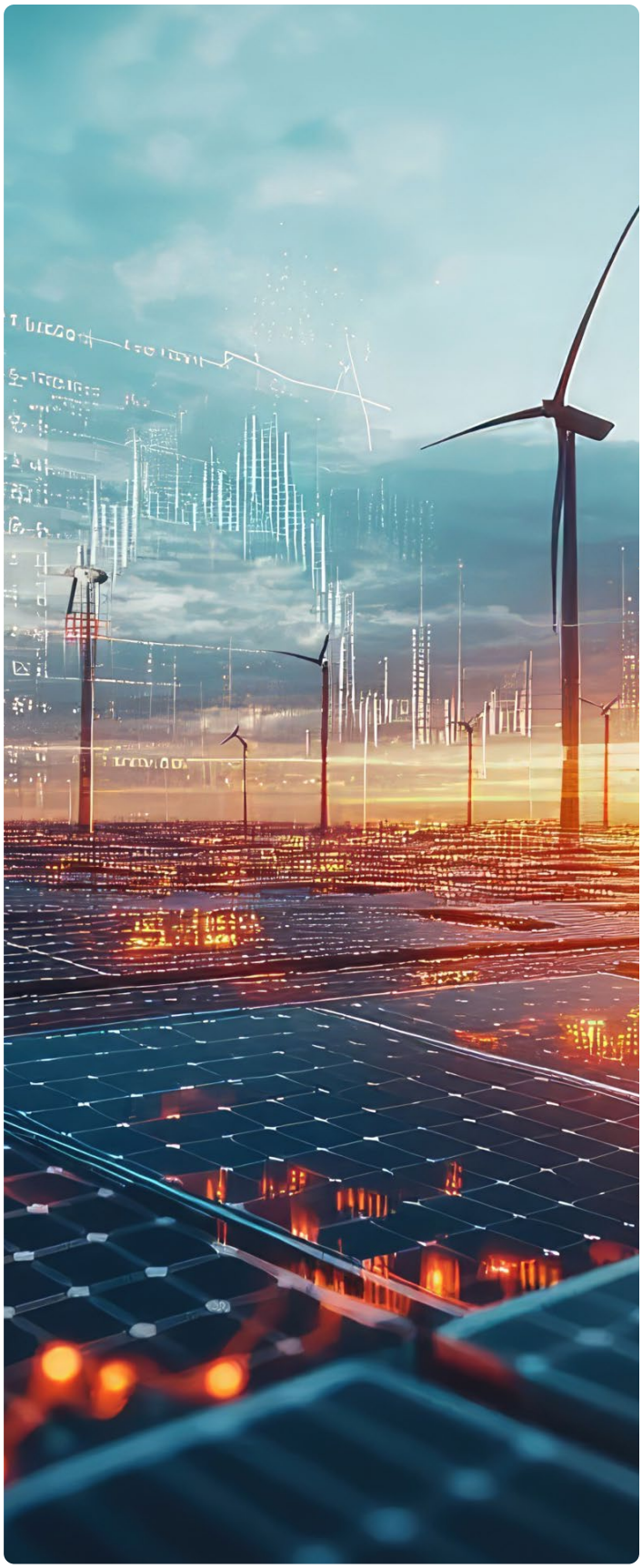
CHOOSING THE RIGHT ETRM FOR RENEWABLES TRADING.

The renewables market is expanding at a pace few systems were built to handle. When an ETRM can't keep up, the costs show up quickly: missed trades, delayed reporting, blind spots in risk, and hours lost to manual workarounds — all of which eat into performance and profitability.

The right system should do more than track trades. It should scale with your portfolio, automate routine processes, and give you the confidence to act decisively in a fast-moving market. When evaluating ETRMs for renewable certificate portfolios, look for:

- **Automated trade capture:** Reduce manual entry, cut errors, and avoid missing transactions.
- **A single source of truth:** Centralize renewables data — certificates, positions, trade attributes (vintage, location, serials) — to eliminate version control issues.
- **Scalability for growth:** Support multi-asset strategies without slowing down.
- **Real-time P&L and risk visibility:** See current exposure and valuations, so you can act on volatility instead of yesterday's numbers.
- **Simplified compliance and auditability:** Automate reporting and position monitoring to meet regulatory requirements with confidence.



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THE FUTURE OF ETRMS.

Demand for renewable energy continues to grow — driven by advances in battery technology, rising power needs from data centers, and expanding global commitments to decarbonization. As this growth accelerates, it will add new layers of complexity to an already volatile market.

The next generation of ETRMs will need to evolve alongside this shift, supporting more diverse portfolios, and managing exponentially larger and more complex datasets. To keep up with the pace of change, ETRM systems must be built for scalability, real-time visibility, and rapid adaptability to new market structures.

Future-ready ETRMs will enable teams to model new asset types, integrate emerging data sources, and manage risk with greater precision as renewable markets mature.

> **"Any organization in our industry... must engage in a continual process of aligning technology with market economics. Those who set themselves up for success with resilient architectures will be able to keep pace, and will lead the next era of energy."**
>
> ***Sameer Soleja,***
> ***CEO and Founder,***
> ***Molecule***

READY TO POWER YOUR GROWTH?

Evolving markets bring challenges, but they also open the door to new opportunities. Renewable growth, shifting regulations, and rising portfolio complexity are already reshaping how energy teams work. Staying ahead means having a system that not only keeps pace but helps you grow with confidence.

A renewables-ready ETRM goes beyond trade capture. It takes the complexity out of managing large portfolios, cuts down on manual work, and gives you reliable, real-time visibility. The result: faster decisions, fewer headaches, and the ability to scale your portfolio without slowing down.

Molecule's multi-tenant, cloud-native ETRM helps renewable producers, middle marketers, energy traders, and large-scale energy consumers manage portfolio complexity and scale with confidence.

Feeling the strain of outdated systems that aren't made for evolving portfolios? See how Molecule can work for you: schedule a demo today.

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