



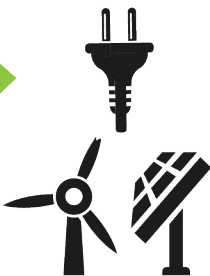
The Ascend Analytics Product Suite integrates physical and financial resources to optimize decisions

Renewable integration creates opportunity for better models, and better decisions

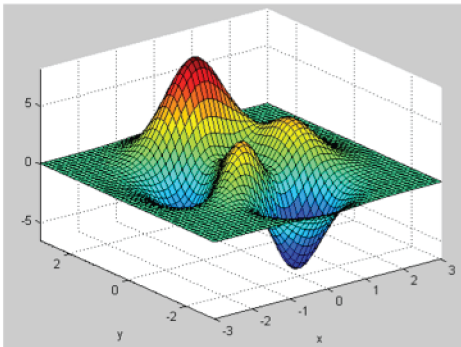
Weather-induced volatility...



Impacts load and variable generation resources...



Creating new opportunities for generation



Ascend's software finds optimal solutions

Distinguishing the Ascend Analytics Software Suite from the Competition

Capability	Competitors	Ascend
Integrate weather to drive load, renewables & market price	X	✓
Match hourly & sub-hourly price vols and spreads	X	✓
Incorporate imperfect foresight (i.e., forecast error)	X	✓
Project stochastic sub-hourly prices and RE gen	X	✓
Simulate full transmission & generation outages	✓ —	✓
Continuously optimize battery bid strategy	X	✓
Quantify position and financial risk	X	✓
Report aggregated / disaggregated stochastics	X	✓
Perform capacity expansion plans	✓ —	✓
Select the best plan integrating all conditions	X	✓



Learn more:  
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Advanced Software & Services for Capturing the Dynamics of Today's Energy Markets



Integrating Physical & Financial Resources



## The Ascend Analytics Product Suite captures the *new dynamics* of electricity markets:

- Weather is a fundamental driver
- Stochastic simulation engine
- Hourly & sub-hourly price forecasting
- Best resource plan over all conditions
- Risk based portfolio management
- AI-based bid strategy

## Software products for a competitive edge:

- **PowerSIMM™** optimizes operational & planning needs for any time frame
- **BatterySIMM™** maximizes storage investment & operational efficiency
- **CurveDeveloper™** provides short & long term market forecasts

### SHORT TERM

1 hour to 1 week

#### PowerSIMM™ Ops

Balance Generation & Bid Optimization

- Continuously optimize profit maximizing strategies for generation and load
- Optimize ISO bidding for day-ahead and real-time markets
- Integrate predictive analytics with optimization
- Manage forecast error, market exposure, and gas nominations
- Determine short-term trade strategies and track profitability

### INTERMEDIATE TERM

1 month to 5 years

#### PowerSIMM™ Portfolio Manager

Portfolio Management & Risk Analysis

- Optimize portfolio and hedge strategies
- Assess position and gross margin risk to variability in prices, load, gen, and weather
- Conduct full risk reporting: including CFaR, VaR, MtM, P&L
- Manage physical and financials of wholesale and retail portfolios
- Determine market transactions, valuations and retail pricing

### LONG TERM

5 to 30+ years

#### PowerSIMM™ Planner

Resource Planning & Capacity Expansion

- Optimize capacity expansion planning and resource selection
- Evaluate reliability of renewables and storage
- Incorporate “meaningful uncertainty” with stochastics
- Value sub-hourly dynamics of battery storage, non-wires alternatives and EV planning
- Fundamental modeling of transmission, demand and supply

### SHORT TERM

5 minutes to 5 days

#### BatterySIMM™ SmartBidder

Energy Storage & Renewable Operations

- Maximize profit with strategic operations and bidding
- Create and track multiple strategies based on risk and return
- Continuously optimize storage bids to ISO
- Integrate predictive analytics with storage optimization
- Forecast hourly and sub-hourly price spikes and negative prices

### LONG TERM

1 month to 20 years

#### BatterySIMM™ Val

Energy Storage Valuation

- Optimize revenue given both physical characteristics and ISO market rules
- Conduct full financial evaluation to market prices
- Co-optimize revenue of renewables + storage
- Determine optimal siting and sizing
- Capture realistic revenues with imperfect foresight

### MARKET / FORECAST

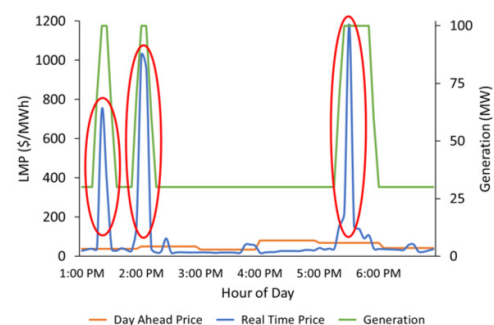
5 minutes to 30 years

#### CurveDeveloper™

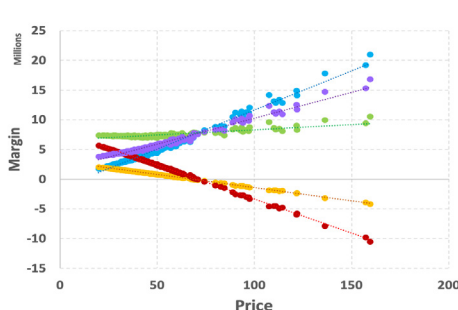
Price Curve Generation

- Complete set of forward curves, day-ahead, and real-time prices, and system fundamentals
- User-defined rules for curve generation
- Forecast forwards for 30 years
- Forecast volatility, correlations, hourly, and sub-hourly prices
- Verify curves against multiple broker sources

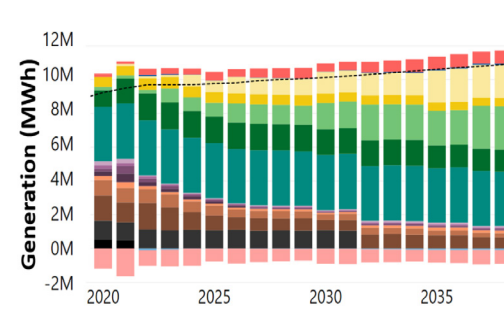
### Predict & Optimize Generation



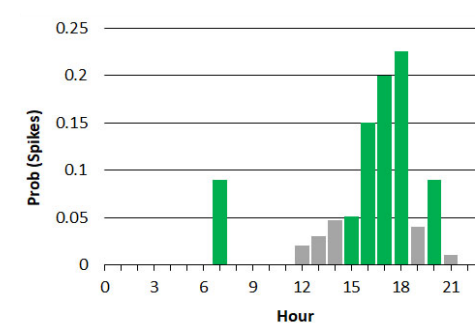
### Evaluate Risk & Return



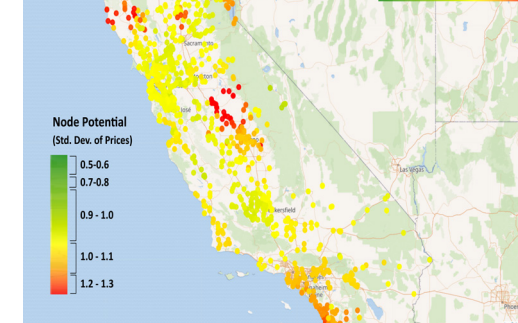
### Select Optimal Resource Plan



### Predicts Price Spikes for ISO Bids



### Capture Congestion Persistence



### Market Forwards & Forecasts

