Wind resource variability creates financial risk. 3TIER provides quick and accurate answers so you can act with confidence across the development, financial, and operational spectrums.

**Project Feasibility**

**PROSPECTING & RESOURCE ASSESSMENT**

The "fuel" of a wind project is the most critical factor driving its commercial success or failure. Whether you are doing initial site prospecting or due diligence for financing, uncertainty about the available wind resource drives your decision process. 3TIER can help you mitigate the risk that resource uncertainty can bring to a project even at your most challenging sites at every step along the way.

**Energy Marketing**

**FORECASTING FOR POWER SCHEDULING & TRADING**

Efficient wind plant operations, energy integration, and power trading require quick decisions with substantial exposure to risk. These decisions impact production, operational costs, and ultimately project profitability. As one of the largest wind power forecasters in the world, 3TIER delivers the accuracy and context you need to manage risk and optimize operations at a single project or across an entire region.

**Asset Management**

**PERFORMANCE RECONCILIATION & DUE DILIGENCE**

3TIER helps developers, utilities, and financiers make informed decisions in a challenging energy market with fluctuating price and volumetric risk. Our project reforecasting services with advanced wind deviation analysis can help you get the most out of an operating project. When considering a purchase or sale of a wind project 3TIER can provide a truly independent third party review of its energy potential.
Wind Energy Project Feasibility
PROSPECTING & RESOURCE ASSESSMENT

Risk Mitigation Process
3TIER provides a full suite of services to help you manage the risk of wind resource variability.

### EARLY STAGE

**Prospecting**
Identify the best areas for closer evaluation quickly and inexpensively.

**Tools:**
- Long-term time series from multiple sources
- 5 km resolution maps and mean data
- GIS data layers
- API access

**Project Design**
Optimize your project design and objectively prioritize your portfolio.

**Tools:**
- High resolution wind maps
- Long-term hourly wind and power data
- Risk assessment based on initial project designs
- Independent recommendations for project design improvements

### LATE STAGE

**Financing**
Maximize certainty in your project’s long-term performance to secure financing.

**Tools:**
- Multi-staged observational due diligence
- Comprehensive loss analysis incorporating proprietary time-varying wake model
- Energy risk framework

**Post-Construction**
Optimize your project’s performance and make smarter acquisition decisions.

**Tools:**
- Integrate power production data into the analysis
- Long-term simulation of wind and power
- Reconcile recent performance against long-term climate

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**Quickly Explore Wind Resources Around the World**
Now you can avoid problem sites and separate successful projects from marginal ones earlier in the process. 3TIER offers a 5km wind prospecting tool that includes a download tool with several long term time series to choose from, direct to your computer within 24 hours.

**Maximize Accuracy With State-of-the-Art Science**
In a process unique in the industry, 3TIER uses on-site measurements to correct our long-term mesoscale model simulations of project climatology with advanced statistical techniques. We combine our advanced wind resource assessment methods with a holistic analysis of project risk. Time-varying wake losses, observational data integrity, high stability conditions, shear variability and more are assessed on a project specific basis through our energy risk framework. The result is significantly reduced uncertainty about future project performance and the bankable production estimates required to secure project financing.

**Experienced and Trusted**
3TIER is a trusted assessment partner for hundreds of developers, engineering firms and financiers, including many of the largest and most successful energy companies in the world. We have performed wind energy assessments on all 6 continents, many in challenging locations, and our experience includes over 30GW of proposed and operating wind projects.

Whether you are just getting started on developing a project or you are preparing to get financing, 3TIER can be your experienced energy assessment partner.
Wind Energy Marketing
FORECASTING FOR POWER SCHEDULING & TRADING

PRIMARY USES
» Make informed purchasing, energy trading, and marketing decisions
» Reduce imbalance penalties
» Maximize integration and reduce curtailments
» Manage long-term financial agreements
» Improve construction, energy, and maintenance scheduling

Why 3TIER?
Guaranteed Industry-Leading Accuracy
3TIER provides the most accurate wind energy forecast available. From an individual site to an entire region, 3TIER utilizes the latest forecast capabilities; weather and climate science, advanced statistical methods, real-time data integration, historical data mining, and an ensemble of weather forecast models provide an industry-leading energy forecast. Understanding uncertainty requires transparency. 3TIER provides real-time verification and a situational awareness tool to understand forecast performance over any time horizon.

Cutting-Edge Forecast Science
Science never stands still at 3TIER. Our approach combines state-of-the-art numerical weather prediction models with advanced non-linear statistical techniques that incorporate an ensemble of model and observational data. New and existing techniques are continuously under evaluation for inclusion and refinement to maintain and improve forecast quality.

Extensive Forecasting Experience
3TIER has over a decade of utility-scale wind energy forecast experience, including geographic experience that spans the globe. 3TIER has earned its reputation forecasting for merchant non-PPA wind projects which have the highest degree of financial exposure. 3TIER provides wind energy forecasts for over 46 GW of installed capacity worldwide.

Immediate Forecast Access
3TIER provides real-time direct API and online access to wind energy forecasts and histories. Use these tools to build seamless workflows that integrate 3TIER into your EMS, RMS, and other core systems. The online interface can be configured to provide access to the information necessary for the task at hand.

WIND ENERGY FORECAST SERVICES
Premium Wind Forecasting
3TIER can provide accurate wind energy forecasts updated at the frequency of your observations for any wind farm in the world. Industry-leading accuracy enables improved plant operations, maximized power production, improved energy marketing, reduced imbalance charges, and effective trading in intraday and day-ahead energy markets.

Regional Wind Forecasting
3TIER provides regional wind energy forecasts for major energy trading markets. For traders interested in a subset of the region, 3TIER provides the ability to drill-down to a specific country, group, or even an individual wind farm. The forecast and supporting tools are designed to provide energy traders, analysts, schedulers, and asset managers the critical information they need to reduce risk and make fast day-ahead and intraday trading decisions with confidence.

Situational Awareness
Quickly understand the spatial context and degree of certainty for a single site or entire regional wind energy forecast. Within an innovative map interface, view hub-height wind forecasts from all of the major global weather models for any location on earth. Compare how models have changed over time, compare them to each other, to quickly assess your degree of confidence in the forecast.
Primary Uses

» Structure long-term energy agreements, trades, and hedges
» Perform financial and portfolio analysis
» Reconcile energy performance and deviation
» Optimize and integrate assets
» Plan for climate anomalies

Project Forensic Studies
Recognizing and resolving underperformance issues as early as possible helps maximize energy production, optimize operations, and proactively restructure financial obligations. When performance guarantees are not being met, 3TIER can perform a full forensic evaluation of the project. Our unique methodologies provide an independent answer from pre-construction estimates. 3TIER can isolate issues related to wind variability from equipment performance so you can identify the systemic causes of underperformance.

Performance Reconciliation
Put recent and future wind performance in context by reconciling expected energy production with actual production, helping you spot problems early on. This helps you understand the risks and implications of resource variability at potential and existing projects across your portfolio. 3TIER uses mesoscale models and the best available observations to model weather patterns and climate anomalies that impact wind energy output to deliver timely information.

Performance Reconciliation
When thinking about purchasing or selling a project, it is good to get a second opinion on its potential energy production. Our unique methodologies provide an independent answer from industry standard pre-construction estimates. Using onsite wind speed or power observations, 3TIER can quickly give you the long term context you need to make a good investment.