



Developing Probabilistic Renewable Generation Forecasts for IPPs

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Amperon

Cutting-edge AI unlocks Amperon's industry-leading accuracy, mitigating operational risk and enabling customers to improve grid reliability, manage financial risk, optimize renewables, and accelerate the energy transition.

Forecasting and Analytics

Grid Forecasts



Grid Demand Short-Term Forecast



Grid Renewables & Net Demand Short-Term Forecast



Grid Demand Mid-Term Forecast



Day-Ahead and Real-Time LMP forecasts

Meter & Portfolio Demand



Meter & Portfolio Demand Short-Term Forecast



Meter & Portfolio Demand Long-Term Forecast



Meter & Portfolio Demand Mid-Term Forecast

Asset Renewable Generation



Asset Solar Short-Term Forecasts



Asset Wind Short-Term Forecasts

Why Amperon?

Industry-leading Accuracy

- Custom-weighted weather data from leading vendors
- Decades of power markets, renewables, and forecasting experience baked into next-gen AI models

Premium Customer Service

- Proactive engagement and quick response times from a dedicated account team
- Custom forecasts deployed in weeks, not months

Customer-Focused Innovation

- Deep relationships with customers enable innovative, relevant new products that address operational needs across the energy sector

Enterprise-Ready

- Grid forecasts in NA and Europe; meters and assets worldwide
- State-of-the-art visualization platform and API
- Strategic partnerships with Microsoft and Snowflake
- SOC-2 compliant



Why Probabilistic Forecasts Matter to IPPs



IPPs increasingly need to quantify:

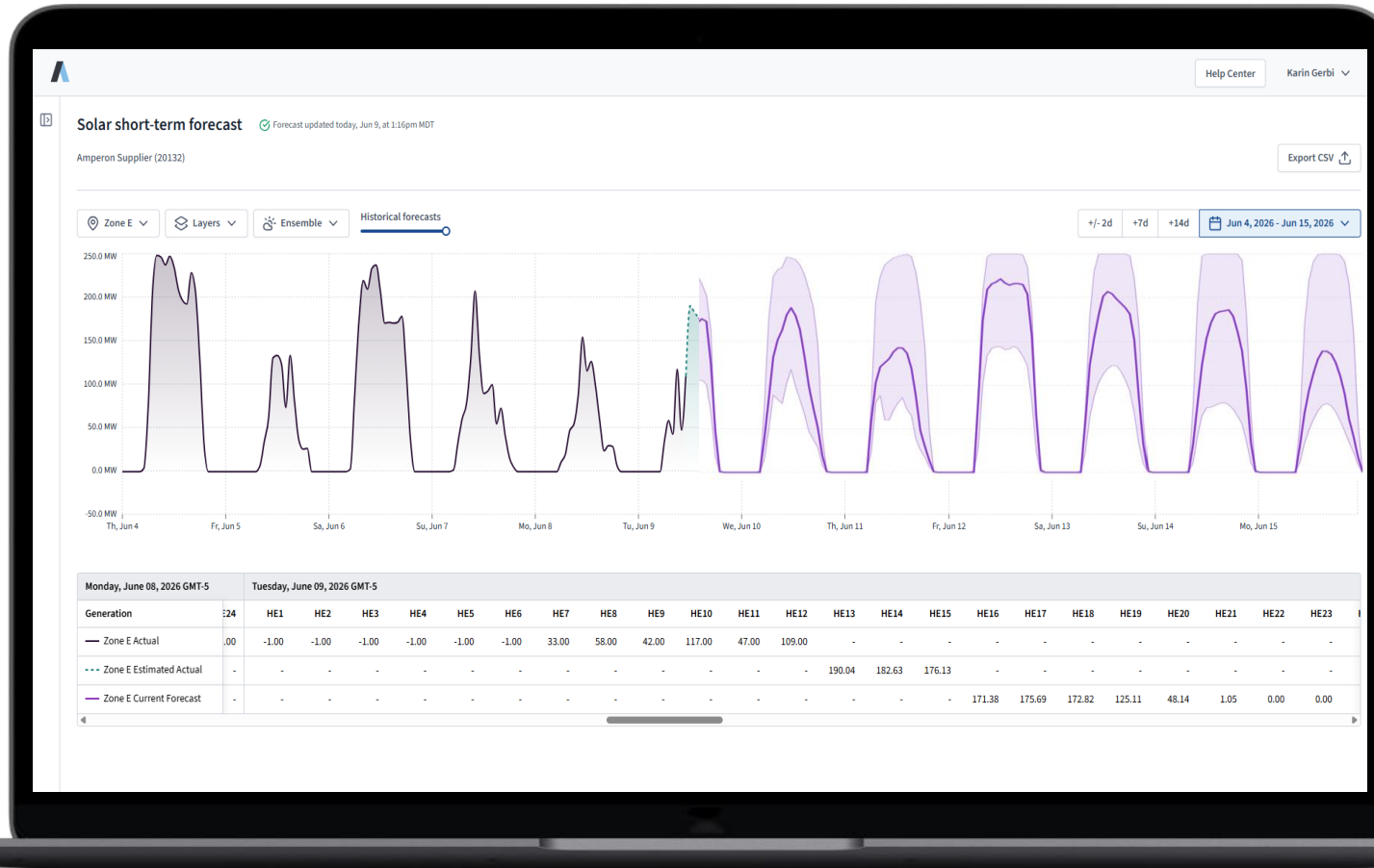
Imbalance exposure

Congestion risk

Curtailment probability

Battery dispatch uncertainty

Revenue volatility

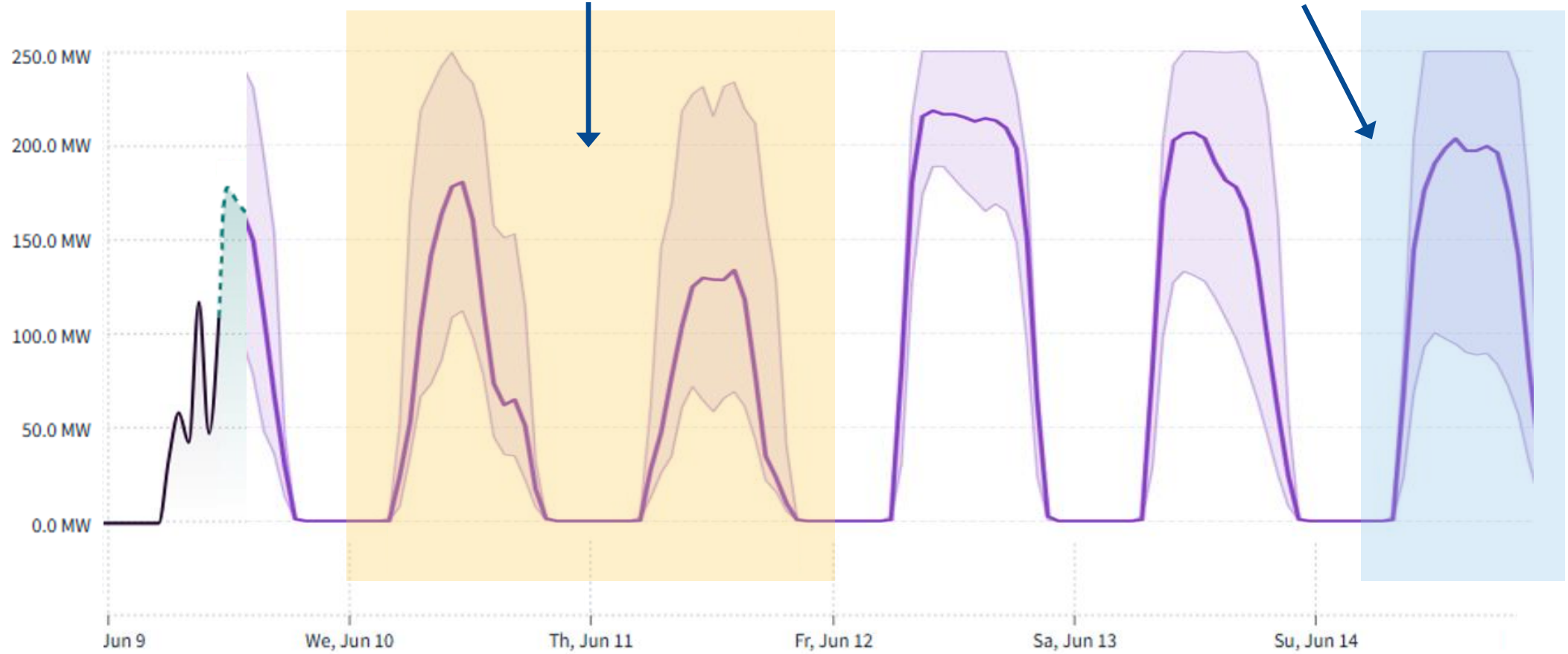




Sources of Uncertainty in Asset-Level Renewable Forecasting

The range of plausible generation outcomes widens during extreme weather

Similar forecast values, very different uncertainty





Amperon's Probabilistic Forecasts for Asset Generation

Probabilistic forecasts deliver a full distribution of outcomes – not just a point estimate – enabling smarter risk management and trading for asset managers who want to see the full picture.

How do we forecast uncertainty?

Uncertainty is learned directly from historical weather forecast errors and generation variability, capturing the true drivers of forecast risk.

- Horizon-aware modeling
- Curtailment-aware uncertainty quantification
- Calibration of new assets

Amperon's Probabilistic Forecasts are optimized for three metrics

Coverage Error

Low coverage error, or high reliability, indicates that each percentile function splits the set accurately.

Quantile Loss

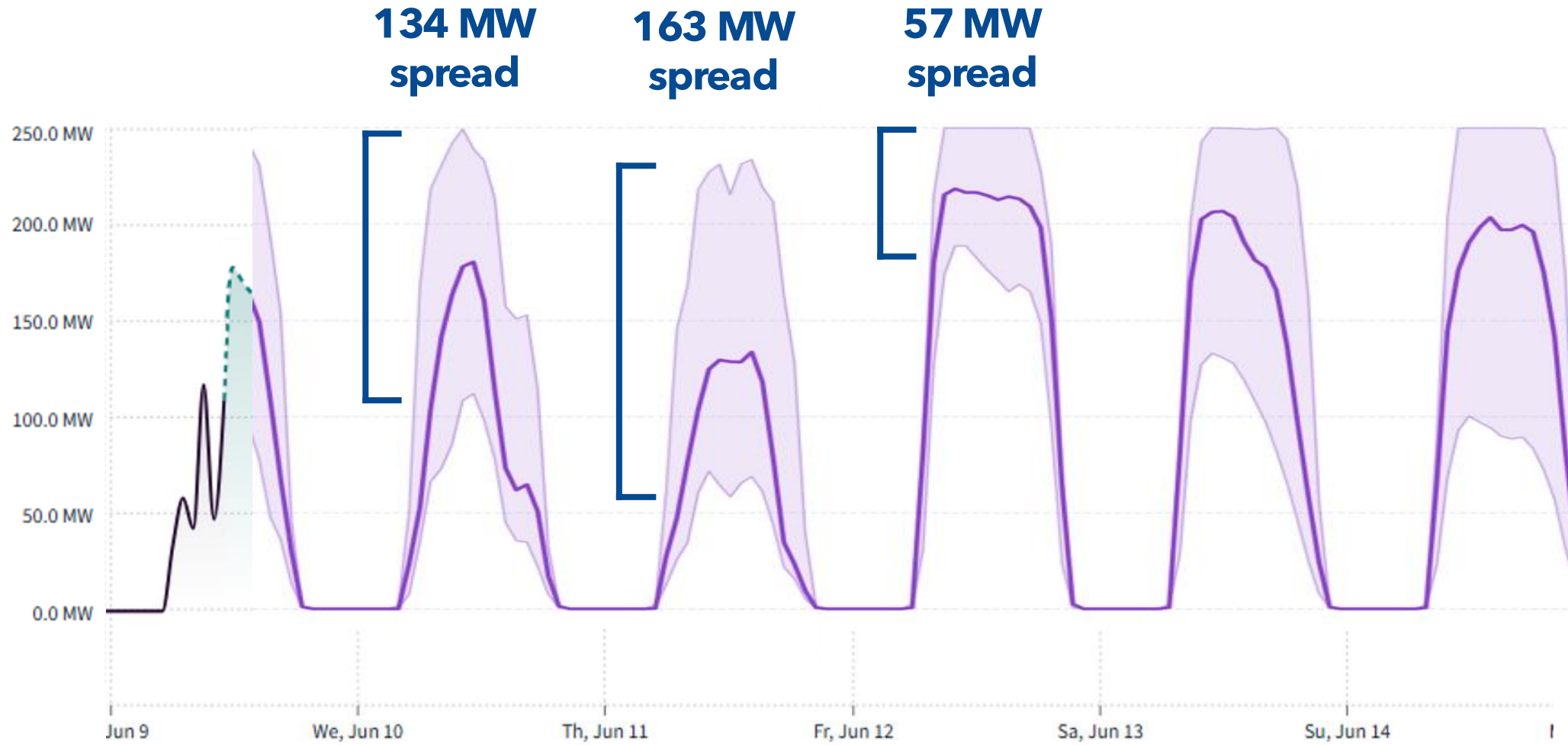
A low quantile loss, also known as pinball loss, indicates that each quantile closely matches actual generation.

Continuous Ranked Probability Score (CRPS)

A low CRPS, analogous to a low MAE, indicates that the entire set of forecasts is precise and reliable.

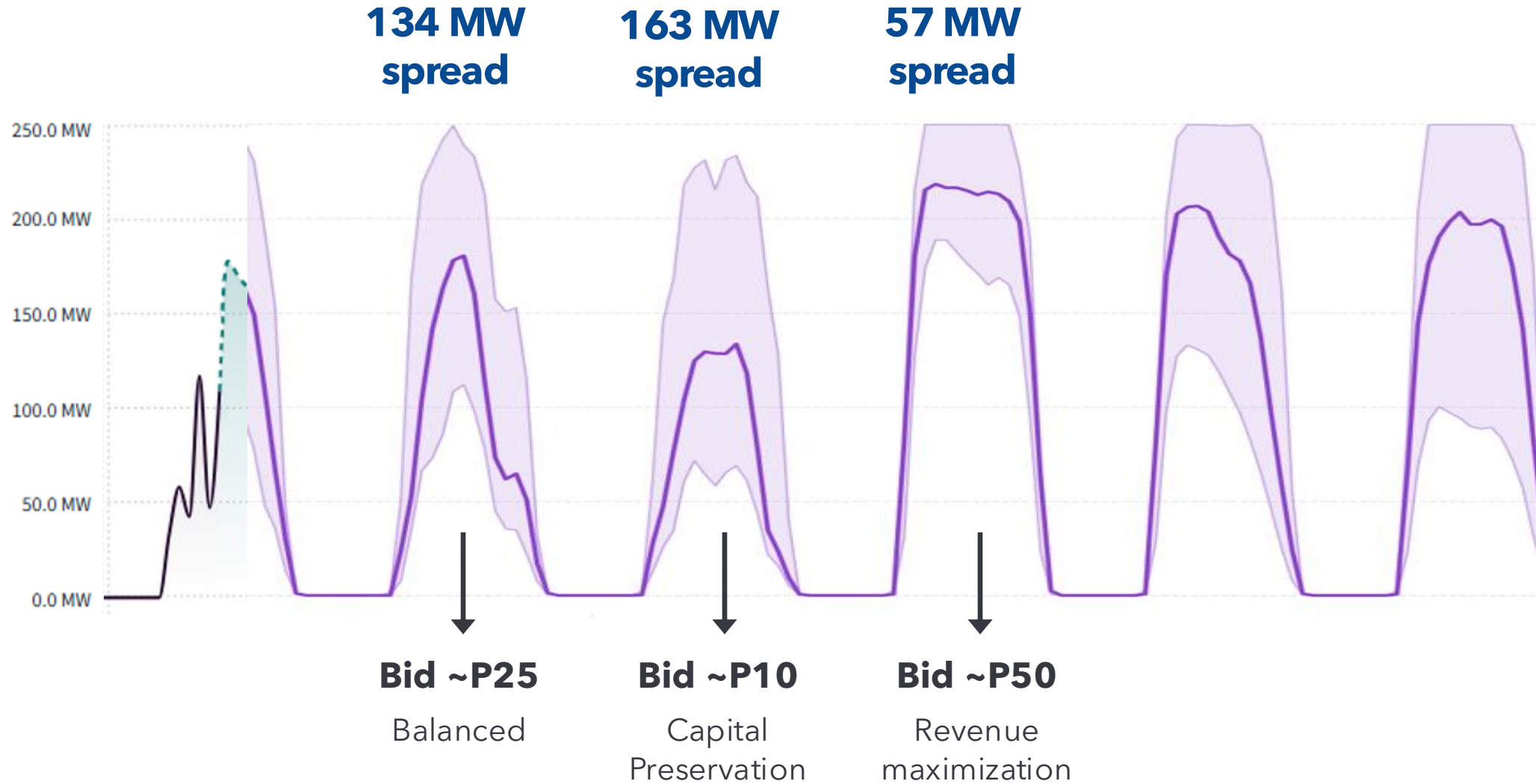


Forecast Uncertainty Drives Risk-Adjusted Bidding





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Regional Operational Differences for IPPs

What drives decision making?

United States

Optimize market participation under price uncertainty

- Market volatility
- Congestion and nodal basis risk
- Day-ahead bidding strategy
- Intraday position management

Europe

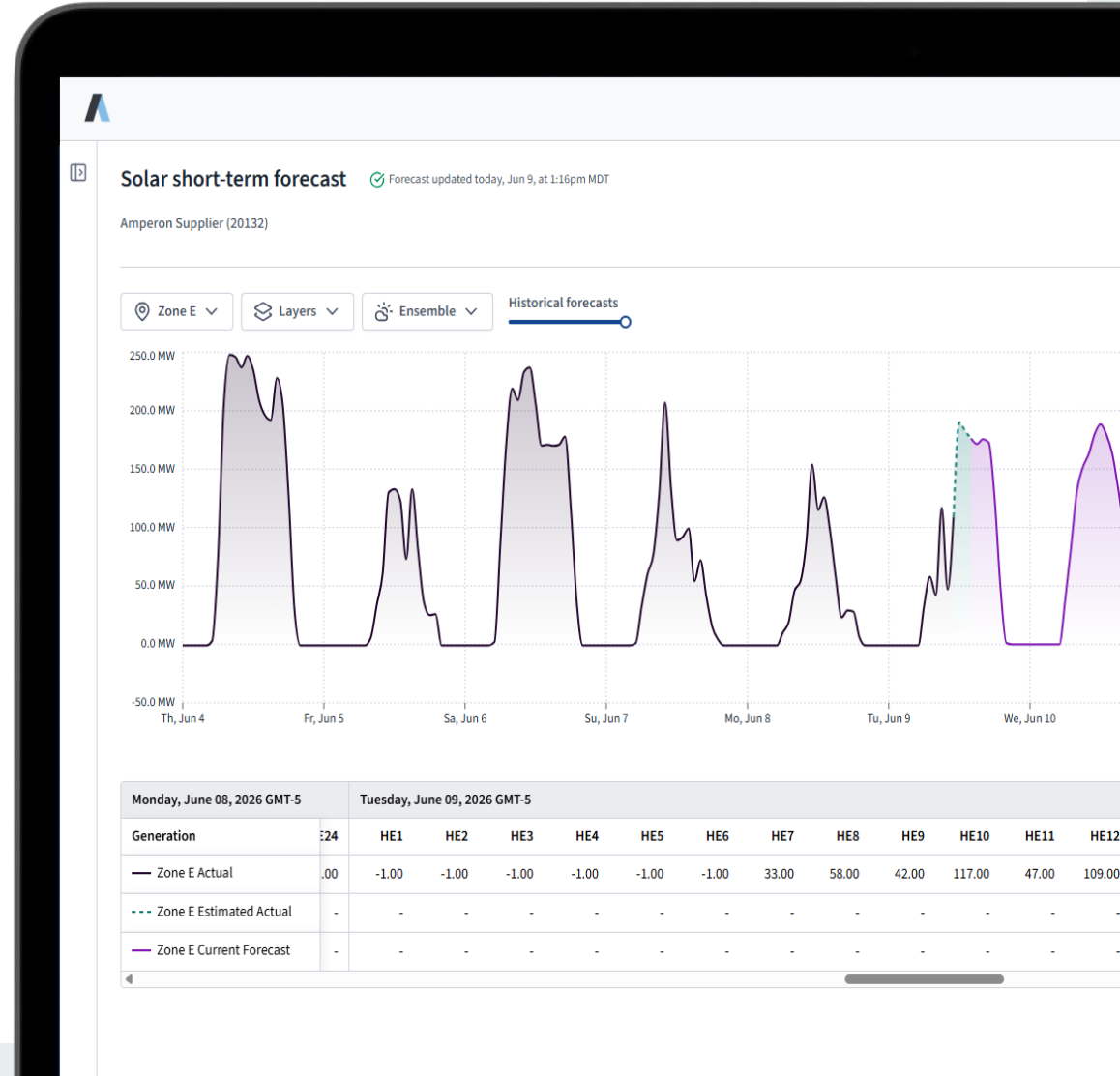
Manage imbalance exposure and curtailment risk

- Curtailment & negative pricing
- Imbalance fees
- Intraday market optimization

Latin America

Operate around infrastructure and grid constraints

- Reliability & infrastructure variability
- Curtailment
- Merchant revenue uncertainty





Thank You

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