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Industry Report

Forecasting Services for Wind and Solar Farms

November 2025

Report Index

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Executive Summary

Forecasting services for wind and solar farms generate time-sequenced estimates of renewable power generation and deliver them as operational inputs, market schedules, risk measures, and performance diagnostics. These services transform meteorological data and asset characteristics into actionable products—ranging from ultra-short nowcasts and day-ahead schedules to probabilistic risk outputs and ramp alerts—that support decision-making by system operators, market participants, asset owners, financiers, and distributed energy resource aggregators. The sector operates at the nexus of advanced meteorology, power-system operations, and energy market design, with its structure fundamentally shaped by forecast horizon requirements, the productization of uncertainty, data and computing supply chains, and evolving regulatory frameworks.

The global market for wind and solar forecasting services reached approximately USD 5.5 billion in 2024 and is projected to expand at a compound annual growth rate of 12 percent through 2030, reflecting the sector's vital role in enabling the safe, reliable, and economically efficient integration of variable renewable generation. This growth trajectory is underpinned by the accelerating deployment of wind and solar capacity worldwide, intensified grid modernization initiatives, and the increasing sophistication of electricity markets that reward accurate, uncertainty-aware forecasting. Regional concentration remains highest in North America and Europe, where mature grid infrastructures and advanced market mechanisms demand high-fidelity forecasts, while the Asia-Pacific region is experiencing the fastest expansion as large-scale renewable installations proliferate and regulatory systems modernize.

Sector Overview and Strategic Context

The industry is characterized by a moderately consolidated competitive landscape in which a handful of global data and forecasting providers—benefiting from extensive observational networks, advanced numerical weather prediction capabilities, and deep integration with client operational stacks—coexist alongside a broader set of niche and regional specialists. These specialists often target specific forecast horizons, delivery models, or customer segments. Competitive differentiation hinges on data quality, model transparency, horizon-specific product design, and the ability to deliver consistent, validated performance under stringent service-level agreements. The sector exhibits high barriers to entry, driven by the capital intensity of data acquisition, compute infrastructure, model development, and the need to build trust through performance benchmarking and regulatory compliance. Switching costs are substantial, as forecast outputs must integrate seamlessly with energy management systems, supervisory control and data acquisition platforms, trading systems, and distributed energy resource management platforms.

Market participants face a demanding operational environment. System operators and independent system operators prioritize aggregated, probabilistic forecasts that support balancing, reliability, and reserve provisioning decisions. Market participants and traders require deterministic schedules with probabilistic overlays to optimize market bids and hedging strategies, while asset owners and plant operators seek site-level forecasts with ramp detection capabilities to minimize imbalance charges and optimize maintenance windows.

Developers, financiers, and lenders demand statistically robust, long-term yield distributions and probabilistic risk metrics to underwrite project finance and manage portfolio exposure. Distribution utilities and distributed energy resource aggregators need granular, scalable forecasts to manage increasingly complex, geographically dispersed asset portfolios. These distinct customer types, each with unique decision cycles, procurement complexities, and economic drivers, require tailored product specifications, contractual structures, and delivery mechanisms.

Summary of Key Structural Drivers

The forecasting services industry is propelled by several interrelated structural drivers that define its current state and future trajectory.

First, the rising penetration of wind and solar generation within electricity systems elevates the value of accurate forecasts across all time horizons, from real-time dispatch to long-term planning. As intermittent resources constitute an ever-larger share of the generation mix, the economic and reliability costs of forecast error amplify, creating sustained demand for high-quality, uncertainty-aware products.

Second, regulatory and market design evolution increasingly emphasizes forecast quality, transparency, and performance accountability. Market rules that reward probabilistic outputs, ramp alerts, and demonstrated forecast skill shape procurement criteria and influence the competitive positioning of vendors.

Third, technological advances in meteorological modeling, data assimilation, satellite and sky imagery, and machine learning post-processing are enabling material improvements in forecast accuracy, particularly at ultra-short and short horizons where real-time operational decisions hinge on predictive fidelity.

Fourth, the proliferation of distributed energy resources and energy storage systems is driving demand for granular, site-level forecasts and flexible delivery models capable of serving large, heterogeneous asset portfolios.

Finally, the sector's economic structure—characterized by high fixed costs in data sourcing and compute, low marginal costs of serving additional clients, and significant switching costs—creates potential for scale economies and durable client relationships, while also exposing providers to data-access risks and regulatory shifts.

Synthesis of Findings

The industry's segmentation framework is anchored in two primary, mutually exclusive and collectively exhaustive dimensions: customer type and forecast horizon. Customer type determines product specifications, service-level expectations, pricing models, and procurement pathways, while forecast horizon dictates the dominant input data, modeling methodologies, update frequencies, and decision-making contexts. Complementary dimensions—delivery model, product output type, spatial aggregation, and forecasting methodology—enable precise mapping of product features to contractual arrangements and technology choices. This segmentation logic is reinforced by the evidence that different customer segments face fundamentally different penalties for forecast error and operate under distinct regulatory and market constraints.

Market size and growth analyses confirm a robust demand environment. Current total addressable market estimates, corroborated by syndicated market intelligence and industry guidance documents, place the sector at approximately USD 5.5 billion in 2024, with projections of USD 6.16 billion in 2025, USD 6.93 billion in 2026, and USD 7.80 billion in 2027, assuming a sustained 12 percent compound annual growth rate. These figures reflect the increasing integration of renewables, tightening grid reliability requirements, and the growing adoption of probabilistic and ensemble-based forecasting products across both regulated and market-based systems. Regionally, North America and Europe represent the most mature markets with the highest data availability and vendor visibility, while Asia-Pacific is experiencing the most rapid growth as renewable capacity additions accelerate and grid infrastructure modernizes.

Demand drivers are multifaceted. Rising wind and solar deployment and greater grid penetration elevate the value of accurate forecasts for dispatch, trading, and reliability management. Increasing regulatory requirements and market designs that reward forecast accuracy—especially probabilistic outputs, ramp alerts, and uncertainty quantification—drive demand for advanced products across horizons. The adoption of artificial intelligence and machine learning techniques, high-resolution satellite and sky imagery, and ensemble weather models improves forecast skill and expands product appeal. The growth of distributed energy resources and storage integration increases demand for granular, site-level forecasts and ramp-alert capabilities to optimize storage dispatch and participant behavior.

The sector's competitive landscape is anchored in a moderately consolidated structure with medium rivalry intensity. A small set of large, established vendors—such as Solcast, Vaisala, The Weather Company (IBM), DTN, Meteomatics, Meteoblue, and DNV—dominate through their data assets, computational capabilities, and integration with client ecosystems. Differentiation hinges on proprietary data streams, advanced modeling techniques, transparent performance metrics, and seamless integration with operational platforms. Competitive intensity is tempered by high barriers to entry, substantial switching costs, and the criticality of forecast reliability. Opportunities for market positioning lie in horizon-specific product design, probabilistic outputs, ensemble-based decision support, ramp alerts, and API-driven delivery. Performance benchmarking, explainability, and data governance remain decisive factors in vendor selection and client retention.

Trends shaping the industry's evolution include the accelerating shift toward probabilistic forecasting as the standard across horizons, the maturation of ultra-short nowcasting leveraging sky and satellite imagery, the emergence of hybrid and modular delivery models that blend centralized and decentralized approaches, the institutionalization of performance validation and continuous benchmarking, and the regulatory evolution toward standardized forecast quality metrics and model traceability. These trends collectively reinforce the centrality of uncertainty-aware, horizon-aligned product design and the importance of transparent, validated performance.

Macro-environmental analysis reveals that political factors—regulatory design, market-structure evolution, grid modernization mandates, and data-access policies—create both opportunities and risks. Economic factors, including macroeconomic conditions, renewable capacity growth, and data and compute cost dynamics, shape investment appetite and demand cycles.

Social factors, such as environmental, social, and governance priorities, workforce evolution, and distributed energy resource adoption, influence stakeholder expectations and talent availability. Technological factors, encompassing advances in numerical weather prediction, imagery-based nowcasting, artificial intelligence and machine learning post-processing, and cloud-scale delivery architectures, drive continuous improvements in forecast quality and operational efficiency. Together, these macro forces create a favorable environment for providers with robust data provenance, scalable delivery, and advanced post-processing capabilities, while exposing the sector to policy shifts, data-access costs, and vendor-concentration risks.

Customer and go-to-market insights emphasize the importance of aligning forecast outputs with the decision horizons, economic drivers, and operational workflows specific to each customer type. System operators prioritize aggregated, probabilistic products for reliability and reserve management. Market participants and traders value deterministic schedules with uncertainty layers for bidding and hedging. Asset owners and plant operators require site-level accuracy and ramp detection for imbalance cost reduction. Developers, financiers, and lenders demand statistically robust, long-term yield distributions for underwriting. Distribution utilities and distributed energy resource aggregators need granular, scalable outputs for portfolio management. Procurement complexity varies by segment, with high integration requirements, stringent service-level agreements, and formal performance auditing shaping buying behavior. Retention is driven by integration depth, service-level commitments, performance transparency, and data governance, while switching costs are elevated by the need for interoperability, reliability, and validated forecast quality.

Industry attractiveness and risk assessment, synthesized through Porter's Five Forces and structural return on invested capital analysis, indicates moderate to high attractiveness in segments with high value capture, particularly nowcasting and short-horizon probabilistic products for reliability and ramp management, and day-ahead services with strong market relevance. Profitability outlook is moderate, supported by scalable productization and performance-based pricing elements, yet tempered by capital intensity, data licensing costs, and regulatory exposure. Returns are more favorable where service-level differentiation and data assets justify pricing and where customers value trust and transparency in forecast quality. The risk landscape is shaped by regulatory dynamics, technological evolution, operational reliability, and supply chain dependencies, with early red flags including geopolitical fragility affecting data flows, input scarcity, overdependence on narrow revenue streams, and the potential emergence of in-house capabilities by major customers.

The investment thesis rests on several pillars:

Investment thesis and strategic recommendations

The forecasting services industry for wind and solar farms presents a compelling investment and strategic opportunity, anchored in robust demand fundamentals, structural market forces, and the critical role of forecasts in enabling the safe and economical integration of variable renewable generation. The sector's growth trajectory is supported by accelerating renewable capacity additions, intensified grid modernization, and the evolution of market and regulatory frameworks that reward forecast quality and transparency.

Competitive positioning is reinforced by high barriers to entry, substantial switching costs, and the importance of data assets, model discipline, and reliable delivery. However, profitability and defensibility hinge on maintaining superior data quality, transparent performance metrics, seamless integration with client ecosystems, and resilient data-sourcing strategies.

Strategic recommendations for participants in this sector include the following priorities:

First, invest in building and maintaining high-quality, diversified data pipelines to mitigate single-stream supply risk and sustain forecast accuracy across horizons.

Second, develop transparent performance metrics, continuous benchmarking frameworks, and auditable model provenance to build trust, reduce dispute risk, and meet regulatory and procurement expectations.

Third, ensure interoperable, API-driven delivery mechanisms that integrate seamlessly with energy management systems, trading platforms, and distributed energy resource management platforms, thereby reducing client integration costs and enhancing stickiness.

Fourth, tailor product specifications and service-level agreements to the distinct needs of each customer segment, aligning forecast horizons, output formats (deterministic versus probabilistic), and spatial aggregation with the decision-making contexts and economic drivers of system operators, market participants, asset owners, financiers, and distributed energy resource aggregators.

Fifth, pursue scalable, cloud-hosted delivery models that enable low marginal cost of serving additional clients while preserving the ability to customize outputs for specialized customers. Sixth, actively monitor and respond to regulatory and market design evolution, data-access policy shifts, and technological advances that may alter competitive dynamics or input costs.

Finally, maintain a diversified client base to reduce cyclicality and contractual risk, while leveraging performance track records, user communities, and robust customer success capabilities to sustain high retention and defend pricing power.

The sector's value proposition rests fundamentally on the ability to translate complex meteorological and asset data into decision-relevant, uncertainty-aware forecast products that reduce operational risk, optimize market participation, and support long-term investment confidence. As the electricity system transitions toward higher shares of variable renewable generation, the demand for sophisticated, reliable, and transparent forecasting services will intensify, creating sustained opportunities for providers who can deliver superior performance, maintain data and model discipline, and adapt to evolving market and regulatory requirements.

Appendix | List of Sources

Market size, growth, and geography:

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Date: (2021) (RP-20.1)
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Used for: Forecast horizons, product types (deterministic vs probabilistic), vendor selection guidance

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Used for: Delivery models and product-type examples in practice

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