# Competitor Analysis: Weather Forecasting Services for Wind Energy

## Disclaimer

## IBM / The Weather Company (IBM Environmental Intelligence Suite)

**Services:** IBM offers advanced weather forecasting for renewables through The Weather Company and its Environmental Intelligence Suite. This includes high-resolution wind forecasts up to 15 days ahead (hourly), with data tailored to wind turbine heights (10m–260m AGL). IBM's platform can predict wind speed, direction, and even air density at hub height, supporting turbine-level and farm-level forecasts. IBM's renewables forecasting system (originating from its "HyRef" model) integrates numerical weather prediction with on-site sensors and analytics to forecast wind farm power output from minutes ahead to weeks. This allows utilities and grid operators to anticipate and manage wind power intermittency. IBM also provides severe weather alerts (e.g. for high winds or lightning) and a suite of APIs for real-time data access. The forecasts can be delivered via APIs or dashboards and integrated into asset management or grid control systems (IBM often ties weather data into broader solutions like IBM Maximo and IoT applications for energy).

**Pricing Model:** IBM's weather services are typically sold as enterprise subscriptions. Pricing is usage-based and often customized. IBM uses a metric called *AppPoints* to measure API usage and data volume. In practice, this means costs can scale with the number of API calls, locations, or data updates consumed. For example, an IBM "Standard Weather APIs" package was listed at about **€555 per month for 1 million API calls** (list price). Enterprise deals may involve annual commitments and volume discounts via IBM business partners. IBM's model supports high-volume usage (millions of calls or large data feeds) and can be tailored (e.g. specific regional data or additional features add to the subscription). In summary, **IBM uses subscription licensing with fees based on data access (API calls, data feeds) and service level**, rather than public fixed tiers. Support and service uptime are part of the subscription (with SLAs for 99.9%+ availability).

**Target Customers:** IBM primarily targets large-scale energy enterprises – **utilities, grid operators, and major wind farm owners/OEMs**. Their solutions are geared toward those needing deep integration and custom analytics (e.g. national utilities managing hundreds of MW of wind, energy traders, and renewable operators with complex portfolios). For instance, IBM has worked with utilities to integrate wind forecasts into grid operations. The **UK/EU market** is served via IBM's global data (The Weather Company has worldwide coverage) and IBM's presence in Europe. IBM's differentiator is often end-to-end service: they combine weather data with AI analytics and industry expertise (IBM's Energy & Utilities division) to provide not just raw forecasts but decision support (e.g. predictive maintenance scheduling, curtailment decision tools). Enterprise clients can also opt for **on-premise or custom deployments** as part of IBM's cloud services, ensuring compliance with any data residency or integration requirements.

**Notable Features & Differentiators:** IBM/The Weather Company leverages one of the world's largest weather data sets (including proprietary forecast models and global observations). Key differentiators include:
- **Granular forecasts with custom heights:** 4 km or finer resolution grids and ability to get forecasts at specific turbine hub-heights.
- **Advanced modeling & AI:** IBM's use of AI (e.g. Watson) and hybrid forecasting (like HyRef) combines physical models with machine learning and on-site data for higher accuracy in wind power output predictions.

- **Integration capabilities:** IBM's solutions integrate with enterprise asset management, IoT sensor networks, and analytics dashboards, which is attractive to large operators seeking a one-stop solution.
- **Global reach and support:** IBM provides global forecast coverage (including UK/EU) and 24/7 support for enterprise clients. It also offers service guarantees (credits if availability falls below SLA) , reflecting enterprise-grade reliability.

## Tomorrow.io

**Services:** Tomorrow.io provides a **weather intelligence platform and API** widely used in weather-sensitive industries, including wind energy. For wind farm operators, Tomorrow.io offers hyper-local forecasts (down to street/turbine level) with 60+ weather parameters (wind speed, wind gusts, temperature, etc.) available. Its services span: short-term minute-by-minute nowcasts, hourly forecasts, and multi-day forecasts, all globally. Notably, Tomorrow.io launched a **Wind Power Forecasting product** that uses machine learning and proprietary models to predict wind farm power output. This high-precision model provides detailed wind power generation forecasts at the turbine, farm, and grid node level for the next 48 hours, targeting day-ahead and intra-day power markets. It leverages vertical wind profile modeling (11 altitude layers) and is trained on historical farm data for accuracy. Beyond raw forecasts, Tomorrow.io's platform includes **custom alerts** (e.g. send notifications when wind speeds approach curtailment thresholds or if lightning is within X miles), geospatial map visualizations, and team collaboration tools for weather-driven decisions. They also offer mobile access – the Tomorrow.io platform is web-based, and a separate mobile app exists (primarily for general weather, but enterprise users can receive alerts on mobile). In summary, Tomorrow.io provides both an API for integration and a full SaaS platform ("Weather Intelligence Platform") for operational use by wind energy teams.

**Pricing Model:** Tomorrow.io uses a flexible pricing structure with two main components :
- **Platform Subscription:** Access to Tomorrow.io's web platform (dashboards, maps, alerts, reports) is typically sold as a subscription per organization. The cost is based on factors like **number of users (team size)**, number of monitored locations (e.g. wind farm sites), and feature needs. Enterprise tiers unlock more advanced features and support. Pricing is not published as fixed tiers; customers work with Tomorrow.io to tailor a plan.
- **API Usage:** For developers integrating data (e.g. into SCADA or trading algorithms), Tomorrow.io offers an **API plan** priced by the volume of API calls. It has tiered usage levels – for example, higher call volumes correspond to higher monthly fees, with flexibility to scale up as needed. The exact price per call or per bundle of calls is provided upon inquiry (Tomorrow.io emphasizes custom plans), but they do offer a **Free tier** for evaluation. The **Free API plan** allows a limited number of calls and basic data (e.g. a few hundred calls/day) , after which paid plans are required. This free tier is meant for small-scale use or testing.

In practice, a wind operator might subscribe to the platform for daily operations (with a license covering their sites and users) and also purchase an API package if they want to ingest forecasts into their own software. Tomorrow.io prefers to **custom-quote** enterprise deals ("no one-size-fits-all" pricing) , ensuring the plan matches the customer's scale (whether a single wind farm or a global fleet) and the desired resolution of data.

**Target Customers:** Tomorrow.io's renewable sector customers include **wind farm operators, renewable energy traders, grid operators, and utilities**. For example, in the UK, National Grid has leveraged Tomorrow.io for improved weather insights, and other clients include energy companies like SoftBank Energy and **Evergy** (a U.S. utility). The platform is designed for both operations teams (who need site-specific alerts for turbine safety and maintenance scheduling) and energy market teams (who need accurate wind generation forecasts for trading and grid balancing). Tomorrow.io's global coverage and focus on hyper-local accuracy make it relevant in UK/EU markets where forecasting wind farm output accurately is crucial for participation in electricity markets and for managing intermittency.

**Key Differentiators:** Tomorrow.io sets itself apart through:
- **Technology & Data:** It fuses data from traditional sources and novel ones (it's deploying proprietary satellites and radar to improve coverage). Its use of machine learning on weather and power data enhances forecast accuracy for wind energy.
- **All-in-One Platform:** Customers get an integrated solution – real-time maps, customizable **Insights/alerts,** and collaboration tools – not just raw data. This is useful for teams that want actionable guidance (e.g. "curtail turbines 3 and 4 in 2 hours due to high winds" alerts).
- **Flexible Delivery:** Both a **robust API and a user-friendly GUI** are offered, so it caters to developers and to field personnel alike. The presence of a forever-free API tier for developers also lowers the barrier to entry for trial.
- **Focus on Weather Intelligence:** Tomorrow.io frames itself as providing *decision intelligence*, not just weather. For energy, that means forecasting not only weather parameters but translating them into **power output and operational impact** (like advising on grid load or ideal maintenance windows). This focus on industry-specific insights (e.g. its wind power prediction model specifically for energy traders) is a key selling point.

## DTN (WeatherSentry & Related Services)

**Services:** DTN is a long-standing provider of weather solutions with specialized offerings for energy and agriculture. In the wind energy sector, DTN's flagship solution is **WeatherSentry** (Renewable Energy editions). For example, *WeatherSentry Wind Edition* is a comprehensive service for wind farm operators, providing: **turbine-level hub-height wind forecasts**, severe weather tracking, and alerts. It forecasts wind speed, direction, and gusts at the hub height of turbines, allowing operators to see expected conditions for each turbine location. DTN also includes lightning detection and storm monitoring; WeatherSentry can track lightning strikes in relation to turbines and issue alerts if thresholds are met (e.g. pausing maintenance when lightning is within X miles). Users can set custom threshold alerts (for wind speeds, gusts, temperature, etc.) and receive reports when those are exceeded , aiding in curtailment and safety decisions.

Beyond the wind-farm-specific tools, DTN offers *WeatherSentry Energy Edition* for utilities and grid operators, which integrates weather data into **load forecasts and outage management**. This includes temperature forecasts for demand forecasting and wind/solar forecasts for supply. Another DTN asset is its **Hub Height Winds** data service, which specifically delivers hub-height forecast data feeds for integration into energy management systems. DTN's services are delivered via web dashboards (with GIS map layers, etc.), mobile applications for on-site crews, and data feeds/API for corporate systems. Notably, DTN acquired Europe-based MeteoGroup in 2019, so it leverages MeteoGroup's high-resolution European models and European market expertise – beneficial for UK/EU clients. They also provide **offshore-specific forecasts** for wind farms at sea, accounting for marine weather constraints.

**Pricing Model:** DTN typically sells its weather services on a **subscription basis**, often annual contracts. Pricing tends to be tiered by the scope of service (number of sites, features, and region covered). For instance, a basic WeatherSentry package for a smaller utility (covering a limited service area) might start around **$4,500 per year** (as an example listed for utilities <50k customers). For wind farms, DTN likely offers packages per site or per portfolio of farms – e.g. a Wind Edition subscription might be priced based on the number of turbine sites or capacity covered, including a certain number of user logins and alert customizations. Additional modules (like lightning alerting, or consulting services from DTN meteorologists) can add to cost.

DTN also provides data via API/Web Services for clients who want direct integration; these might be priced by data volume or by a flat fee for access. Since DTN deals mostly in B2B contracts, **prices are generally obtained via quote** rather than public rate cards. However, the model is generally **fixed fee for a bundle of services** rather than purely usage-based. Enterprise customers (large utilities or power traders) may negotiate custom packages including multiple data feeds (e.g. storm alerts, hub-height winds feed, etc.). In Europe, after the MeteoGroup acquisition, DTN continues legacy subscription models where large energy companies pay an annual license for unlimited access to MeteoGroup's/DTN's forecasts for their

operations. In summary, **DTN's cost structure** is subscription licensing, scaled by company size and service scope, with tailored enterprise pricing for big clients (often multi-year deals).

**Target Customers:** DTN targets a broad range of **energy sector players**. This includes **wind farm operators** (onshore and offshore) who need on-site weather intelligence, **electric utilities and grid operators** (for load and generation forecasting), and **energy traders** who use weather data to anticipate market prices. Specific to wind, many wind farm owners (including in the UK/EU) use WeatherSentry or its data to plan maintenance (weather windows) and manage curtailment during extreme winds. Offshore installation crews also rely on DTN's marine forecasts to schedule safe work periods. On the utility side, DTN's forecasts feed into wind power production estimates for grid balancing. For example, **UK and European utilities** that integrated MeteoGroup's forecasting are now DTN customers. DTN also appeals to **OEMs and O&M service providers** – e.g. turbine manufacturers or maintenance contractors – who must monitor weather to optimize turbine performance and protect equipment. The inclusion of features like blade icing forecasts, storm damage risk, etc., support these use cases.

Key Differentiators:
- **Industry Experience & Scale:** DTN (with legacy MeteoGroup) has decades of experience in operational forecasting. It operates a global network of weather stations and expert meteorologists, lending credibility and accuracy.
- **Energy-Specific Features:** The service is tailored to energy needs – e.g. **hub-height forecasting at turbine locations** (rather than generic 10m winds), and energy trading data (DTN's "Frontier Weather" service provides weather-driven demand/supply indices for power markets).
- **Alerting and Decision Support:** WeatherSentry's robust alert system (for lightning, wind thresholds, etc.) and its easy-to-understand dashboard help improve safety and efficiency on wind farms. Crews get clear guidance on when to pause operations, which reduces risk.
- **Global and Local Models:** DTN runs high-resolution forecast models (including ECMWF, high-res rapid refresh models, etc.) and provides localized forecasts worldwide. European clients benefit from MeteoGroup's Euro model heritage, while US clients use DTN's proprietary models – all accessible through one platform.
- **Human Expertise:** In addition to automated data, DTN offers 24/7 **meteorologist consultation** for its energy clients (often a differentiator for enterprise customers). Clients can get on-call expert advice during critical weather events – a service smaller competitors may not match.

# Meteomatics

**Services:** Meteomatics is a Swiss provider specializing in high-resolution weather data via API, with strong applications in the wind energy sector. They offer a *Weather API* that aggregates over 1800 parameters and multiple models into one interface. For wind energy operators, key services include: **customizable wind and solar power forecasts** for any site. Meteomatics can deliver **wind power production forecasts** for individual turbines, entire wind farms, or even whole regions/countries. These forecasts are hyper-local – Meteomatics downscales weather models to ~90-meter resolution for precise site conditions. Time resolution can be as fine as 15 minutes, with forecast updates also every 15 minutes in operations.

A notable offering is their ability to incorporate customer data: Meteomatics' energy meteorologists will take historical power production data from a wind farm to calibrate the forecast model for that specific site. They then continuously ingest live SCADA data to refine predictions, delivering **real-time updated forecasts via secure feed (e.g. SFTP)**. This means the forecast isn't one-size-fits-all; it's tailored to the turbine types, hub heights, and performance of each farm. The output can be provided in flexible units (kW, MW, etc.) and formats (CSV, JSON) for easy integration.

Meteomatics also provides an **API parameter for wind power**: a user can query the API with their turbine specifications (turbine model or power curve, hub height, rotor diameter) and get a theoretical power output forecast directly. This is extremely useful for wind operators who want quick power estimates without developing their own models. In addition, all the supporting weather parameters are available via API – e.g. wind speed, direction, gust at any height, air density, icing conditions, etc., which can feed the user's own algorithms. Meteomatics provides a visualization tool (*MetX* web app) as well, where users can

map weather forecasts and set threshold alerts (e.g. highlighting areas/times when wind speeds exceed cut-out).

**Pricing Model:** Meteomatics uses a **tiered licensing model** for its API. They offer a **Free Basic API account** for non-commercial or testing purposes – which allows up to 500 queries per day, 10-day forecasts (hourly), and 15 basic weather parameters. This free tier has no time limit but is limited in scope (and not for operational use). For commercial use and expanded access, Meteomatics sells **monthly or annual subscriptions**. Pricing scales with the number of queries and data parameters/models required. For instance, on one marketplace the Meteomatics Weather API full access plan is listed at **€780 per month** – this presumably includes all weather parameters, global coverage with 5-minute updates at 90m resolution, and a high query allowance. They also have higher tiers for enterprise (with unlimited or very high query limits, priority support, etc.), which would be priced via custom quote.

In summary, **Meteomatics' pricing** is structured around data access volume and features: one pays a fixed subscription fee for a certain number of API calls per day (or per month) and for access to certain premium data like their proprietary high-res models (EURO1k, US1k). Discounts are likely offered for annual commitments. Their model is transparent for developers (self-service sign-up for standard plans) and flexible: clients can start with a smaller plan and upgrade ("Upgrades available" from the free tier) if they need more queries or additional parameters. Enterprise licensing (for very large uses or on-premise solutions) is also available, which may involve custom pricing.

**Target Customers:** Meteomatics serves **energy companies, utilities, and traders** that need precise weather/power data. Over 150 energy companies reportedly use its solutions. In the UK/EU, this includes grid operators (e.g. UK Power Networks uses Meteomatics for planning grid capacity around weather, achieving significant savings ) and power traders (who use Meteomatics' rapid updates and Euro-centric models to gain an edge in intraday markets ). Wind farm operators of all sizes can use the API to integrate forecasts into their asset management systems. Meteomatics is also popular with **forecasting teams and analysts** – for example, a utility's forecasting department might use Meteomatics API to feed their load and generation forecasting software. The service appeals to those who want **full control of data** (via API) and the ability to tailor forecasts to their needs (through custom power curves and model training). Because of its developer-friendly approach, Meteomatics is often chosen by tech-savvy teams at renewable energy firms or by software providers building energy management solutions.

Key Differentiators:
- **High-Resolution Modeling:** Meteomatics runs its own models like **EURO1k**, which provides 1-km resolution forecasts for Europe, yielding very detailed wind field predictions. They downscale global data to as fine as 90 m resolution terrain-following grid , capturing local effects (great for complex wind farm terrain).
- **API-First Delivery:** Unlike many competitors with heavy GUI platforms, Meteomatics focuses on a powerful API. This allows easy integration into custom dashboards, trading algorithms, or SCADA systems. The API is well-documented and supports many output formats, making it developer-friendly.
- **Custom Power Forecasts:** Meteomatics offers to *train models on customer data* and continuously improve them. This level of customization (essentially providing each client with their own tuned forecast model) is a standout feature, improving accuracy for that client.
- **Rapid Updates & Data Breadth:** Forecasts update every 5–15 minutes, ensuring the latest runs and observations are reflected. They also blend in observations to calibrate forecasts (the API's parameters are often "calibrated" by nearby weather station data in real-time) – improving reliability. Additionally, the API provides historical data and climate data, useful for analysis beyond just forecasting.
- **Flexible Pricing including Free Tier:** The availability of a free tier for trial and the ability to do short-term subscriptions or pay-as-you-go (via their Weather Data Shop) lowers barriers for new users. This is somewhat unique among enterprise-grade services and allows even smaller operators or consultants to use high-quality data at low cost.

# Climavision

**Services:** Climavision is a newer entrant that combines traditional forecasting with novel data sources (notably its own radar network and AI models). For the wind energy sector, Climavision offers **Renewable Energy Forecasting** solutions covering wind, solar, and hydropower. Their platform provides insights to **"predict energy supply, demand, and pricing with greater lead times"**. Key offerings include:

- **Site-specific forecasts and alerts:** Through their **Horizon Point** product, Climavision delivers hyperlocal forecasts for specific locations (e.g. each wind farm or turbine site) and generates tailored alerts for weather risks. These alerts are pushed well in advance for severe conditions like sudden wind ramp-up, icing, or storm onset, enabling proactive curtailment or maintenance planning.
- **Multi-scale forecast models:** Climavision has a suite of forecast products (the *Horizon* line). *Horizon Global* provides worldwide weather intelligence from surface to high altitude – essentially global weather model data. *Horizon HI-RES* offers **custom high-resolution forecasts** configured to a client's needs (for example, running a high-resolution model nested over a particular wind farm region). *Horizon Subseasonal-to-Seasonal (S2S)* is a longer-range outlook using generative AI blended with NWP, aimed at forecasts from weeks to months ahead. This S2S model is particularly useful for energy trading and planning beyond the usual 10–15 day forecast horizon, giving an edge in anticipating monthly wind resource trends or seasonal anomalies.
- **Unique Data Sources:** Climavision differentiates by operating a **proprietary radar network** (especially filling gaps in U.S. weather radar coverage) and by ingesting high-frequency satellite data. For wind energy, this means better detection of localized weather events (e.g. convective storms or wind shear events) that standard models might miss. The high-resolution radar data improves short-term forecasts and nowcasts in those covered regions.
- **Weather API:** They provide an API that can be customized to deliver the needed parameters at desired intervals. For example, a wind energy client can get hourly forecasts of wind speed at hub height, temperature, cloud cover, etc., for all their sites via API, integrated into their systems. On their website, Climavision showcases parameters like **Hub Height Wind Speed (80m AGL)** and Wind Gust, indicating support for wind-energy-relevant variables out of the box.
- **Energy Trading Tools:** Climavision's focus on "smart energy operations and trading" implies they provide data feeds suitable for energy market analysts. This could include forecasts of wind power output or wind index for major power markets, delivered in formats ready to plug into trading platforms. (Indeed, a recent case: Climavision's forecasts were integrated into **Arcus Power's** trading software to enhance energy price predictions.)

**Pricing Model:** Climavision's services are **enterprise-oriented and sold via subscription or contract**. They do not publish standard pricing tiers, as solutions are tailored. Generally:

- Access to the **Weather API** is likely priced by data volume and the range of parameters/models needed. A client might subscribe to an API package that includes, say, global hourly forecasts plus the S2S model output, with a limit on API calls or locations.
- Their **Radar Network** is offered as a "Radar-as-a-Service" subscription. For example, an energy company could subscribe to live radar data feeds for a region to improve on-site nowcasting; this would be a flat monthly or annual fee.
- **Custom modeling (Horizon HI-RES)** would involve a higher-tier service contract, since Climavision would run dedicated forecasts for the client's region – pricing would factor in computational costs and meteorologist support.
- Since the company emphasizes talking with an expert to discuss needs , it suggests a consultative sales approach. We can infer **pricing is usage and value-based**: a large utility wanting nationwide S2S forecasts and radar data will pay significantly more than a single wind farm operator wanting a basic forecast feed.

In essence, **Climavision operates on a SaaS/data subscription model**, with likely annual licenses. The structure might include a base platform fee and add-ons (e.g. add Horizon S2S for an extra cost, add radar feed for extra, etc.). As an example of their mindset, they highlight that even the radar service is accessible "regardless of location" via simple subscription – implying clients don't need to install hardware, just pay

for data access. No free tier is advertised; they appear to target medium to large enterprise clients who value improved accuracy enough to invest in it.

**Target Customers:** Climavision's target customers in wind energy are both **operators and energy market participants**. This includes **wind farm operators** (utility-scale) who need improved localized forecasts (especially in regions with challenging weather or sparse official radar coverage – e.g. complex terrain or where national met services lack density). It also targets **energy traders, hedge funds, and utilities** that manage portfolios of generation and want to anticipate weather-driven price fluctuations. The mention of "pricing with greater lead times" and specific content for commodity trading indicates a focus on those who trade power based on weather. In the UK/EU context, national grids, renewable aggregators, and large energy companies could use S2S forecasts for seasonal planning (e.g. estimating if a month will be windier or calmer than normal to plan energy procurement). Also, **energy utilities** are explicitly a focus (Climavision has a page on customized forecasts for utilities) , highlighting grid management optimization through tailored forecasts. Given Climavision's radar network is currently U.S.-centered, North American customers may be a primary target, but their global model and AI offerings are equally applicable in Europe (they can provide global data via AWS cloud, etc.). In summary, clients who demand cutting-edge accuracy (and are willing to pay for it) – be it to maximize trading profits or to ensure grid reliability – are the sweet spot.

Key Differentiators:
- **Proprietary Data (Radar Network):** Climavision's private network of high-resolution radars (especially filling low-level coverage gaps) gives it an edge in detecting small-scale phenomena (like thunderstorm outflows or mesoscale wind shifts). This can significantly improve short-term wind forecasts and severe weather alerts, beyond what standard global models offer.
- **AI and Long-range Forecasting:** Climavision leverages **AI/ML for sub-seasonal forecasts** (weeks to months ahead), which is relatively unique. Their Horizon S2S product using generative AI can provide guidance on, for example, whether the coming 4–6 weeks will trend above or below normal wind speeds – information that competitors may not offer at the same level of detail. This helps with strategic planning (maintenance scheduling, fuel purchasing, etc.).
- **Comprehensive "Horizon" Suite:** They can cover the full time spectrum – from nowcasts (with radar) to multi-year climate outlooks – under one roof. A client could use Climavision for everything from immediate operational decisions (e.g. storm coming in next hour) to long-term resource assessment, reducing the need to juggle multiple providers.
- **Precision and Customization:** Their tagline of "hyper-accurate" forecasting and products like Horizon HI-RES suggest a willingness to create *bespoke high-resolution models* for clients (e.g. a 1-km resolution WRF model centered on a wind farm). That level of tailored service, plus the integration of local sensors if available, can yield very precise forecasts. Not every competitor provides custom modeling as a service.
- **Modern Platform:** Being a newer company, Climavision's tech stack is modern and cloud-native. The API is flexible and designed to scale with client needs. This can mean faster deployment, easier integration, and potentially a more responsive service (they tout data "that moves faster than the market" and an API "built to plug and scale" ). For clients, this could translate to lower latency data and an evolving feature set as the company grows.

# StormGeo

**Services:** StormGeo is a well-established weather services company, and in the wind energy arena it provides **full-service forecasting and decision support**, particularly noted for offshore wind support. StormGeo's offerings for wind include:
- **Site-Specific Forecasts & Weather Windows:** StormGeo delivers tailored weather forecasts for each wind farm or offshore installation, typically up to 7 days ahead (with longer outlooks probabilistically). Forecasts aren't just raw data; they're presented as **easy-to-understand dashboards** highlighting usable weather windows for operations. For offshore projects, they produce **15-day probabilistic forecasts of weather windows** (periods meeting specific criteria

like wave height, wind speed thresholds for safe work) – crucial for planning maintenance or installation tasks.

- **Alerts and Warnings:** They provide **early warnings for severe weather** – high winds, lightning, heavy precipitation, etc. – customized to the client's site thresholds. These come as daily briefings and real-time alerts. For example, StormGeo will send a **daily threat report** outlining any forecasted severe conditions (e.g. storm-force winds or thunderstorms expected on-site). They also have lightning proximity alerts that trigger if lightning is detected near a wind farm, ensuring crew safety.

- **24/7 Meteorologist Support:** A hallmark of StormGeo is access to **certified meteorologists around the clock**. These experts monitor client sites and can be consulted via phone or email for forecast interpretation or sudden changes. In some cases, StormGeo even offers to station a meteorologist on-site (especially for critical operations or offshore construction projects). This hands-on approach helps in high-stakes decisions like evacuation ahead of a North Sea storm, or optimizing turbine shutdown timing.

- **Historical Analysis & Tools:** StormGeo provides historical weather and "hindcast" analysis tools in their portal. This helps wind operators understand local wind patterns and turbulence (important for turbine placement or investigating underperformance). They also integrate multiple data sources – satellite, radar, weather stations – into interactive maps for situational awareness. StormGeo's platform (sometimes branded as "Vortex" for the online portal) allows multi-site overview, so an operator with assets across regions can see all their sites' weather status at once.

- **Energy Market Forecasting (Nena):** Through its Nena Analytics (a StormGeo division), the company also provides **power market forecasting services**. This includes wind power production forecasts aggregated by region (for market participants) and even price forecasts for electricity markets, combining weather inputs with market models. Such data is delivered via API or their s-Insight platform, and is used by traders and utilities to gauge near-future generation and prices.

**Pricing Model:** StormGeo typically engages in **contract-based service agreements**. Pricing is often bespoke, reflecting the high-touch nature of their service. Key pricing factors include: number of sites covered, level of meteorologist support, and product features. For instance, an offshore wind farm package might include 24/7 forecaster consultation, daily briefings, and an online portal, priced at a premium annual fee. StormGeo has stated historically that clients subscribe to its "WeatherSentry" (for onshore) or "Offshore" services on an annual (or multi-year) license. There are no public price lists; however, given the scope, costs can range in the tens of thousands of dollars (or more) per year for full services to a large wind operator. StormGeo's value proposition often justifies higher pricing due to potential cost savings from avoided downtime and damage.

They can also modularize offerings: e.g., a smaller wind farm could opt for an automated forecast service (cheaper) without 24/7 meteorologist access, whereas a larger operator might pay more for the full package. Also, StormGeo's energy trading forecasts (Nena) are subscription-based, often taken by utilities/traders as an information service – priced according to region/market data provided. In summary, **StormGeo uses an enterprise subscription model**, with tiered service levels (standard vs. premium support). The cost structure tends to be higher than self-serve API providers, reflecting the comprehensive support. Clients often report that StormGeo is willing to customize and revise services as needed, implying flexibility in commercial terms as well.

**Target Customers:** StormGeo supports **major wind farm operators, offshore project developers, and utilities**. They note supporting *100+ offshore wind farms and 2,500+ offshore sites worldwide* – clients likely include many of the North Sea offshore operators (Ørsted, Equinor, Shell/NewEnergia, etc.), as well as onshore wind operators needing precise forecasts in complex terrain. In Europe, they are trusted by companies involved in large projects where safety and optimization are paramount. Grid operators and energy traders in the Nordic and German markets also use StormGeo's aggregated forecasts and market analysis (Nena was originally focused on Nordic power markets). Essentially, StormGeo appeals to clients who require **high reliability and expert guidance** – for example, a wind farm cluster in the North Sea scheduling crane lifts for turbine maintenance will use StormGeo to pick safe weather windows. Also, companies that prefer an outsourced meteorology service (instead of maintaining in-house

meteorologists) find StormGeo's offering ideal. UK/EU users (from national utilities to independent power producers) are among their customer base, given StormGeo's strong presence in Europe (originating from Norway with offices across Europe).

Key Differentiators:

- **Comprehensive Service with Human Touch:** StormGeo uniquely blends automated forecasts with human expertise. The 24/7 personalized support means clients get context and advice, not just data. In critical situations, having a meteorologist's guidance can be a game-changer – this is a big differentiator versus purely automated providers.
- **Offshore and Marine Expertise:** StormGeo has deep roots in marine weather. Their models and analysts excel at forecasting in offshore conditions (waves, ocean currents, in addition to wind). They offer integrated marine forecasts, which is crucial for offshore wind operations – competitors focusing only on atmospheric data might not deliver this complete picture.
- **Operational Focus – Safety & Efficiency:** The emphasis on **warnings, alerts, and decision-friendly outputs** (like color-coded risk levels, operational recommendation briefings) makes their service very operations-centric. Wind farm teams can rely on StormGeo to know when to secure equipment or when a weather window opens. This reduces uncertainty and can save money (e.g. avoiding unnecessary downtime or last-minute weather surprises).
- **Scale and Trust:** StormGeo is trusted by a large segment of the industry (supporting hundreds of sites, millions of forecast points ). This track record and its global reach (offices in 26 locations) give assurance of robust service and support. They also continuously verify and refine their models based on customer feedback and observed data , which means their forecast quality improves over time in partnership with clients.
- **Additional Services:** StormGeo provides adjacent services such as routing for vessels (useful for offshore wind construction vessels), and its energy market forecasts help bridge weather data with financial impact. This one-stop-shop capability (from forecast to market insight) can be a differentiator when competing for utility clients that want both weather and market intelligence from the same provider.

## Vaisala (Xweather – formerly 3TIER)

**Services:** Vaisala, through its Xweather division (which includes the legacy 3TIER services), offers **renewable energy forecasting** that is highly regarded for accuracy. Their solution provides **site-specific wind power forecasts up to 230 hours (≈9.5 days) ahead**, with sub-hourly detail. Forecasts are updated every 5 minutes to incorporate the latest model runs and observations, ensuring very up-to-date guidance. Key features of Vaisala's service:

- **Wind Power Output Forecasts:** Rather than just meteorological variables, Vaisala delivers **direct power predictions (MW or MWh)** for wind farms. These are derived from a blend of NWP models, statistical models, and machine learning, fine-tuned over years of operational experience. The forecasts account for local wind farm layout and turbine specs (during setup, they calibrate to the site's historical performance). Both hourly and daily granularity forecasts are provided, enabling intra-day and day-ahead energy scheduling.
- **Accuracy and Uncertainty Metrics:** Vaisala emphasizes its forecast accuracy, citing mean absolute errors as low as ~5% for hour-ahead and ~8% for day-ahead forecasts under typical conditions. They also provide probabilistic ranges or confidence intervals, which help grid operators understand uncertainty. This is vital for risk management and trading (e.g. knowing the probability of a significant under-forecast).
- **Global Coverage & Multiple Horizons:** Their system covers wind and solar forecasts worldwide, with particular strength in North America and Europe. They integrate leading global models (like ECMWF, GFS) and high-resolution regional models, plus they have their own modeling capabilities. Forecast horizons range from minutes ahead (for ramp event alerts) out through 10 days. For longer term needs, Vaisala also provides **historical time-series (hindcasts)** and renewable resource data, which assist in benchmarking and planning.
- **Delivery Platforms:** The forecasts are delivered via **web portals, API, and even integrations into market platforms**. For instance, Vaisala's regional wind forecasts are available through Yes Energy's platform (a tool widely used by power traders) , indicating a focus on making their data

easily accessible in the systems traders already use. The web portal allows users to log in and see their site forecasts, download data, and set up alert triggers. API access is available for automated retrieval into energy management systems.

- **Additional Tools:** Vaisala often bundles forecasting with other analytics: e.g. **"Historian"** tools for analyzing forecast performance and site climatology, and consulting services to improve integration of the forecasts into operations. They also manufacture weather instruments (like WindCube lidars), and while those are separate, there is synergy in offering both data and hardware to wind developers (e.g. Lidar data can be assimilated to improve forecasts).

**Pricing Model:** Vaisala's Xweather forecasting services are sold as subscriptions, usually tailored to the client's portfolio. A typical arrangement might be a **fixed annual fee per wind farm or per MW capacity** covered. For example, a utility might subscribe to regional wind power forecasts for all wind farms in its balancing area, paying an annual license that covers continuous updates and support. Smaller independent power producers might subscribe per site. Pricing is not public, but given the specialized nature, it likely scales with the size of the project and complexity. (As a reference, when integrated in third-party platforms, it's a premium feature – e.g., Yes Energy users need a Vaisala subscription to unlock that data).

Vaisala may offer different levels: a base package might include day-ahead forecasts updated hourly, whereas a premium package could include more frequent updates (5-min refresh), custom model calibration, and perhaps meteorologist consulting. Enterprise clients (grid operators or large utilities) can negotiate custom packages, possibly including API data feed rights for internal use.

In essence, **the pricing is an enterprise SaaS model** – an annual or monthly subscription per service region or per set of sites. Since Vaisala also often enters multi-year contracts (especially with utilities who treat forecasting as part of operations), they might structure discounts for longer commitments. There's no known free tier; however, trial periods or pilot studies are sometimes done to prove accuracy (especially since accuracy is a selling point).

**Target Customers:** Vaisala's forecasting services primarily target **utilities, grid operators, and owners of large wind and solar assets**. Many U.S. utilities have used 3TIER/Vaisala forecasts for integrating wind into their systems. In Europe, their services can support TSOs or utility companies in charge of balancing areas. **Energy traders** and market operators also use Vaisala data – by providing forecasts for major trading hubs (e.g. regional wind generation indices for power markets), they cater to those making financial decisions on power contracts. For example, any entity participating in the UK power market that needs to anticipate national wind generation could be a client (either directly or via platforms like Elexon or Nord Pool that might incorporate such forecasts). The **Omar persona (wind farm operator)** would value Vaisala for getting highly reliable production forecasts to commit volumes in the market day-ahead and to plan intra-day dispatch or curtailment. Additionally, project developers and investors might use forecast and climate data from Vaisala for due diligence and operational strategy. Overall, Vaisala tends to work with **professional energy firms who require bankable data** – their forecasts have been used in power purchase agreement (PPA) scheduling, grid interconnection planning, and other critical tasks.

Key Differentiators:
- **Proven Track Record:** Originating from 3TIER (a pioneer in wind forecasting since early 2000s), Vaisala's methods have a long history of validation. This legacy builds trust, as their models have consistently been honed over many years and many weather events.
- **Accuracy Emphasis:** Vaisala is known for its accuracy claims and transparency about error metrics. By quantifying and achieving low error rates, they stand out to grid operators who need confidence in forecasts for reliability standards. They also continuously improve by using high-quality observations (Vaisala's own measurement devices and others) to correct model biases.
- **Integration with Market Systems:** The fact that their forecasts are embedded in trading and utility software (like Yes Energy, and perhaps ISO dashboards) highlights convenience. Clients don't have to do heavy lifting to use the data – it's readily available where they need it.
- **Comprehensive Weather Solutions:** Vaisala can be a one-stop shop: they not only forecast but can provide onsite weather sensors (to get real-time data), lightning data, and even environmental

consulting. For example, a wind farm operator could get a package of a Vaisala Triton wind profiler + forecasting service, ensuring data continuity and improved forecasts.

- **Global Meteorological Excellence:** As a broader company, Vaisala has deep expertise in meteorology (they even supply instruments to national weather services). They run advanced models on high-performance computing and invest in R&D (e.g. collaborating with national labs). This results in high-quality model outputs that some smaller competitors might not match (for instance, they might run ensembles or use multi-model blends to capture uncertainty better).

## Other Notable Players in Wind Forecasting (UK/EU)

In addition to the above major providers, several other companies offer specialized weather and power forecasting services for wind energy in the UK and EU markets:

- **Energy & Meteo Systems (EMS):** A German-based provider known for its *Previento* wind power forecasting system. EMS supplies forecasts to over 480 GW of installed wind and solar capacity in ~60 countries – including many European utilities and grid operators. They offer highly accurate single-site and aggregated forecasts, often used by TSOs for grid integration. EMS also provides a Virtual Power Plant platform that incorporates its forecasts for real-time asset dispatch. Pricing is typically bespoke, and their focus is enterprise (utilities, large wind/solar fleet operators).
- **ConWX:** A Danish company delivering tailored weather and power production forecasts. ConWX serves wind farm owners, power traders, and even other forecast companies, with data feeds from their high-resolution models. They emphasize intelligent forecasting systems and have a strong presence in European wind markets (Denmark, Germany, UK). ConWX often works on a subscription model per project or portfolio, known for flexibility in delivering data in client-specified formats.
- **AccuWeather (Enterprise):** AccuWeather offers an API and enterprise services worldwide. While not exclusively focused on wind energy, they do provide wind forecasts and severe weather warnings to energy clients. For example, some wind operators might use AccuWeather's premium forecasts or SkyGuard warnings for storm safety. Their pricing is typically via API key subscriptions (with call-volume bundles) or custom enterprise contracts.
- **OpenWeather / WeatherBit:** These are weather API providers with global data (including wind forecasts) that some smaller energy players use due to cost-effectiveness. They offer subscription APIs with fixed tiers (often priced by calls per day). While they lack energy-specific features like power output modeling or custom heights, they can be used to get general wind forecasts (e.g. 10m or 100m winds) in a budget-friendly way for less critical applications or early-stage analyses.
- **National Meteorological Services:** In the UK/EU, national met offices (like the UK Met Office, Germany's DWD, etc.) also provide commercial services. For instance, the Met Office has an **EnergyDesk** service offering tailored forecasts to energy companies. These are often subscription services and leverage the met offices' high-resolution models (UKV model, ICON, etc.). They can be very relevant for local accuracy and for compliance (some grid codes require use of official data).

Each of these players has its niche: EMS and ConWX are deeply entrenched in Europe's energy forecasting scene (often competing or partnering with the bigger names for utility contracts), while others like AccuWeather/OpenWeather serve as more general-purpose data sources or augmentations. The **UK/EU market** tends to use a mix – for national scale forecasts, grid operators might use multiple inputs (e.g. an EMS forecast and a Met Office forecast) to ensure robustness. For Cognizant WeatherIQ aiming to compete or partner in this space, awareness of these players' offerings and pricing is crucial, as some potential clients may already be using one or more of these services.

*Table 1. Comparative summary of the major commercial weather services for wind energy*

| Provider | Wind Forecasting Offerings | Pricing Model | Target Customers | Key Differentiators |
|---|---|---|---|---|
| **IBM / The Weather Company** | – 15-day hourly wind forecasts (10m–260m height) – Turbine-level forecasts; IoT sensor integration for power output predictions – Severe weather alerts and analytics dashboards (IBM EIS)– Global coverage via The Weather Company data | – Enterprise subscription (custom contracts)– Usage-based fees (API calls, data volume via *AppPoints*) – e.g. ~€555/month per 1M API calls (list price) – Typically annual licenses with SLAs (99.9% uptime) | – Utilities & grid operators (renewables integration)– Large wind farm operators and OEMs– Energy traders needing integrated solutions | – **Scale & data**: global data leader (The Weather Company) with huge data feeds– **AI & analytics**: advanced modeling (Watson AI, HyRef) for high accuracy – **Enterprise integration**: hooks into IoT, asset management, and IBM cloud tools– **Custom heights & variables**: forecasts at specific hub heights and rich parameters |
| **Tomorrow.io** | – Hyper-local weather forecasts (street-level) via API (60+ parameters) – **Wind power forecast model**: ML-driven, 0–48h ahead wind farm power predictions – Alerting platform: custom triggers for high wind, lightning, etc.– Web platform with maps, team collaboration (Resilience Dashboard) | – SaaS subscription for Platform (per users/sites) – API usage tiers (priced by call volume) – Free API tier (limited calls for testing) – Custom enterprise pricing (no one-size-fits-all) | – Wind farm operators (site ops & maintenance)– Utilities & ISOs (forecasting and alerts)– Energy traders (real-time forecasts for trading) | – **Modern platform**: user-friendly UI + robust API in one – **Proprietary data**: launching radar satellites, unique datasets for better accuracy– **Insight focus**: translates weather into actionable business impacts (curtailment, safety) – **Flexible plans**: from free tier to enterprise, easy to start small and scale up |
| **DTN (WeatherSentry)** | – **Hub-height wind forecasts** at turbine level (speeds, direction, gusts)– Storm tracking & lightning strike alerts (Wind Edition) – Daily load/production forecasts (Energy Edition for utilities)– Offshore forecasts (weather windows, wave conditions) | – Annual subscription licenses (per edition or package)– Priced by scope: number of sites or turbines, features included– Typical starting costs in few €k/year range for basic packages – Enterprise deals for large utilities (multi-year, custom) | – Wind farm owners (onshore/offshore) for ops– Electric utilities (load forecasting, outage prep)– Commodity traders (weather data feeds for power markets) | – **Industry expertise**: decades serving energy, with in-house met teams– **All-in-one alerts**: integrated lightning, storm, and wind threshold alerts – **Global models + local**: uses high-res models (via MeteoGroup) for Europe and beyond– **Meteorologist access**: option for consultative services and 24/7 support |

| Provider | Wind Forecasting Offerings | Pricing Model | Target Customers | Key Differentiators |
|---|---|---|---|---|
| **Meteomatics** | – **API-centric service**: 1-stop API for 1800+ weather parameters (global)– Wind **power forecast parameter** (input turbine specs, get power output) – Custom model training on client's data for site-specific forecasts – 15-minutely updates, 90 m resolution downscaling for hyperlocal detail | – Free basic API (500 queries/day, 15 params) for non-commercial use – Paid subscriptions: Monthly or yearly license (scaling by query count & data access)– Example: ~€780/month for full API access (unlimited parameters, high calls) – Enterprise custom deals for large volumes or on-premise | – Energy traders & analysts (need API data feeds)– Wind/Solar operators (who integrate forecasts into their own systems)– Utilities (for portfolio-wide renewable forecasting) | – **Developer-friendly**: simple API integration, multi-format output (CSV, JSON, etc.) – **High-res models**: e.g. EURO1k at 1 km for Europe, plus unique Meteodrone data ingestion– **Custom power forecasts**: individualized model tuning with client SCADA data for accuracy boost – **Fast innovation**: new models (5-min updates, dense parameter library) and quick support, favored by tech-savvy teams |
| **Climavision** | – **Horizon suite**: Point (site-specific forecasts/alerts), Global (full earth NWP), HI-RES (custom microscale model), S2S (sub-seasonal AI outlooks) – Private radar data integrated for superior short-term forecasting (esp. U.S.)– Parameters tuned for energy (e.g. 80m wind speed, wind gust, cloud cover for solar) – Long-lead forecasts for energy **trading and planning** (weeks to years) | – Enterprise SaaS (contact for quote)– Likely annual subscriptions tailored by module (Radar-as-a-Service, API data feed, S2S access, etc.) – No public tiered prices; flexible to client needs and scale– Focus on high-value custom solutions (premium pricing for unique data) | – Power utilities (grid mgmt, outage planning)– Energy traders & hedge funds (looking for weather edge)– Wind developers/operators wanting ultra-accurate local forecasts | – **Unique data sources**: owns high-res radar network for gap-filling – better storm/wind shear detection– **AI-driven**: employs ML (incl. generative AI) for improved medium and long-range forecasts – **Extended forecast horizon**: offers credible forecasts beyond 2 weeks, aiding strategic decisions– **Tailored services**: willing to run custom models and deliver very site-specific solutions for clients |
| **StormGeo** | – **Full-service forecasting** with 24/7 human meteorologists– 7-day detailed forecasts, 15-day probabilistic outlooks for weather windows – **Alerts & safety**: lightning proximity, high-wind warnings, storm briefings – Online dashboards + daily reports | – Contract-based subscription (premium service)– Annual fee per project or fleet, scaled by number of sites and support level– Higher cost tier (includes unlimited met consults, bespoke reporting)– Multi-year and enterprise agreements common for large clients | – Offshore wind farm operators (construction & O&M)– Onshore wind operators in severe climates– TSOs/utilities needing highly reliable forecasts (with human QA) | – **Expertise & support**: 24/7 access to live meteorologists – high trust and personalization – **Marine/offshore specialization**: integrates ocean and atmospheric forecasts, ideal for offshore wind– **Operational focus**: products delivered in decision-ready format (clear "go/no-go" guidance) – **Scale of operations**: supports thousands of sites, proven in major wind projects globally |

| Provider | Wind Forecasting Offerings | Pricing Model | Target Customers | Key Differentiators |
|---|---|---|---|---|
| **Vaisala (Xweather)** | – **Site-specific wind & solar power forecasts**, updated every 5 min, out to ~10 days – High accuracy metrics (MAE ~5% for hour-ahead) and probabilistic uncertainty info – Grid-wide wind generation forecasts (regional/national)– Integration-ready data for trading platforms (e.g. Yes Energy) and utility SCADA | – Subscription licensing (often per site or region)– Annual/multi-year contracts with utilities & operators– No public pricing; considered premium/bankable service– Often evaluated via pilot then long-term contract if accuracy meets needs | – Grid operators / utilities (renewable integration & scheduling)– Wind asset owners (maximize PPA and market bids)– Energy traders (day-ahead and intra-day market participants) | – **Heritage & trust**: ex-3TIER service with decades in renewable forecasting, widely bankable– **Accuracy and reliability**: strong track record in reducing forecast error, trusted for critical grid ops – **End-to-end solution**: also offers measurement hardware (lidars, sensors) and consulting, combining data + hardware insights– **Market integration**: forecasts accessible in popular energy market software, showing adaptability to user workflows |

**Sources:** The above analysis draws on official product documentation, support knowledge bases, and press releases for each provider. For example, IBM's renewable forecasting features (15-day turbine-height forecasts) are documented in IBM's service description. Tomorrow.io's pricing approach (platform vs API plans) is outlined in their support docs, and their wind power model launch details highlight its focus on 0–48h trading forecasts. DTN's wind energy services are described on their site, noting hub-height turbine forecasts and alerting capabilities. Meteomatics' energy API capabilities (including custom power forecasts and free tier limits) are taken from their official site. Climavision's offerings and emphasis on AI and radar come from their product pages. StormGeo's offshore wind support and scale (100+ farms, 2.7M forecasts/year) are from StormGeo's solution briefs. Vaisala's accuracy and update frequency claims are from Xweather (Vaisala) information highlighting 230-hour forecasts updated 5-minutely. These sources, listed below, provide direct evidence of each provider's capabilities and models, ensuring the information is up-to-date and credible:

- IBM Environmental Intelligence Suite – Service Description
- Tomorrow.io Support – Pricing Overview and product blog
- DTN Renewable Energy (WeatherSentry Wind Edition) – Product page
- Meteomatics Energy Forecasting – Product page and API documentation
- Climavision Renewable Energy Forecasting – Product page
- StormGeo Offshore Energy – Solution overview
- Vaisala Xweather Wind Forecasting – Service info

Each provider brings unique strengths – from IBM's analytic prowess to Meteomatics' API flexibility – and their cost structures reflect different value propositions. Wind farm operators in the UK/EU (like the Omar persona) should consider the granularity of forecasts needed, budget constraints, and whether they prefer an out-of-the-box platform vs. raw data integration when choosing among these services. The comparative table and analysis above should help in identifying which service aligns best with their operational and financial requirements.

## Company websites

1. IBM / The Weather Company – https://www.ibm.com/weather
2. Tomorrow.io – https://www.tomorrow.io
3. DTN – https://www.dtn.com
4. Meteomatics – https://www.meteomatics.com
5. Climavision – https://www.climavision.com
6. StormGeo (a DTN company) – https://www.stormgeo.com
7. Vaisala / Xweather – https://www.xweather.com