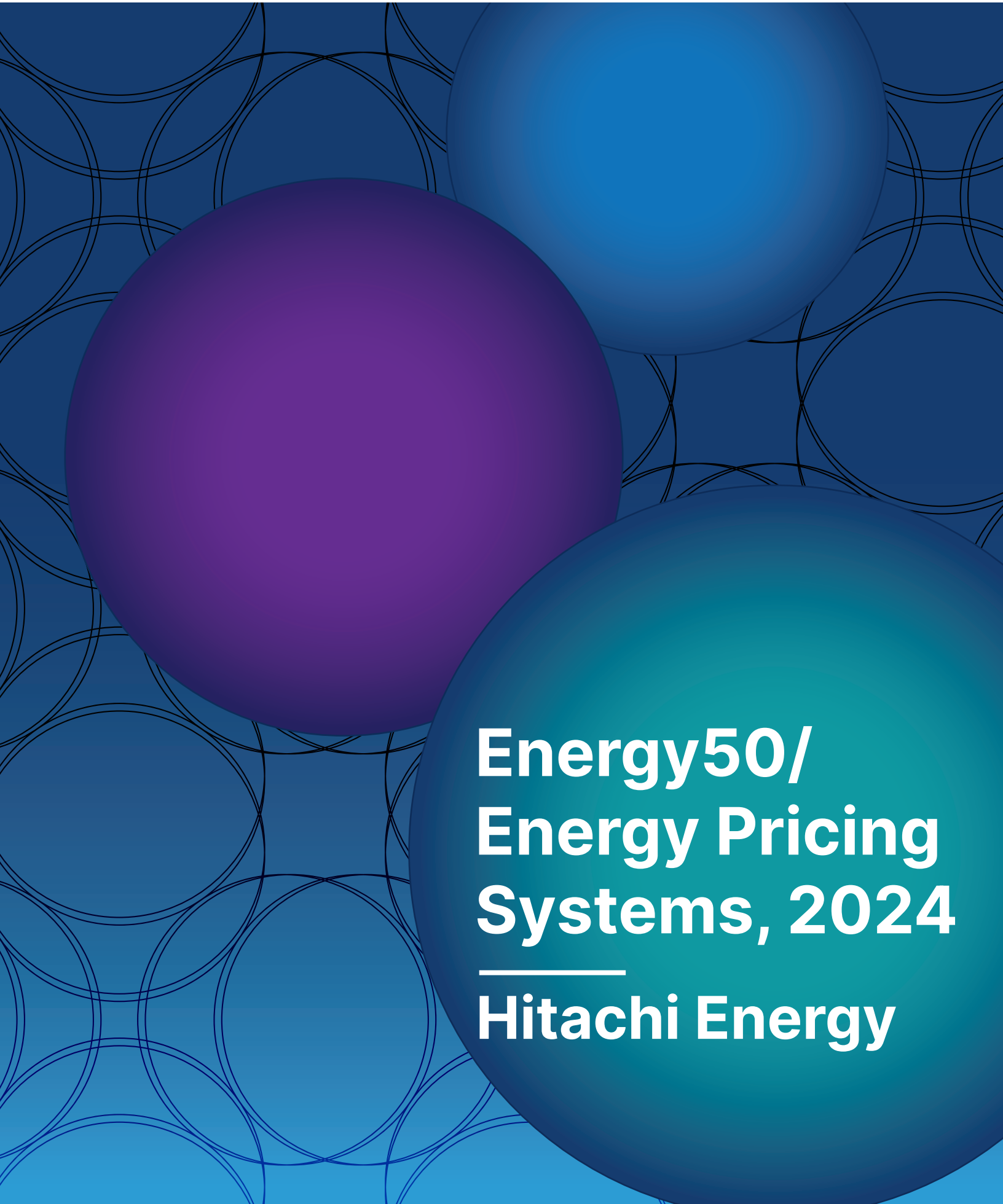
Chartis

VENDOR SPOTLIGHT



Energy50/ Energy Pricing Systems, 2024

Hitachi Energy

Market context

Energy markets around the globe are evolving, in response to macro factors such as shifting supply chains, a growth in renewable energy generation and increased globalization and financialization. As a result, in a fundamentally different and volatile environment, the complexities of forecasting, contract management, operational optimization and risk mitigation are creating challenges for energy firms.

Today's market for energy trading, risk management, data management and analytics tools is increasingly characterized by several key dynamics and structural shifts (see Table 1):

- **Structural shifts in the renewable energy sector**, where Chartis is also seeing the emergence of advanced analytics.
- **Structural shifts in the liquified natural gas (LNG) sector**. Advanced analytics are also increasingly being used here.
- **Structural changes in modeling**. The relationship between the short-term and long-tenor universes is complex, and very quickly network models can involve thousands of points.
- **The expansion of decision-making within energy trading and risk management (ETRM) systems**. Rather than becoming a dashboard as part of a larger entity, ETRM tools are evolving into a central 'cockpit' in the decision-making process.
- **The reintroduction of banks into the energy market**. As banks re-enter the energy market, many firms are focusing on implementing lighter, more agile systems – similar to those employed by prime brokerages – rather than maintaining legacy trading systems.

To meet changing market needs, ETRM systems are increasingly separating individual analytical capabilities into various subsystems outside the core engine. This creates an ETRM ecosystem in which independent analytics engines are linked through a unified data framework.

Notably, firms in the energy sector have already learned considerable lessons from the financial markets about how these frameworks should be built, the type of physical data infrastructure in which they should be held and the storage advantages of different kinds of vector databases.

Table 1: Structural shifts in the energy market

Data and analytics
- Increase in data and analytics-driven decision-making in all business units.
- Independent subsystem capabilities separated from core ETRM engine.
- Standardization and merging (or at least interacting) of third-party analytical environments.

LNG and renewables
- High-investment markets that encourage considerable price risk over the life of a project.
- Biggest drivers of global decarbonization efforts.
- Commercialization through complex power purchase agreements (PPAs) for renewables and long-tenor LNG contracts.

Reintroduction of banks
- Strict banking regulations impacting the completeness of energy markets.
- Lack of complete markets with complex over-the-counter (OTC) derivatives and long-tenure swaps.
- Old-style trading systems struggle to keep pace with today's volatile and dynamic energy markets.

However, despite their similarities with financial models, energy market models must consider many more elements, including multi-asset correlations, storage costs and challenges, complex long-term contracts and an evolving regulatory environment. Modeling techniques in the energy market will be varied, as firms identify the model types that best suit the varied applications available.

One of the major structural shifts in energy pricing has been the formalization of a mechanism for managing, fitting and calibrating curves while also extracting the underlying stochastic distribution for the series, regardless of asset class. By using these models, firms can price a range of contingent claims and flexible optionalities.

This has led to a growing focus on energy P&L explain systems, which are increasingly converging with corresponding approaches in finance. Starting to emerge are standard P&L pricing and curve systems that can effectively calibrate to larger historical time series and leverage more sophisticated models.

Hitachi Energy: category leadership

Hitachi Energy continues to perform well in Chartis' Energy50 rankings, once again attaining second place overall. And the company's broad range of support for energy analytics, particularly power analytics, is reflected in its 13 category award wins. Hitachi Energy's Energy Portfolio Management comprehensive solutions provide broad coverage, from market intelligence and forecasting to portfolio management and trading across asset classes and geographies.

Hitachi Energy also placed as a category leader in Chartis' 2024 RiskTech Quadrant® for energy pricing systems. This highlights the strength of its pricing solutions, which give firms the advanced tools necessary to support planning, trading and operating activities throughout the trade lifecycle, helping them reduce risk and enhance decision-making.

Spotlight: Energy50 2024 ranking and awards

Managing a portfolio of demand- and supply-side resources is complex. With more renewable generation and changing load patterns, wholesale market participants are challenged to effectively forecast demand and resource availability while managing their positions, mitigating exposure to market risk, complying with regulations, and meeting financial targets. Recognizing this, Hitachi Energy offers integrated solutions for making optimal decisions in planning, developing, financing and trading energy assets.

Hitachi Energy's ETRM solution provides functionality across the full trade lifecycle, and includes fundamental price curve management, strong 'what-if' scenario analysis, robust and 'slice and dice' reporting capabilities, flexible workflow management, market and credit risk, and straight-through processing with most exchanges. This coverage extends to both physical and financial transactions.

The solution also provides separate specialized analytical modules beyond the base ETRM, to introduce such capabilities as gas scheduling, hedge accounting and energy attribute certificate (REC, GoO, carbon credit) tracking and management. Composable modules enable users to tailor the system to meet their needs.

Bringing a wide range of analytics together has been a historical challenge for ETRM systems, as each subsystem has highly diverse data requirements. Hitachi Energy's unified data framework seamlessly integrates modules across the product suite into a single platform, helping to streamline workflows, reduce errors and identify trade opportunities.

Rank	Company	Overall score
2	Hitachi Energy	71.6

Category award	2024 winner
Regional leadership	
Europe	Hitachi Energy
Solution categories	
Cross-product renewable analytics	Hitachi Energy
Emissions modeling	Hitachi Energy
Environmental technology innovation	Hitachi Energy
Generation operations analytics and control	Hitachi Energy
Integrated energy management solutions	Hitachi Energy
Load forecasting	Hitachi Energy
Power inventory and asset management	Hitachi Energy
Power market pricing and modeling	Hitachi Energy
Power portfolio optimization	Hitachi Energy
Power risk management	Hitachi Energy
Power systems inventory and asset management	Hitachi Energy
Transmission operation analytics and control	Hitachi Energy

Hitachi Energy for ETRM also features a highly flexible hierarchical book structure with which firms can view and manage portfolios. Risk and trade data can be rolled up by factors such as legal entity, location and asset group for a detailed understanding of the portfolio's position. From an exposure perspective, price risks are broken down into components that can be hedged separately.

As markets adjust to volatility induced by the generation of new renewables as well as regulations and financialization, credit risk will remain a critical element of energy trading. The complexity of trades can leave a portfolio exposed to counterparty risk. Hitachi Energy provides comprehensive credit risk management tools. These cover counterparty management (credit scores/limits, collateral, margin calls, etc.) and advanced exposure metrics (user-configurable analysis, conditional value at risk [CvaR], etc.), with built-in drill-down reporting and an ad hoc report builder.

Hitachi Energy also offers back-office support for complex settlements, including automated settlement and invoicing tools; hedge accounting and reporting; and the tracking and management of end-to-end carbon and renewable energy certificates.

Power market participants can leverage Hitachi Energy's entire solution stack for investment planning and operational analytics. Hitachi Energy for Market Insights, for example, contains historical energy market data (such as congestion, financial transmission rights, locational marginal price and generating production costs) for all ISO nodes. Users can then predict economical impacts to the grid with the nodal simulation engine, which provides full market simulations and forecasting of new and existing renewables projects. Operational forecasts, long-term investment planning and portfolio decisions can be leveraged through advisory, forecasting and optimization solutions.

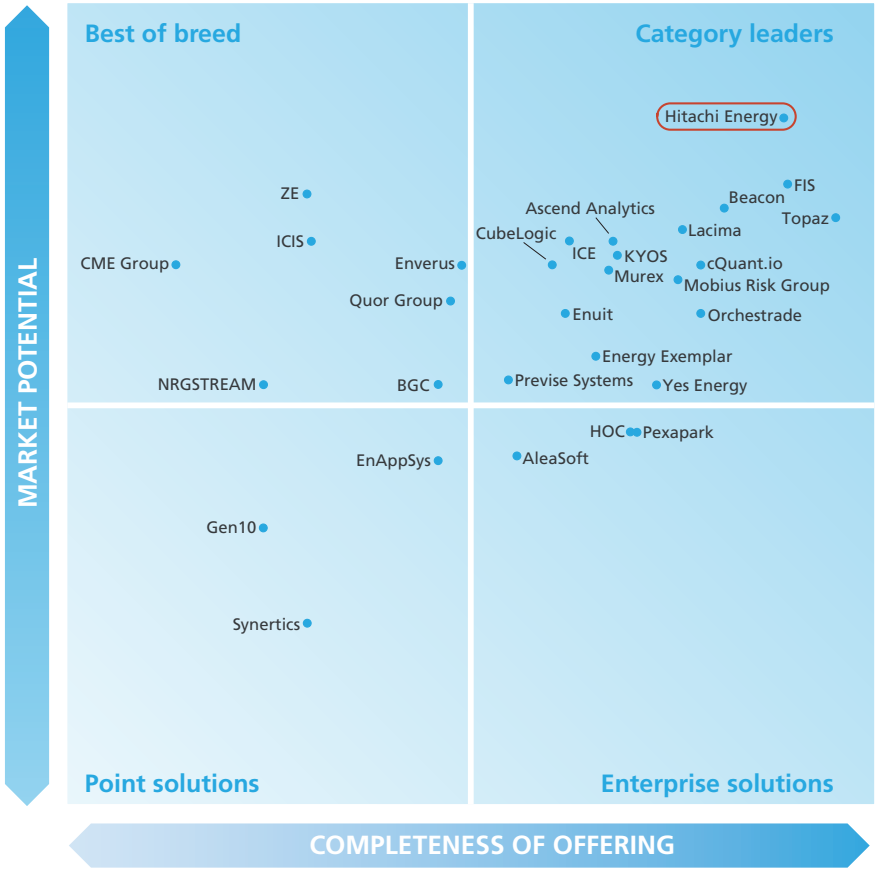
Spotlight: Energy Pricing Systems, 2024

Borrowing from methods used in financial markets, energy pricing analytics have become more sophisticated and formalized. The challenges of adapting to new sources of generation, complex long-term contracts and shifting regulations have driven demand for larger, more diverse datasets and advanced modeling techniques to be incorporated into pricing systems.

Hitachi Energy's strong placement in Chartis' 2024 energy pricing systems quadrant (see Figure 1) reflects its focus on providing advanced forecasting algorithms and detailed breakdown reporting across the full breadth of the solution stack.

> **Hitachi's performance in our quadrant and ranking reflects its broad range of energy analytics, and specifically power analytics, ranging from forecasting to portfolio management tools. With both the tools and robust supporting technology, it has some of the broadest capabilities in this area.**
>
> **— Sidhartha Dash, Chief Researcher, Chartis**

Figure 1: Hitachi Energy's positioning; energy pricing systems, 2024

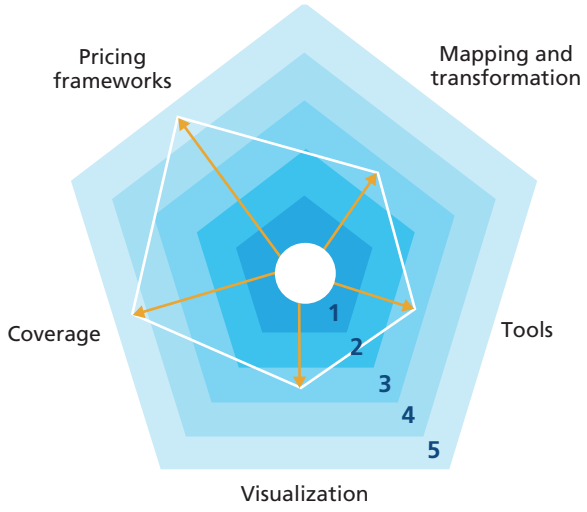


In addition to off-the-shelf fundamental forecasts, Hitachi Energy offers an AI-powered solution for producing advanced forward curves. This solution leverages multiple machine learning algorithms to transform and normalize data, address data outliers, and engineer new model features to then generate forward price curves as well as electrical generation/load forecasts.

The company's flexible 'what-if' testing capability enables traders and risk managers to evaluate a range of scenarios using exclusive curves (that are separate from primary forward curves) to stress test the portfolio for price shock, interest rate and FX shock, new hypothetical transaction and volatility. These scenarios can then be saved and executed on a user-specified portfolio of trades (company, trader, counterparty, etc.) as needed.

As trades are captured, price curves are attached to each trade, allowing for both standard and alternative mark-to-market (MTM) valuations. MTM snapshots are then made available to a range of standard customizable reports. Hitachi Energy's powerful reporting engine offers comprehensive drill-down and pivot capabilities for developing a detailed understanding of risk, position and P&L breakdowns, based on filters such as commodity, location, trader and counterparty.

Figure 2: Hitachi Energy's category-leading capabilities



Hitachi Energy placed as a 'Category Leader' in energy pricing systems due to the completeness of its offering and its market potential (see Figure 2).

In Chartis' analysis, category leaders combine depth and breadth of functionality, technology and content with the required organizational characteristics to capture a significant share in their market.

Methodology

Chartis Research ('Chartis') is a research and advisory firm that provides technology and business advice to the global risk management industry. Chartis assesses risk technology vendors using consistent, objective methodology regardless of business relationships.

Chartis' Energy50 rankings and RiskTech Quadrants® cover a broad range of vendors and solutions in the energy risk and trading space. Chartis employs a multi-step process in its research and analysis, using detailed evaluation forms, customer surveys, expert interviews, vendor briefings and other research sources to assess solutions.

Vendors are evaluated on both current and future dimensions for completeness of offering and market potential.

- **Completeness of offering** includes depth and breadth of functionality, data and infrastructure, analytics, reporting and more specialized capabilities such as risk and performance linkage.
- **Market potential** looks at business model, market penetration, financials, customer satisfaction and growth strategy.

This rigorous methodology provides an independent view of solutions and vendors.